Nouryon Functional Chemicals, LLC
Axis, Alabama
EPA I.D. Number ALD 008 161 176

FACT SHEET

A draft renewal of the Alabama Hazardous Waste Management and Minimization Act (AHWMMA) permit has been prepared for the Nouryon Functional Chemicals, LLC (Nouryon) facility. This hazardous waste facility is located in Axis, Alabama. This fact sheet has been prepared to briefly advise the public of the principal permitting, legal and policy issues of the draft permit.

I. PERMIT PROCESS

The purpose of the permitting process is to allow the State and the public to evaluate Nouryon's ability to comply with the hazardous waste management requirements of the AHWMMA, as amended. Nouryon must comply with hazardous waste management conditions set forth in the permit during the effective period of the permit, which is ten (10) years from the last permit renewal.

II. PROCEDURES FOR REACHING A FINAL DECISION

The Alabama Department of Environmental Management (ADEM or Department) is proposing to issue Nouryon a permit renewal for post-closure care for the New Brine Mud Pond which has been closed as a single landfill unit with wastes and/or contaminated soils remaining in-place.

ADEM Admin. Code r. 335-14-8-.08(6)(b)1. requires that the public be given at least a 45-day comment period for each draft permit. The comment period will begin on September 17, 2025, which is the date of publication of the public notice in major local newspaper(s) of general circulation, and will end on November 3, 2025. The public notice will also be broadcast over local radio station(s).

Any person interested in commenting on the application or draft permit must do so within the 45-day comment period discussed above.

All persons wishing to comment on any of the permit conditions or the permit application should submit their comments in writing to the Alabama Department of Environmental Management, Permits and Services Division, 1400 Coliseum Blvd. (zip 36110-2059), P.O. Box 301463 (zip 36130-1463) Montgomery, Alabama, ATTENTION: Mr. Russell A. Kelly.

ADEM will consider all written comments received during the comment period while making a permit decision for this facility. When the Department makes its final permit decision, notice will be given to the applicant and each person who has submitted written comments or requested notice of the final permit decision.

III. FACILITY DESCRIPTION

Nouryon has applied for a permit renewal under the requirements of AHWMMA for post-closure care including corrective action for groundwater contamination. Nouryon is a facility that was previously owned by Stauffer Chemical Company (Stauffer) which operated the chemical manufacturing plant (LeMoyne Plant) from 1953 until 1987. In 1987, Akzo Chemie America, Inc. (Akzo), which later became Akzo Nobel Chemicals (Akzo Nobel) in 1994, purchased the property and continued to operate as a multi-product chemical manufacturing plant. In 2018, Akzo Nobel spun off their specialty chemicals business, which became Nouryon. The facility began operations in 1953 with a retort Carbon Disulfide Plant (CS2) followed by a reactor CS2 process in 1956. Several other

production facilities were subsequently added, including a Sulfuric Acid Plant (on line in 1957), a Carbon Tetrachloride Plant (1964), a Caustic/Chlorine plant (1964, also referred to as a chloro/alkali plant), a Crystex® (a proprietary sulfur compound) Plant (1974), and Metam Sodium (1984). Akzo Chemie America (now Akzo Nobel Functional Chemicals LLC) acquired the LeMoyne Plant in 1987. Since that time, the caustic/chlorine and carbon tetrachloride manufacturing processes have been discontinued (1991 and 1992, respectively) and the Monochloroacetic Acid Unit has been brought on-line (1994). Sodium Hydrosulfide (NaSH) production was added in 2002. The New Brine Mud Pond, which is now closed, contained waste material from the electrolytic production of chlorine and caustic. The New Brine Mud Pond was closed in place in 1992 in accordance with an approved closure plan. The hazardous waste which was managed in the New Brine Mud Pond was K071 (Brine purification muds from the mercury cell process in chlorine production). The New Brine Mud Pond has an approved cap and cover installed over the remaining waste. These actions are intended to mitigate the potential for future groundwater contamination. The proposed permit will contain provisions for post-closure care and groundwater monitoring for the New Brine Mud Pond.

Additional provisions have been included in the permit as a result of the changes made to AHWMMA to incorporate the requirements of the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA. These requirements are included in accordance with ADEM Admin. Code r. 335-14-5-.06(12), which addresses corrective action for Solid Waste Management Units (SWMUs). This rule requires a RCRA Facility Assessment (RFA) of all SWMUs to be conducted at the facility. The RFA for Nouryon has been completed and SWMUs have been identified. Some SWMUs are recommended for further sampling and corrective action if necessary.

IV. TECHNICAL CONTACT

Charmaine Roche
Engineering Services Section
Industrial Hazardous Waste Branch, Land Division
Alabama Department of Environmental Management
1400 Coliseum Blvd (zip 36110-2059)
P.O. Box 301463 (zip 36130-1463)
Montgomery, Alabama
334-271-7763

ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
HAZARDOUS WASTE PERMIT

Permittee:

Permit Number: ALD 008 161 176
Identification Number: ALD 008 161 176

OWNER:
Nouryon Functional Chemicals, LLC
525 West Van Buren Street
Chicago, Illinois 60607-3823
Cook County

OPERATOR:
Nouryon Functional Chemicals, LLC
13340 Hwy 43 North
Axis, Alabama 36505
Mobile County

Pursuant to the Alabama Hazardous Wastes Management and Minimization Act (AHWMMA), Code of Alabama 1975, Section 22-30-1, et. seq., as amended, and attendant regulations promulgated thereunder by the Alabama Department of Environmental Management (ADEM or the Department), a permit is issued to Nouryon Functional Chemicals, LLC for the facility located in Axis, Alabama, at latitude N 30° 58′ 17″ and longitude W 88° 01' 30".

The Permittee must comply with all terms and conditions of this permit, which consists of the conditions set forth herein (including those in any attachments), and the regulations applicable to the Permittee's facility contained in Chapters 335-14-1, 335-14-2, 335-14-5, 335-14-8, and 335-14-9 of the ADEM Administrative Code of Regulations (hereinafter referred to as the "ADEM Admin. Code r."). Applicable regulations are those which are in effect on the date of issuance of this permit.

This permit is based on the assumption that the information submitted in the permit application attached to the Permittee's letter dated February 29, 2024, as modified by subsequent amendments dated October 23, 2024 and June 17, 2025 (hereby incorporated by reference and hereafter referred to as the Application) is accurate and that the facility will be constructed and operated as specified in the Application. Any inaccuracies found in this information could lead to the termination or modification of this permit in accordance with ADEM Admin. Code r. 335-14-8-.04(2), 335-14-8-.04(3), and 335-14-8-.04(4) and could lead to potential enforcement action. The Permittee must inform ADEM of any deviation from or changes in the information provided in the Application that would affect the Permittee's ability to comply with the applicable regulations or permit conditions.

This permit is effective as of November XX, 2025, and shall remain in effect until November XX, 2035 unless revoked and reissued, or terminated under ADEM Admin. Code r. 335-14-8-.04(2) and 335-14-8-.04(4) or continued in accordance with ADEM Admin. Code r. 335-14-8-.05(2).

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Alabama Department of Environmental Management

Date Signed

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Documents Incorporated By Reference:

Part A and Part B Permit Application submitted on February 29, 2024, as modified by subsequent amendments dated October 23, 2024 and June 17, 2025.

Corrective Measures Implementation Plan for AOC M submitted on November 24, 2004.

Corrective Measures Implementation Plan for AOC A and SWMU 20 submitted on June 23, 2006.

Corrective Measures Implementation Plan for AOC A submitted on October 3, 2017, as modified by subsequent amendments dated November 17, 2017, January 10, 2018, April 18, 2018 and February 29, 2024.

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PART I

STANDARD AND GENERAL FACILITY CONDITIONS

I.A. EFFECT OF PERMIT

Issuance of this permit does not authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local law or regulations. Compliance with the terms of this permit does not constitute a defense to any action brought under the AHWMMA, or any other law governing the protection of public health or the environment, for any imminent and substantial endangerment to human health, welfare, or the environment. (ADEM Admin. Code Rule 335-14-8-.01(4)).

I.B. SEVERABILITY

The provisions of this permit are severable and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

I.C. DUTIES AND REQUIREMENTS

1. Duty to Comply

   The Permittee shall comply with all conditions of this permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit. Any permit noncompliance, other than noncompliance authorized by an emergency permit, constitutes a violation of the AHWMMA, and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or denial of a permit renewal application.

2. Duty to Reapply

   a. If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit.

   b. The Permittee must apply for a new permit for both post-closure and Solid Waste Management Unit (SWMU) corrective measures at least 180 calendar days before the expiration of this permit. The Permittee must reapply in order to fulfill the 30-year post-closure care period required by ADEM Admin. Code r. 335-14-5-.07(8)(a)1. The Department may shorten or extend the post-closure care period applicable to the hazardous waste facility in accordance with ADEM Admin. Code r. 335-14-5-.07(8)(a)2. and 335-14-8-.03(1)(b).

3. Need to Halt or Reduce Activity Not a Defense

   It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

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4. Duty to Mitigate

In the event of noncompliance with this permit, the Permittee shall take all reasonable steps to minimize releases to the environment and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment.

5. Proper Operation and Maintenance

The Permittee shall, at all times, properly operate and maintain all facilities and systems of treatment, monitoring, and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance (O&M) include effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.

6. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause as specified in ADEM Admin. Code r. 335-14-8-.04(2), 335-14-8-.04(3), and 335-14-8-.04(4). The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay any permit condition.

7. Property Rights

Issuance of this permit does not convey any property rights of any sort, nor any exclusive privilege.

8. Duty to Provide Information

The Permittee shall furnish to the Department, within a reasonable time as determined by the Department, any relevant information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The Permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

9. Inspection and Entry

The Permittee shall allow duly designated officers and employees of the Department or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

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c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

d. Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the AHWMMA, any substances or parameters at any location. The Permittee shall have the opportunity to split samples during sampling.

10. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste to be analyzed must be the appropriate method from ADEM Admin. Code r. 335-14-2-Appendix I or the methods specified in Section 2 and Appendix B of the permit application. Laboratory methods must be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846 (latest edition), Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020), Standard Methods for the Examination of Water and Wastewater (latest edition), the methods specified in Section 2 and Appendix B of the permit application, or an alternative method approved by ADEM. [ADEM Admin. Code r. 335-14-8-.03(1)(j)1.]

b. The Permittee shall maintain at the facility records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, the certification required by ADEM Admin. Code r. 335-14-5-.05(4)(b)9., records of all data used to prepare documents required by this permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the certification, application, sample, measurement, report or record, or until corrective action is completed, whichever date is later. This period may be extended by the Department at any time and is automatically extended during the course of any unresolved enforcement action regarding this facility. [ADEM Admin. Code r. 335-14-5-.05(5)(b) and 335-14-8-.03(1)(j)2.]

c. The Permittee shall maintain, at the facility, records of all groundwater monitoring wells, piezometers, and associated groundwater surface elevations throughout the post-closure care period. These records shall include the surveyed location, surveyed elevation, surveyed elevation reference point, total depth, screened interval, construction details, well log, and all other pertinent information for each well and piezometer.

d. Records for monitoring information shall include:

i. The date(s), exact place, and times of sampling or measurements;

ii. The names of individual(s) who performed the sampling or measurements;

iii. The date(s) analyses were performed;

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iv. The names of individual(s) who performed the analyses;

v. The analytical techniques or methods used; and,

vi. The results of such analyses.

e. The following documents and information shall be maintained throughout the post-closure care period at the Facility.

i. Complete copy of this permit and the permit application.

ii. Operating record as required by ADEM Admin. Code r. 335-14-5-.05(4) and this permit.

iii. Copies of all plans, reports, inspection schedules, and inspection logs as required by ADEM Admin. Code Chapter 335-14-5 and this permit.

11. Signatory Requirements

All applications, reports or information required by this permit and submitted to the Department shall be signed and certified in accordance with ADEM Admin. Code r. 335-14-8-.02(2) and 335-14-8-.03(1)(k).

12. Reporting Requirements

a. Planned Changes

The Permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility and any solid waste management units identified under Part IV of this permit.

b. Anticipated Noncompliance

The Permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

c. Transfer of Permits

This permit may be transferred to a new owner or operator only if it is modified or revoked and reissued pursuant to ADEM Admin. Code r. 335-14-8-.04(1) or 335-14-8-.04(3)(a)1.(vii). Before transferring ownership or operation of the facility during its post-closure period, the Permittee shall notify the new owner or operator, in writing, of the requirements of ADEM Admin. Code Chapters 335-14-5 and 335-14-8 and this permit.

d. Monitoring Reports

Monitoring results shall be reported at the intervals specified elsewhere in this permit.

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e. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted to the Department no later than 14 calendar days following each schedule date.

f. Twenty-Four Hour Reporting

i. The Permittee shall report to the Department any noncompliance with this permit that may endanger human health or the environment. Any such information shall be reported orally within 24 hours from the time the Permittee becomes aware of the circumstances. This report shall include, but is not limited to, the following:

(I) Information concerning the release of any hazardous waste which may endanger public drinking water supplies; and,

(II) Information concerning the release or discharge of any hazardous waste, or hazardous waste constituents, or of a fire or explosion at the facility, which could threaten the environment or human health outside the facility.

ii. The description of the occurrence and its cause shall include:

(I) Name, address, and telephone number of the owner or operator;

(II) Name, address, telephone number, and EPA Identification Number of the facility;

(III) Date, time, and type of incident;

(IV) Name and quantity of material(s) involved;

(V) The extent of injuries, if any;

(VI) An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and,

(VII) Estimated quantity and disposition of recovered material that resulted from the accident.

iii. A written submission shall also be provided within 5 calendar days of the time that the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the periods of noncompliance (including exact dates and times); whether the noncompliance has been corrected, and if not, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

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g. Other Noncompliance

The Permittee shall report to the Department all instances of noncompliance not otherwise required by Permit Conditions I.C.12.d., I.C.12.e., or I.C.12.f. at the time any other reports required by this permit are submitted. The reports shall contain the information required by Permit Condition I.C.12.f.

h. Other Information

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information. In addition, upon request, the Permittee shall furnish to the Department any information related to compliance with this permit.

13. Certification of Construction

The Permittee may not commence treatment, storage or disposal of hazardous waste or contaminated media at any new or modified portion of the facility until the Permittee has submitted to the Department, by certified mail or hand-delivery, a letter (together with the certification by the Construction Quality Assurance (CQA) officer required by ADEM Admin. Code r. 335-14-5-.02(10)(d) and any other certifications required by this permit or ADEM Admin. Code Division 335-14 signed by the Permittee and an Alabama-registered professional engineer, stating that the facility has been constructed or modified in compliance with this permit where appropriate; and,

a. The Department has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of this permit; [ADEM Admin. Code r. 335-14-8-.03(1)(l)(2)(ii)(I).] or

b. The Department has either waived the inspection or has not notified the Permittee, within 15 calendar days of the notification from the Permittee, of its intent to inspect. [ADEM Admin. Code r. 335-14-8-.03(1)(l)(2)(ii)(II).]

14. The Permittee shall assure that all measures necessary to maintain and/or achieve compliance with all applicable requirements of ADEM Admin. Code Division 335-14 are taken during the active life of the facility and throughout the post-closure care period, corrective action period, and the term of this permit.

15. If circumstances beyond the Permittee's control arise to prevent achievement of any deadline set forth by this permit, the Permittee may immediately, upon the occurrence thereof, request an extension by sending a written request to the Department explaining the need for the extension. The Department may, after consideration of the circumstances, grant the extension. Requests for extensions may require a permit modification pursuant to ADEM Admin. Code r. 335-14-8-.04(2) or (3).

I.D. DEFINITIONS

For the purposes of this permit, terms used herein shall have the same meaning as those in ADEM Admin. Code Chapters 335-14-1, 335-14-2, 335-14-5, and 335-14-8, unless this permit specifically

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provides otherwise. Where terms are not defined in the regulations or this permit, a standard dictionary reference or the generally accepted scientific or industrial meaning of the term shall define the meaning associated with such terms.

"Area of concern" (AOC), for the purposes of this permit, includes any area having a probable release of a hazardous waste or hazardous constituent which is not from a solid waste management unit and is determined by the Department to pose a current or potential threat to human health or the environment. Such areas of concern may require investigations and remedial action as required under Section 3005(c)(3) of the Resource Conservation and Recovery Act and ADEM Admin. Code r. 335-14-8-.03(3)(b)2. to ensure adequate protection of human health and the environment.

"Contamination," for the purposes of this permit, refers to the presence of any hazardous constituent in a concentration that exceeds the naturally occurring concentration of that constituent in the immediate vicinity of the facility (*i.e.*, areas not affected by the facility).

"Corrective action", for the purposes of this permit, is the sum of all corrective measures necessary to protect human health and the environment for all releases of hazardous constituents from any SWMU at the facility, regardless of the time at which waste was placed in the unit, as required by ADEM Admin. Code Rules 335-14-5-.06(11) and/or 335-14-5-.06(12). Corrective measures may address releases to air, soils, surface water, or groundwater.

"Corrective measures", for the purposes of this permit, include all individual measures taken and/or necessary to remedy releases and to protect human health and the environment for all releases of hazardous waste or hazardous constituents from any SWMU at the facility, regardless of the time at which waste was placed in the unit, as required under ADEM Admin. Code Rule 335-14-5-.06(12). Corrective measures may address releases to air, soils, surface water, or groundwater. The sum of all individual corrective measures is known as corrective action.

"Extent of contamination," for the purposes of this permit, is defined as the horizontal and vertical areas in which the concentrations of hazardous constituents in the environmental media being investigated are above detection limits or background concentrations indicative of the region, whichever is appropriate as determined by the Department.

"Groundwater Protection Standard", for the purposes of this permit, refers to a groundwater concentration limit which is established pursuant to ADEM Admin. Code Rule 335-14-5-.06(3).

"Hazardous constituents," for the purposes of this permit, are those substances listed in ADEM Admin. Code r. 335-14-2-Appendix VIII and/or ADEM Admin. Code r. 335-14-5-Appendix IX and include hazardous constituents released from solid waste, hazardous waste, and hazardous waste constituents that are reaction by-products.

"Interim measures", for the purposes of this permit, are actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental exposure to contaminants while long term corrective action remedies are evaluated and, if necessary, implemented.

"Land Use Controls," for the purposes of this permit, is as defined by ADEM Admin. Code r. 335-5-1-.03.

"Method detection limit" (MDL), for the purposes of this permit, means the minimum concentration of a substance that can be measured and reported with 99% confidence that the

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analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

"Operating day," for the purposes of this permit, means any day on which hazardous waste is treated, stored, or disposed of in a unit. For example, each day that a hazardous waste storage unit contains hazardous waste is an operating day; as is each day that a disposal unit contains or receives hazardous waste, or each day that hazardous waste is treated in a treatment unit.

"Release," for the purposes of this permit, includes any spilling, leaking, pouring, emitting, emptying, discharging, injecting, escaping, leaching, pumping, or disposing into the environment of any hazardous waste or hazardous constituent.

"Solid waste", for the purposes of this permit, means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded materials, including solid, liquid, semisolid, or contained gaseous materials resulting from industrial, commercial, mining, and agricultural operations, and from community activities. It does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under Section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880), or source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

"Solid waste management unit" (SWMU), for the purposes of this permit, includes any unit that has been used for the treatment, storage, or disposal of solid waste at any time, irrespective of whether the unit is or ever was intended for the management of solid waste. RCRA-regulated hazardous waste management units are also solid waste management units. SWMUs include areas that have been contaminated by routine and systematic releases of hazardous waste or hazardous constituents, excluding one-time accidental spills that are immediately remediated and cannot be linked to solid waste management activities (*e.g.*, product or process spills).

"Storm event," for the purposes of this permit, is defined as a 1-year, 24-hour storm event or rainfall that measures 1-inch or greater in 1 hour or less. Rainfall measurements may be taken at the site, or the closest official weather monitoring station may be used.

I.E. EXPIRATION AND CONTINUATION OF PERMIT

This permit and all conditions herein will remain in effect beyond this permit's expiration date if the Permittee has submitted a new application as required by Permit Condition I.C.2. and, through no fault of the Permittee, the Department has not issued a new permit (ADEM Admin. Code Rules 335-14-8-.05(1) and 335-14-8-.05(2)).

I.F. WASTE MINIMIZATION

1. Certification Requirements

   Pursuant to ADEM Admin. Code r. 335-14-5-.05(4)(b)9., the Permittee must certify, no less often than annually, that:

   a. The Permittee has a program in place to reduce the volume and toxicity of hazardous waste to the degree determined by the Permittee to be economically practicable; and,

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b. The proposed method of treatment, storage or disposal is the most practicable method available to the Permittee and that it minimizes the present and future threat to human health and the environment.

2. Recording Requirements

The Permittee shall maintain copies of this certification in the facility operating record as required by ADEM Admin. Code r. 335-14-5-.05(4).

I.G. COST ESTIMATES

1. The Permittee shall maintain detailed written cost estimates, in current dollars, at the location specified in Permit Condition I.C.10.e. and on file with ADEM in accordance with ADEM Admin. Code Rules 335-14-5-.08(3), 335-14-5-.08(5), and 335-14-5-.08(10).

2. All cost estimates must be updated annually as required by ADEM Admin. Code Rules 335-14-5-.08(3)(b), 335-14-5-.08(5)(b), and 335-14-5-.08(10)(b).

3. The cost estimate shall be maintained and submitted in the form designated by the Department.

4. The Permittee must update the cost estimate no later than 30 calendar days after the Department has approved a modification to the Closure Plan, Post-Closure Plan, or Corrective Action Plan, or any other plan required or referenced by this permit, if the change in the plan results in an increase in the amount of the cost estimate.

I.H. FINANCIAL ASSURANCE

1. The Permittee shall demonstrate continuous compliance with ADEM Admin. Code r. 335-14-5-.08 by providing documentation of financial assurance in at least the amount that equals or exceeds the cost estimate. Changes in financial assurance mechanisms must be approved by the Department.

2. The Permittee shall submit itemized statements for all capital expenditures and a complete, revised post-closure and corrective action cost estimate to the Department when requesting approval for a reduction in the financial assurance mechanism.

I.I. PERMIT MODIFICATIONS

The Permittee shall request a permit modification whenever changes in operating plans or facility design affect any plan (*e.g.,* closure, groundwater monitoring, post-closure, or corrective action) required or referenced by this permit. The Permittee must submit a written request for a permit modification, pursuant to the requirements of ADEM Admin. Code r. 335-14-8-.04(2), at least 60 calendar days prior to the proposed change in the facility design or operation.

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I.J. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE DEPARTMENT

One hard copy and one electronic copy (an optical character recognition PDF document or text-searchable is preferred) of all reports, notifications, or other submissions that are required by this permit should be sent via certified mail or given to:

Chief, Land Division
Alabama Department of Environmental Management
P.O. Box 301463 (Zip 36130-1463)
1400 Coliseum Boulevard (Zip 36110-2059)
Montgomery, Alabama

and

Director, RCRA Division
USEPA Region 4
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, Georgia 30303-3104

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PART II

POST-CLOSURE CARE

II.A. POST-CLOSURE CARE PERIOD

The post-closure care period shall extend for a period of thirty (30) years after the date of issuance of a post-closure permit unless shortened or extended pursuant to ADEM Admin. Code r. 335-14-5-.07(8). The post-closure care period shall automatically extend through the end of the compliance period specified in Part III of this permit.

II.B. POST-CLOSURE PROCEDURES AND USE OF PROPERTY

1. Post-Closure Activities

   The Permittee shall conduct post-closure care activities, in accordance with Sections 1, 2, and Appendix B of the permit application and as required by ADEM Admin. Code r. 335-14-5-.07 and 335-14-5-.14(11)(d), for each hazardous waste management unit listed in Table II.1. Post-closure care shall commence upon the effective date of this permit and shall continue throughout the post-closure care period.

2. Security

   The Permittee shall comply with the security provisions of ADEM Admin. Code r. 335-14-5-.02(5) and as described in Section 1.3 of the permit application.

3. Disturbance of Closed Unit(s)

   The Permittee shall not allow the disturbance of the integrity of the final cover, liners, any components of the containment system, or the function of the facility's monitoring systems during the post-closure care period for any unit identified in Table II.1.

4. The Permittee shall:

   a. Maintain the integrity and effectiveness of the landfills' final cover, including making repairs to the cap, as necessary, to correct the effects of settling, subsidence, erosion, or other events;

   b. Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of ADEM Admin. Code r. 335-14-5-.06 and Part III of this permit;

   c. Prevent run-on and run-off from eroding or otherwise damaging the final cover; and,

   d. Protect and maintain surveyed benchmarks used in complying with the surveying and recordkeeping requirements of ADEM Admin. Code r. 335-14-5-.14(10).

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II.C. INSPECTIONS

1. The Permittee shall inspect the components, structures, and equipment at the site in accordance with the inspection schedule as described in Section 1.4 and Appendix A-3 of the permit application, the post-closure care plan as described in Section 1.7 and Appendix B of the permit application, and as required by ADEM Admin. Code r. 335-14-5-.02(6) and 335-14-5-.07.

2. Monitoring and Inspection

   The Permittee shall inspect the closed hazardous waste management unit listed in Table II.1 at least weekly and after storms to detect any evidence of deterioration or improper operation as described in Section 1.4 and Appendix A-3 of the permit application and as required under ADEM Admin. Code Rules 335-14-5-.02(6), 335-14-5-.07 and 335-14-5-.14. The inspections shall specifically include evaluation of the following items:

   a. Integrity of the final cover (erosion, ponding, subsidence, cracking, *etc.*);

   b. Growth and stabilization of vegetative cover;

   c. Run-on and run-off control system;

   d. Groundwater monitoring wells; and,

   e. Survey benchmarks.

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TABLE II.1

POST-CLOSURE CARE UNITS

UNIT NAME	UNIT DESCRIPTION	CLOSED-IN-PLACE CAPACITY (QUANTITY)	DESCRIPTION OF UNIT*	LOCATION OF UNIT*
5WP202	New Brine Mud Pond	10,000 Cubic Yards	Section 1.1.1.1	Figure A9

* Location in permit application containing description (text) and location (figure) of unit.

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PART III

GROUNDWATER MONITORING AND CORRECTIVE ACTION

III.A. REQUIRED PROGRAM(S)

1. Groundwater monitoring shall consist of the General Groundwater Monitoring Program of Permit Condition III.B., the Detection Monitoring contained in Permit Condition III.C, and the Corrective Action Monitoring Program contained in Permit Condition III.E.

2. The Permittee shall continue groundwater monitoring as required by this permit not later than 120 calendar days after the effective date of this permit.

III.B. GENERAL GROUNDWATER MONITORING PROGRAM

1. Well Location, Installation and Construction

   The Permittee shall install and/or maintain a groundwater monitoring system to comply with the requirements of ADEM Admin. Code r. 335-14-5-.06(8), 335-14-5-.06(9), 335-14-5-.06(10), and 335-14-5-.06(11) as applicable and as specified below:

   a. The Permittee shall maintain all groundwater monitoring wells at the facility as identified in Table III.1. of this permit, at the locations specified on Figures A7, A9, A10, A11 and Appendix A-7 of the permit application, and any other groundwater monitoring wells specified by Permit Condition III.B.1.d and III.B.1.e.

      i. All groundwater monitoring wells shall be maintained and inspected in accordance with the plans and specifications presented in Appendix B of the permit application and/or CMI Plan, and in accordance with ADEM Admin. Code r. 335-14-5-.06.

      ii. A groundwater monitoring well shall not be removed from any monitoring program specified in this permit without an approved permit modification pursuant to Permit Condition I.I.

      iii. If a groundwater monitoring well is damaged, the Permittee shall immediately notify the Department in writing, which includes a description of the well repair activities to be conducted. The well repair procedures must be approved by the Department prior to implementation. Within 30 calendar days after the well is repaired, the Permittee shall submit a written notification to the Department that the well repair activities were conducted in accordance with the approved procedures.

      iv. If a groundwater monitoring well is deleted from the monitoring program(s) required by this permit in accordance with Permit Conditions III.B.1.a.ii. and I.I., it shall be abandoned within 90 calendar days after deletion using procedures to be approved by the Department. Within 30 calendar days after the well is abandoned, the Permittee shall submit a

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written notification to the Department that the well abandonment activities were conducted in accordance with the approved procedures.

b. Groundwater monitoring wells O-62, O-63, O-64, O-81, O-82, O-83, and O-84 shall define the point of compliance for the New Brine Mud Pond closed as a landfill.

c. The Permittee shall maintain groundwater monitoring well(s) O-59, O-60, and O-61 as the background monitoring well(s) for the entire facility as specified in Appendix B of the permit application.

d. The Permittee shall install and maintain additional groundwater monitoring wells as necessary to assess changes in the rate and extent of any plume of contamination or as otherwise deemed necessary to maintain compliance with ADEM Admin. Code r. 335-14-5-.06(6), 335-14-5-.06(8), 335-14-5-.06(9), 335-14-5-.06(10), and 335-14-5-.06(11), as applicable. A plan in the form of a permit modification request specifying the design, location and installation of any additional monitoring wells should be submitted to the Department at least 90 calendar days prior to installation which, at a minimum, shall include:

   i. Well construction techniques including casing depths and proposed total depth of well(s);

   ii. Well development method(s);

   iii. A complete description of well construction materials;

   iv. A schedule of implementation for construction; and,

   v. Provisions for determining the lithologic characteristics, hydraulic conductivity, grain size distribution, and porosity for the applicable aquifer unit(s) at the location of the new well(s).

e. The Permittee shall install PM-1, PM-2, PM-3, PM-4, SVE-1, SVE-2, SVE-3, SVE-4, SVE-5, SVE-6, and SVE-7 within 90 days of the effective date of this permit. The well construction and location will follow the specifications shown in Appendix C of the permit application. After the installation of these wells is completed, and within 120 calendar days after the effective date of this permit, the Permittee shall submit a report to the Department that includes the surveyed location and elevation, surveyed elevation reference point, total depth, screened interval, well log, and other pertinent information for each well installed. All location and elevation data shall be surveyed by a professional surveyor licensed in the State of Alabama. Elevation data shall be recorded and reported as mean sea level (MSL) and referenced to an appropriate national geodetic vertical datum (NGVD) benchmark. Location data shall include latitude and longitude. The report shall be accompanied by a request for a minor permit modification in accordance with ADEM Admin Code Rule 335-14-8-.04(3) and Permit Condition I.I.

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2. General Groundwater Monitoring Requirements

   a. The Permittee shall determine the groundwater surface elevation from all monitoring wells listed in Table III.1. of this permit at least semi-annually and each time a sampling event is conducted. The results of these determinations should be submitted in accordance with Permit Condition III.B.6. Elevation data should be recorded and reported as mean sea level (MSL) and referenced to an appropriate national geodetic vertical datum (NGVD) benchmark.

   b. The Permittee shall determine the groundwater flow rate and direction in the underlying aquifer(s) at least annually and submit the results in accordance with Permit Condition III.B.6.

   c. The Permittee shall determine background concentrations of hazardous constituents and other chemical parameters required to be monitored by this permit in accordance with Appendix B of the permit application and ADEM Admin. Code r. 335-14-5-.06(8)(g).

3. Groundwater Protection Standard

   a. The groundwater protection standard, as required under ADEM Admin. Code r. 335-14-5-.06(3), shall consist of Table III.3 of this permit which lists the hazardous constituents and their respective concentration limits.

   b. The groundwater protection standard applies to all hazardous waste or hazardous constituent releases as deemed appropriate by the Department to protect human health and the environment.

4. Compliance Period

   a. The compliance period, during which the groundwater protection standard specified in Permit Condition III.B.3. applies, shall begin at the time of the first sampling event of the compliance monitoring program (Permit Condition III.D.), or the corrective action monitoring program (Permit Condition III.E.), whichever is earlier.

   b. The compliance period shall continue (after beginning pursuant to Permit Condition III.B.4.a.) until the groundwater protection standard as defined by Permit Condition III.B.3.a. has not been exceeded for a period of three consecutive years.

   c. If the Permittee is engaged in a corrective action program pursuant to Permit Condition III.E., then the compliance period shall continue as required by ADEM Admin. Code r. 335-14-5-.06(7)(c) until the groundwater protection standard has not been exceeded for a period of three consecutive years after corrective action has been terminated and this permit has been modified, in accordance with Permit Condition III.I., to implement a compliance monitoring program pursuant to Permit Condition III.D. or a detection monitoring program pursuant to Permit Condition III.C., as required by ADEM Admin. Code r. 335-14-5-.06(11)(f).

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5. Sampling and Analysis Procedures

The Permittee shall use the following techniques and procedures when obtaining and analyzing samples from the groundwater monitoring wells described in Permit Condition III.B.1. to provide a reliable indication of the quality of the groundwater as required under ADEM Admin. Code r. 335-14-5-.06(8)(d), 335-14-5-.06(8)(e), and 335-14-5-.06(8)(g):

a. Samples shall be collected, preserved, and shipped (when shipped off-site for analysis) in accordance with the procedures specified in Appendix B of the permit application.

b. Samples shall be analyzed according to the procedures specified in Appendix B of the permit application, the most recent edition of SW-846 or other appropriate methods approved by the Department. Analytical method detection limits shall be less than or equal to the concentration limits specified in Table III.2 or III.3, unless otherwise approved in writing by the Department.

c. Samples shall be tracked and controlled using the chain-of-custody procedures specified in Appendix B of the permit application.

d. Statistical analyses used to evaluate the groundwater monitoring data shall be as described in Appendix B of the permit application and ADEM Admin. Code r. 335-14-5-.06(8)(h).

e. All samples collected in accordance with this permit shall not be filtered prior to analysis.

6. Recordkeeping and Reporting

a. The Permittee shall keep and maintain all monitoring, testing, and analytical data obtained in accordance with Permit Conditions III.B., III.C., III.D., and III.E. as required by Permit Condition I.C.10.

b. The Permittee shall submit to the Department a written report to include all analytical sampling data, established background values, statistical evaluations, groundwater elevations, associated potentiometric maps, and the annual groundwater flow rate and direction determinations. The analytical method and the method detection limit (MDL) for each constituent must be integrated into all reports of analysis. The report shall be submitted within 60 calendar days after the first sampling event and on an annual basis thereafter. Copies of this report shall be kept at the facility in accordance with Permit Conditions I.C.10.c. and I.C.10.e.

c. The Permittee shall submit progress reports to the Department describing implementation of groundwater monitoring and/or corrective action activities at the site as required by Part III of this permit on a monthly basis. The first progress report shall be submitted to the Department within 90 calendar days after the effective date of this permit. The progress reports shall continue until such time as the required monitoring and/or corrective action systems and activities required by this permit are fully constructed and operational. In the event that additional monitoring and/or corrective action requirements are imposed through a permit

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modification, in accordance with Permit Condition I.I., the quarterly reporting requirement shall resume, commencing upon the effective date of the permit modification and continuing until the required monitoring and/or corrective action systems and activities are again fully constructed and operational.

III.C. DETECTION MONITORING PROGRAM

The requirements of this Condition are applicable to the New Brine Mud Pond. Except as specified otherwise in this permit, the Detection Monitoring Program shall be implemented in accordance with Section 2 and Appendix B of the permit application and ADEM Admin. Code r. 335-14-5-.06(9).

1. Monitoring Requirements

   In addition to the general groundwater monitoring requirements specified in Permit Condition III.B.2., the Permittee shall:

   a. Sample all point of compliance wells and background wells and analyze for the constituents listed in Table III.2. of this permit, on a semi-annual basis in accordance with Permit Condition III.B.5.

   b. Sample all background and point of compliance monitoring wells and analyze for temperature (degrees F or C), specific conductance (Mhos/cm), and pH (standard units) each time the well is sampled in accordance with Permit Condition III.B.5. The data obtained should be submitted as raw data in the reports required by Permit Condition III.B.6.

   c. Sample all designated background monitoring wells and analyze, in accordance with Permit Condition III.B.5., for the constituents listed in Table III.2. of this permit in all monitoring events.

2. Reporting and Response Requirements

   In addition to the recordkeeping and reporting requirements specified in Permit Condition III.B.6.:

   a. The Permittee shall determine whether there is statistically significant evidence of contamination above background levels at each monitoring well within 45 calendar days after completion of each sampling event. The statistical evaluation of monitoring well analytical data shall be performed pursuant to Permit Condition III.B.5. and ADEM Admin. Code r. 335-14-5-.06(9)(f).

   b. If the Permittee determines, pursuant to Permit Condition III.C.2.a., that there is statistically significant evidence of contamination above background levels for any chemical parameters or hazardous constituents listed in Table III.2. of this permit at any monitoring well at the point of compliance, he or she must comply with ADEM Admin. Code r. 335-14-5-.06(10)(g).

III.D. COMPLIANCE MONITORING PROGRAM (RESERVED)

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III.E. CORRECTIVE ACTION MONITORING PROGRAM

The requirements of this Condition are applicable to AOC A and AOC M. Except as specified otherwise in this permit, the Corrective Action Monitoring Program shall be implemented in accordance with Section 2.6 of the permit application, CMI Plan for AOC A (Appendix C), CMI Plan for AOC M (Appendix D), and ADEM Admin. Code r. 335-14-5-.06(11).

1. Monitoring Systems

   In addition to the point of compliance and background monitoring well systems identified in Permit Conditions III.B.1.b. and III.B.1.c., the Permittee shall:

   a. Maintain groundwater monitoring wells O-30 and O-76 as boundary wells for AOC A and AOC M as specified in Table III.1. of this permit and as shown on Figures A7, A10, A11 and in Appendix C and Appendix D of the permit application.

   b. Maintain groundwater monitoring wells MW-30, O-44, O-45, O-46 and O-47 as effectiveness/point of compliance wells for AOC A as specified in Table III.1. of this permit and as shown on Figures A7, A10, A11 and Appendix C of the permit application.

   c. Maintain well IW-6R as a recovery well for AOC A and AOC M, and SVE-1, SVE-2, SVE-3, SVE-4, SVE-5, SVE-6, and SVE-7 as soil-vapor extraction (SVE) wells for AOC A as specified in Table III.1. of this permit and as shown on Figures A7, A10, A11, Appendix C and Appendix D of the permit application.

   d. Maintain wells O-29, O-30, O-36, and O-39 as effectiveness/point of compliance wells for AOC M as specified in Table III.1. of this permit and as shown on Figures A7, A10, A11 and Appendix D of the permit application.

2. Corrective Action Program

   a. The Permittee shall conduct a Corrective Action Program, as described in Section 2.6, Appendix C, and Appendix D of the permit application, to remove or treat in place all hazardous constituents that exceed their respective groundwater protection standards as described in Table III.3. of this permit at the point of compliance, between the point of compliance and the down-gradient facility property boundary, and beyond the facility boundary in accordance with ADEM Admin. Code r. 335-14-5-.06(11)(e).

   b. Pursuant to ADEM Admin. Code r. 335-14-5-.06(11)(c) and 335-14-5-.06(11)(e)3., the Permittee shall implement the corrective action program as described in Section 2.6, Appendix C, and Appendix D of the permit application within 120 calendar days after the effective date of this permit.

   c. The Permittee shall handle or treat groundwater in accordance with Section 2.6, Appendix C, and Appendix D of the permit application.

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3. Monitoring Requirements

In addition to the general groundwater monitoring requirements specified in Permit Condition III.B.2., the Permittee shall:

a. Sample all boundary, point of compliance/effectiveness and recovery monitoring wells for AOC A and AOC M shown in Table III.1. of this permit and analyze for the constituents listed in Table III.2. and Table III.3. of this permit on a quarterly basis beginning within 120 calendar days of the effective date of this permit and continuing through the end of the compliance period.

b. RESERVED.

c. Sample all point of compliance, effectiveness, recovery and boundary monitoring wells shown in Table III.1. of this permit and analyze for temperature (degrees F or C), specific conductance (Mhos/cm), and pH (standard units) each time the well is sampled. The data obtained should be submitted as raw data in the reports required by Permit Condition III.B.6.

d. When evaluating the monitoring results to determine the effectiveness of the corrective measures, in accordance with Permit Condition III.E.4., the Permittee shall:

i. Determine if the corrective action system effectively addresses the entire plume of contamination;

ii. Determine if the concentration of the hazardous constituents is decreasing (pH increasing or decreasing toward neutrality, as applicable) in the effectiveness wells specified in Permit Condition III.A.1.;

iii. Determine if hazardous waste or hazardous constituents are being released into the environment; and,

iv. Determine if hazardous constituents have been detected in the boundary wells specified in Permit Condition III.E.1.

4. Reporting and Response Requirements

In addition to the recordkeeping and reporting requirements specified in Permit Condition III.B.6.:

a. The Permittee shall report the effectiveness of the corrective action program annually, as required under ADEM Admin. Code r. 335-14-5-.06(11)(g). These reports shall be submitted to the Department annually within 360 calendar days after corrective action is initiated and continue until corrective action is completed. The Permittee must provide data from groundwater monitoring along with an analysis of that data and any conclusions regarding the effectiveness of the program in accordance with Permit Condition III.E.3.d. If the analysis of the data warrants any change to the corrective action program, the Permittee must include these revisions in the annual report, which will be followed-up within 90

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calendar days with an application for permit modification in accordance with Permit Condition I.I.

b. If corrective action is terminated under Permit Condition III.B.4.c., the Permittee must sample all background, point of compliance, effectiveness and boundary sampling locations for the compounds listed in ADEM Admin. Code r. 335-14-5-Appendix IX. Based upon the sampling results, the Permittee may petition the Department, in accordance with Permit Condition I.I., for a permit modification to implement either a detection monitoring program or a compliance monitoring program.

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TABLE III.1

MONITORING WELL DESIGNATIONS

WELL NUMBER	WELL TYPE *	WELL LATITUDE (or Northing)**	WELL LONGITUDE (or Easting)**	UNIT(S) MONITORED	WELL DEPTH (ft)	GROUND ELEVATION (ft. MSL)	TOP-OF-RISER ELEVATION (ft. MSL)	SCREENED INTERVAL (ft. MSL)	MONITORED ZONE
O-59 RCRA	BKG	N 30° 52′ 01.26″	W 92° 41′ 25.40″	New Brine Mud Pond 5EP-202	123	36.322	38.861	107-117	Deep
O-60 RCRA	BKG	N 30° 52′ 01.25″	W 92° 41′ 25.54″	New Brine Mud Pond 5EP-202	96	36.282	38.492	73-93	Intermediate
O-61 RCRA	BKG	N 30° 52′ 01.25″	W 92° 41′ 25.68″	New Brine Mud Pond 5EP-202	70	36.035	38.487	57-67	Upper
O-62 RCRA	POC	N 30° 51′ 56.01″	W 92° 41′ 26.09″	New Brine Mud Pond 5EP-202	120	33.989	35.818	104-114	Deep
O-63 RCRA	POC	N 30° 51′ 56.00″	W 92° 41′ 26.26″	New Brine Mud Pond 5EP-202	93	34.010	35.959	80-90	Intermediate
O-64 RCRA	POC	N 30° 51′ 55.00″	W 92° 41′ 26.44″	New Brine Mud Pond 5EP-202	76	33.468	35.506	64-74	Upper
O-81 RCRA	POC	N 30° 51′ 56.06″	W 92° 41′ 24.86″	New Brine Mud Pond 5EP-202	65	33.774	36.322	47.5-62.5	Upper
O-82 RCRA	POC	N 30° 51′ 56.04″	W 92° 41′ 24.99″	New Brine Mud Pond 5EP-202	120	33.631	36.274	97.5-112.5	Deep
O-83 RCRA	POC	N 30° 51′ 56.21″	W 92° 41′ 27.63″	New Brine Mud Pond 5EP-202	65	33.938	36.743	47.5-62.5	Upper
O-84 RCRA	POC	N 30° 51′ 56.08″	W 92° 41′ 27.64″	New Brine Mud Pond 5EP-202	120	33.907	37.013	97.5-112.5	Deep
O-67 RCRA	PGM	N 30° 52′ 03.13″	W 92° 41′ 36.97″	New Brine Mud Pond 5EP-202	77	24.821	27.254	54-74	Upper
O-68 RCRA	PGM	N 30° 52′ 03.11″	W 92° 41′ 37.14″	New Brine Mud Pond 5EP-202	119	24.884	27.441	96-116	Deep
MW-30	EFF/POC	352592.288	1805829.690	AOC A	50	37.681	41.027	40-50	Upper
O-44	EFF/POC	352490.575	1806216.676	AOC A	119	33.822	36.623	99-119	Deep
O-45	EFF/POC	352486.414	1806206.341	AOC A	92	33.566	35.136	71-91	Upper-Inter
O-46	EFF/POC	352737.310	1805989.866	AOC A	126	37.655	39.591	106-126	Deep
O-47	EFF/POC	352743.704	1806003.904	AOC A	92	37.590	39.810	71-91	Upper-Inter
IW-6R	REC	352239.953	1806733.77	AOC M	125	40.087	40.517	75-125	Deep
O-36	EFF/POC	352272.095	1806738.195	AOC M	128	38.940	40.878	108-128	Deep
O-29	EFF/POC	352244.509	1806566.269	AOC M	88	35.501	36.126	58-88	Upper-Inter
O-30	EFF/POC /BDY	352185.541	1806584.383	AOC A/M	117	35.141	36.509	97-117	Deep
O-39	EFF/POC	352392.568	1806598.036	AOC M	89	31.885	32.525	69-89	Upper-Inter
O-76	BDY	352285.056	1807005.006	AOC A/M	114	32.685	35.010	54-114	Upper-Deep
PM-1***	PM	-	-	AOC A	-	-	-	-	-
PM-2***	PM	-	-	AOC A	-	-	-	-	-
PM-3***	PM	-	-	AOC A	-	-	-	-	-
PM-4***	PM	-	-	AOC A	-	-	-	-	-

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SVE-1***	SVE	-	-	AOC A	-	-	-	-	-
SVE-2***	SVE	-	-	AOC A	-	-	-	-	-
SVE-3***	SVE	-	-	AOC A	-	-	-	-	-
SVE-4***	SVE	-	-	AOC A	-	-	-	-	-
SVE-5***	SVE	-	-	AOC A	-	-	-	-	-
SVE-6***	SVE	-	-	AOC A	-	-	-	-	-
SVE-7***	SVE	-	-	AOC A	-	-	-	-	-

* Well Type:
POC - Point of Compliance Wells
PGM - Piezometers and/or General Monitoring Wells
BKG - Background Wells
EFF – Effectiveness Monitoring Wells
BDY – Boundary Monitoring Wells
REC – Recovery Wells
SVE – Soil-Vapor Extraction Wells
PM – Performance Monitoring Wells (monitor soil vapor in the vadose zone)

** Well Locations were re-surveyed in May 2017 in Alabama State Plane Coordinate System (NAD83)

*** Performance wells PM-1, PM-2, PM-3, PM-4 and SVE wells SVE-1, SVE-2, SVE-3, SVE-4, SVE-5, SVE-6, SVE-7 are proposed to be installed in accordance with Permit Condition III.B.1.e.

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TABLE III.2

GROUNDWATER QUALITY MONITORING CONSTITUENTS

HAZARDOUS CONSTITUENT	UNIT*
Mercury	New Brine Mud Pond 5EP-202
Carbon Disulfide	AOC A, AOC M
Carbon Tetrachloride	AOC A, AOC M

* Identifies the unit(s) at which the given constituent must be monitored.

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TABLE III.3

GROUNDWATER PROTECTION STANDARD

HAZARDOUS CONSTITUENT	UNIT*	CONCENTRATION LIMIT (mg/L)
Mercury	New Brine Mud Pond 5EP-202	0.002
Carbon Disulfide	AOC A, AOC M	0.700**
Carbon Tetrachloride	AOC A, AOC M	0.005**

* Identifies the unit(s) at which the given constituent must be monitored.

** This GWPS is equal to the Record of Decision cleanup goal for carbon disulfide and carbon tetrachloride for OU-1

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PART IV

SOLID WASTE MANAGEMENT UNIT IDENTIFICATION AND EVALUATION

IV.A. APPLICABILITY

The Conditions of this Part apply to:

1. The solid waste management units (SWMUs) and areas of concern (AOCs) identified in Table IV.1, which require investigation and/or remediation;

2. The SWMUs identified in Table IV.2, which require no further action under this permit at this time;

3. Any additional SWMUs or AOCs discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means; and,

4. Contamination beyond the facility boundary, if applicable. The Permittee shall implement corrective actions beyond the facility boundary where necessary to protect human health and the environment, unless the Permittee demonstrates to the satisfaction of the Department that, despite the Permittee's best efforts, as determined by the Department, the Permittee was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis. Assurances of financial responsibility for completion of such off-site corrective action will be required.

IV.B. NOTIFICATION AND ASSESSMENT REQUIREMENTS FOR NEWLY IDENTIFIED SWMUs AND AOCs

1. The Permittee shall notify the Department in writing, within 15 calendar days of discovery, of any additional AOC(s) as described under Permit Condition IV.A.3. The notification shall include, at a minimum, the location of the AOC(s) and all available information pertaining to the nature of the release (*e.g.,* media affected, hazardous constituents released, magnitude of release, *etc.*). If the Department determines that further investigation of an AOC is required, the permit will be modified in accordance with ADEM Admin. Code r. 335-14-8-.04(2).

2. The Permittee shall notify the Department in writing, within 15 calendar days of discovery, of any additional SWMUs as described under Permit Condition IV.A.3.

3. The Permittee shall prepare and submit to the Department, within 90 calendar days of notification, a SWMU Assessment Report (SAR) for each SWMU identified under Permit Condition IV.B.2. At a minimum, the SAR shall provide the following information:

   a. Location of unit(s) on a topographic map of appropriate scale such as required under ADEM Admin. Code r. 335-14-8-.02(5)(b)19.

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b. Designation of type and function of unit(s).

c. General dimensions, capacities and structural description of unit(s) (supply any available plans/drawings).

d. Dates that the unit(s) was operated.

e. Specification of all wastes that have been managed at/in the unit(s) to the extent available. Include any available data on hazardous constituents in the wastes.

f. All available information pertaining to any release of hazardous waste or hazardous constituents from such unit(s) (to include groundwater data, soil analyses, air, and/or surface water data).

4. Based upon the results of the SAR, the Department shall determine the need for further investigations at the SWMUs covered in the SAR. If the Department determines that such investigations are needed, the Permittee shall initiate an investigation as outlined in Permit Condition IV.D.1 immediately upon receiving notification of the Department's determination.

IV.C. NOTIFICATION REQUIREMENTS FOR NEWLY DISCOVERED RELEASES AT PREVIOUSLY IDENTIFIED SWMUs or AOCs

1. The Permittee shall notify the Department in writing of any newly discovered release(s) of hazardous waste or hazardous constituents discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means, within 15 calendar days of discovery. Such newly discovered releases may be from SWMUs or AOCs identified in Permit Condition IV.A.3 or SWMUs or AOCs identified in Permit Condition IV.A.2 for which further investigation was not required.

2. If the Department determines that further investigation of the SWMUs or AOCs is needed, the Permittee shall initiate an investigation as outlined in Permit Condition IV.D. immediately upon receiving notification of the Department's determination.

IV.D. RCRA FACILITY INVESTIGATION (RFI)

1. The Permittee must perform an RFI for any SWMU and AOC identified by the Department in accordance with Permit Conditions IV.A.1, IV.B.4, and IV.C.2.

2. The RFI must completely identify the concentration of hazardous constituents released from each SWMU and AOC and fully delineate the area where such hazardous constituents have come to be located.

3. The RFI must fully characterize the nature and extent of contamination released from each SWMU or AOC under investigation.

4. The RFI must be performed in a manner consistent with the most recent edition of the Alabama Environmental Investigation and Remediation Guidance (AEIRG).

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5. Except as provided by Permit Condition IV.D.6., the RFI must be completed within 180 calendar days from the effective date of this permit or, for SWMUs or AOCs identified pursuant to Permit Condition IV.B. and C., within 180 calendar days from the receipt of notification from the Department that an RFI is required. If, prior to the effective date of this permit, the Department has approved a work plan that includes a schedule for completing the RFI, the RFI shall be completed in accordance with the approved schedule.

6. RFI Schedule of Compliance

   a. For RFIs expected to require greater than 180 calendar days to complete, the Permittee may submit a schedule of compliance subject to Departmental approval and/or modification.

   b. Submittal of an RFI Schedule of Compliance does not delay or otherwise postpone the Permittee's obligation to initiate the RFI.

   c. The Schedule of Compliance must include:

      i. A detailed narrative discussion, which explains why the RFI cannot be completed within 180 days; and,

      ii. A detailed and chronological listing of milestones with estimated durations that provides sufficient information to track the progress of the investigation.

   d. The RFI Schedule of Compliance shall be reviewed by the Department in accordance with Permit Condition IV.G.

   e. The Permittee shall complete the RFI in accordance with the approved RFI Schedule of Compliance.

7. RFI Progress Reports

   a. For an RFI being conducted in accordance with the approved RFI Schedule of Compliance, the Permittee must submit progress reports on a monthly basis.

   b. The RFI Progress Reports must include:

      i. A description of the RFI activities completed during the reporting period;

      ii. Summaries of any problems or potential problems encountered during the reporting period;

      iii. Actions taken to rectify problems;

      iv. Changes in relevant personnel;

      v. Projected work for the next reporting period;

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vi. Any proposed revisions to the RFI Schedule of Compliance. Modifications of the RFI Schedule of Compliance are subject to approval by the Department; and,

vii. A summary of any data collected during the reporting period, including:

A. The location of each sampling point identified on a site map; and

B. The concentration of each hazardous constituent detected at each sampling point.

c. Submittal of RFI Progress Reports, work plans, or other documents during the RFI does not alter the approved RFI Schedule of Compliance.

8. RFI Reports

a. The Permittee shall prepare and submit to the Department an RFI Report within 60 calendar days from the completion of investigation activities in accordance with the approved RFI Schedule of Compliance, if applicable.

b. The RFI Report must provide a detailed description of all required elements of the investigation as described in the most recent edition of the AEIRG.

c. The RFI Report shall be reviewed by the Department in accordance with Permit Condition IV.G.

IV.E. SELECTION OF CORRECTIVE MEASURES AND PERMIT MODIFICATION

1. The Permittee shall develop and submit to the Department a Corrective Measures Implementation (CMI) Plan for any areas of the Permittee's site where hazardous constituents have come to be located at concentrations exceeding those appropriate for the protection of human health and the environment. The CMI Plan must include all applicable elements of the proposed remedy pursuant to the most recent edition of the AEIRG.

2. The CMI Plan shall be submitted to the Department within 120 calendar days following the Permittee's submittal of the RFI Report indicating that hazardous constituents have come to be located at any area of the Permittee's facility, or beyond the facility, at concentrations exceeding those appropriate for the protection of human health and the environment, or within 120 calendar days following notification from the Department that a CMI Plan is required, whichever occurs earlier.

3. The CMI Plan shall be submitted along with a request for permit modification pursuant to ADEM Admin. Code r. 335-14-8-.04(2), and shall include any applicable fees pursuant to ADEM Admin. Code r. 335-1-6. This modification will serve to incorporate the proposed final remedy, including all procedures necessary to implement and monitor the remedy, into this permit.

4. Within 60 calendar days after this Permit has been modified in accordance with Permit Condition IV.E.3., the Permittee shall demonstrate financial assurance for completing the approved remedy.

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IV.F. INTERIM MEASURES (IM)

1. IM Work Plan(s)

   a. Upon notification by the Department, the Permittee shall prepare and submit an Interim Measures (IM) Work Plan for any SWMU or AOC that the Department determines is necessary. IM are necessary in order to minimize or prevent further migration of contaminants and limit human and environmental exposure to contaminants while long-term corrective measures are evaluated and, if necessary, implemented. The IM Work Plan shall be submitted within 30 calendar days of such notification and shall include the elements listed in Permit Condition IV.F.1.b. Such IM may be conducted concurrently with investigations required under the terms of this permit. The Permittee may initiate IM by submitting an IM Work Plan for approval and reporting in accordance with the requirements under Permit Condition IV.F.

   b. The IM Work Plan shall ensure that the IM are designed to mitigate any current or potential threat(s) to human health or the environment and is consistent with and integrated into any long-term solution at the facility. The IM Work Plan shall include: the IM objectives, procedures for implementation (including any designs, plans, or specifications), and schedules for implementation.

   c. The IM Work Plan must be approved by the Department, in writing, prior to implementation. The Department shall specify the start date of the IM Work Plan schedule in the letter approving the IM Work Plan.

   d. The IM Report shall be reviewed by the Department in accordance with Permit Condition IV.G.

2. IM Implementation

   a. The Permittee shall implement the IM in accordance with the approved IM Work Plan.

   b. The Permittee shall give notice to the Department as soon as possible of any planned changes, reductions or additions to the IM Work Plan.

   c. Final approval of corrective action required under ADEM Admin. Code r. 335-14-5-.06(12), which is achieved through IM, shall be in accordance with ADEM Admin. Code r. 335-14-8-.04(2) and Permit Condition IV.E.

3. IM Reports

   a. If the time required for completion of IM is greater than one year, the Permittee shall provide the Department with Progress Reports at intervals specified in the approved work plan. The Progress Reports shall, at a minimum, contain the following information:

      i. A description of the portion of the IM completed;

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ii. Summaries of any deviations from the IM Work Plan during the reporting period;

iii. Summaries of any problems or potential problems encountered during the reporting period;

iv. Projected work for the next reporting period; and,

v. Copies of laboratory or monitoring data.

b. The Permittee shall prepare and submit the IM Report to the Department within 90 calendar days of completion of IM conducted under Permit Condition IV.F. The IM Report shall, at a minimum, contain the following information:

i. A description of IM implemented;

ii. Summaries of results;

iii. Summaries of all problems encountered;

iv. Summaries of accomplishments and/or effectiveness of IM; and,

v. Copies of all relevant laboratory or monitoring data, *etc.*, in accordance with Permit Condition I.C.10.

IV.G. SUBMITTALS

1. All work plans, reports, schedules, and other documents ("submittals") required by this permit shall be subject to approval by the Department to assure that such submittals and schedules are consistent with the requirements of this Permit and with applicable regulations and guidance. The Permittee shall revise all submittals and schedules as directed by the Department.

2. The Department will review all submittals in accordance with the conditions of this permit. The Department will notify the Permittee in writing of any submittal that is disapproved, and the basis thereof. If the Department disapproves a submittal, the Department shall: (1) notify the Permittee in writing of the submittal's deficiencies and specify a due date for submission of a revised submittal, (2) revise the submittal and notify the Permittee of the revisions, or (3) conditionally approve the submittal and notify the Permittee of the conditions. Permit Condition IV.H. shall apply only to submittals that have been disapproved and revised by the Department, or that have been disapproved by the Department, then revised and resubmitted by the Permittee, and again disapproved by the Department.

3. All submittals shall be submitted within the time frame specified by the Department and in accordance with the approved schedule of compliance. Extensions of the due date for submittals may be granted by the Department based on the Permittee's demonstration that sufficient justification for the extension exists.

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4. All submittals required by this permit shall be signed and certified in accordance with ADEM Admin. Code r. 335-14-8-.02(2).

5. Two (2) copies of all submittals shall be provided by the Permittee to the Department in accordance with Permit Condition I.J.

IV.H. DISPUTE RESOLUTION

Notwithstanding any other provision in this permit, in the event the Permittee disagrees, in whole or in part, with the Department's revision of a submittal or disapproval of any revised submittal required by this Part, the following may, at the Permittee's discretion, apply:

1. In the event that the Permittee chooses to invoke the provisions of this section, the Permittee shall notify the Department in writing within 30 calendar days of receipt of the Department's revision of a submittal or disapproval of a revised submittal. Such notice shall set forth:

   a. The specific matters in dispute;

   b. The position the Permittee asserts should be adopted as consistent with the requirements of this permit;

   c. The basis for the Permittee's position; and,

   d. Any matters considered necessary for the Department's determination.

2. The Department and the Permittee shall have an additional 30 calendar days from the Department's receipt of the notification provided for in Permit Condition IV.H.1. to meet or confer to resolve any disagreement.

3. In the event agreement is reached, the Permittee shall submit and implement the revised submittal in accordance with and within the time frame specified in such agreement.

4. If agreement is not reached within the 30-day period, the Department will notify the Permittee in writing of the decision on the dispute, and the Permittee shall comply with the terms and conditions of the Department's decision in the dispute. For the purposes of this provision in this permit, the responsibility for making this decision shall not be delegated below the Department’s Land Division Chief.

5. With the exception of those conditions under dispute, the Permittee shall proceed to take any action required by those portions of the submission and of this permit that the Department determines are not affected by the dispute.

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Table IV.1

The following Solid Waste Management Unit(s) (SWMU) and/or Area(s) of Concern (AOC) numbers and descriptions correspond with those noted in the RCRA Facility Assessment (RFA) Report. Where discrepancies exist, the permit will take precedence.

List of SWMUs and AOCs requiring a RCRA Facility Investigation (RFI) and/or remediation:

SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
AOC A*	Carbon Disulfide Transfer Tanks Area	This area managed washwater, stormwater, and spills containing raw materials (chlorine, carbon disulfide, waste sulfur chlorides), byproducts (sulfur and sulfur chlorides) and carbon tetrachloride.	Air, Groundwater, Soil, Surface Water.
AOC M*	Carbon Disulfide Vertical Storage Tank # 4 Area	This area managed carbon disulfide.	Air, Groundwater, Soil, Surface Water.

* There are no required RFI activities at this time. Corrective Measures requirements are provided in Part V of this permit**.**

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Table IV.2

The following Solid Waste Management Unit(s) (SWMU) and/or Area(s) of Concern (AOC) numbers and descriptions correspond with those noted in the RCRA Facility Assessment (RFA) Report. Where discrepancies exist, the permit will take precedence.

List of SWMUs and AOCs requiring no further action at this time:

SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 5	Old Chlorine Plant Stormwater Treatment Pond	This unit managed treated process water.	Soil, Groundwater.
SWMU 7	Chlorine Plant South Check Pond	This unit managed treated wastewater from the Chlorine Plant. Analysis of the wastewater in the pound indicated trace amounts of mercury (D009).	Groundwater, Soil.
SWMU 9	New Brine Mud Pond	This unit managed brine muds (K071), and process filter cakes.	Groundwater, Soil.
SWMU 10	Sulfuric Acid Plant Wastewater Pond	The unit currently manages equipment decontamination water and iron sludges from turnarounds in the Sulfuric Acid Plant process wastewater, stormwater runoff and sulfuric acid tank car washwater.	Air, Groundwater, Soil, Surface Water.
SWMU 17	Carbon Tetrachloride Plant Effluent Treater Pit	This unit managed process wastewater and sulfur solids from the Carbon Tetrachloride and Sulfur Chlorides Plant. Analysis of the wastewater indicated trace amounts of carbon disulfide, carbon tetrachloride, sulfur, and various oxides of sulfur.	Air, Groundwater, Soil.
SWMU 18	Carbon Tetrachloride Plant Effluent Treater Tank A	This unit managed process wastewater and sulfur solids from the Carbon Tetrachloride and Sulfur Chlorides Plant.	Air, Groundwater, Soil.
SWMU 19	Carbon Tetrachloride Plant Effluent Treater Tank B	This unit managed process wastewater and sulfur solids from the Carbon Tetrachloride and Sulfur Chlorides Plants. The unit also manages effluent from the maintenance scrubber.	Air, Groundwater, Soil.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 20	Carbon Disulfide Plant Oil Retention Pit	The unit manages process wastewater from the Carbon Disulfide Plant (containing trace amounts of carbon disulfide and process oils) and formerly managed process wastewater from the Carbon Tetrachloride Plant.	Air, Groundwater, Soil, Surface Water.
SWMU 21	Carbon Disulfide Plant Still Bottoms Tank	This unit manages carbon disulfide still bottoms (D001).	Air, Groundwater, Soil.
SWMU 22	Chlorine Plant 640 Pit	This unit managed mercury-contaminated wastewater and oil contaminated with mercury from the Chlorine Plant.	Air, Groundwater, Soil, Surface Water.
SWMU 23	Chlorine Plant 645 Pit	This unit managed mercury-contaminated wastewater from the Chlorine Plant.	Air, Groundwater, Soil, Surface Water.
SWMU 24	Chlorine Plant 650 Pit	This unit managed mercury-contaminated wastewater treatment sludge (K106) from the Chlorine Plant.	Air, Groundwater, Soil, Surface Water.
SWMU 25	Chlorine Plant Mercury System Wastewater Collection Tank A (Retrofitted to SWMU 22)	This unit managed mercury-contaminated wastewater and oil contaminated with mercury from the Chlorine Plant.	Air, Groundwater, Soil.
SWMU 26	Chlorine Plant Mercury System Wastewater Collection Tank B (Retrofitted to SWMU 22)	This unit managed mercury-contaminated wastewater from the Chlorine Plant.	Air, Groundwater, Soil.
SWMU 27	Chlorine Plant Mercury System Wastewater Collection Tank C (Retrofitted to SWMU 23)	This unit managed mercury-contaminated wastewater from the Chlorine Plant.	Air, Groundwater, Soil.
SWMU 28	Chlorine Plant Mercury System Treatment Tank D (Retrofitted to SWMU 24)	This unit managed mercury-contaminated wastewater and wastewater treatment sludge (K106) from the Chlorine Plant.	Air, Groundwater, Soil.
SWMU 29	Chlorine Plant Leaf Filters East	This unit managed mercury-contaminated wastewater and wastewater treatment sludge (K106).	Air, Groundwater, Soil, Surface Water.
SWMU 30	Chlorine Plant Leaf Filters West	This unit managed mercury-contaminated wastewater and wastewater treatment sludge (K106).	Air, Groundwater, Soil, Surface Water.
SWMU 31	Chlorine Plant Surge Tank A	This unit managed mercury-contaminated wastewater, wastewater treatment sludge (K106) and stormwater run-off from the Chlorine Plant.	Air, Groundwater, Soil, Surface Water.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 32	Chlorine Plant Surge Tank B	This unit managed mercury-contaminated wastewater, wastewater treatment sludge (K106) and stormwater run-off from the Chlorine Plant.	Air, Groundwater, Soil, Surface Water.
SWMU 33	Chlorine Plant Half-Million Gallon Storage Tank A	This unit managed mercury-contaminated wastewater, wastewater treatment sludge (K106) and stormwater run-off from the Chlorine Plant.	Air, Groundwater, Soil, Surface Water.
SWMU 34	Chlorine Plant Half-Million Gallon Storage Tank B	This unit managed mercury-contaminated wastewater, wastewater treatment sludge (K106) and stormwater run-off from the Chlorine Plant.	Air, Groundwater, Soil, Surface Water.
SWMU 35	Brine Mud Slurry Pit	This unit managed brine muds (K071), which are composed of calcium sulfate, calcium carbonate, sodium chloride, magnesium hydroxide, iron hydroxide, and mercury.	Air, Groundwater, Soil.
SWMU 36	Brine Mud Slurry Tank	This unit managed brine muds (K071).	Air, Surface Water, Groundwater, Soil.
SWMU 37	Brine Mud Holding Tank	This unit managed brine muds (K071).	Air, Groundwater, Soil.
SWMU 38	Brine Mud Treatment Tank	This unit managed brine muds (K071).	Air, Groundwater, Soil.
SWMU 39	Brine Mud Filter Building	This unit managed brine muds (K071).	Air, Groundwater, Soil.
SWMU 40	Sulfuric Acid Plant Neutralization Pit	This unit managed sulfuric acid plant process wastewater, stormwater runoff and sulfuric acid tank car washwater, containing trace amounts of chromium, zinc, and iron.	Air, Groundwater, Soil, Surface Water.
SWMU 41	Sulfuric Acid Plant Neutralization Tank (Retrofitted to SWMU 40)	The unit manages Sulfuric Acid Plant process wastewater, stormwater runoff, sulfuric acid tank car washwater, and iron sludges, containing trace amounts of chromium, zinc, and iron.	Air, Groundwater, Soil.
SWMU 42	Crystex Plant Wastewater Pit	This unit manages process wastewater containing trace amounts of carbon disulfide, process oils, and sulfur form the Crystex Plant.	Air, Groundwater, Soil, Surface Water.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 43	Sulfur Chlorides Plant Wastewater Sump	This unit manages stormwater run-off and washwater containing sulfur, chlorine, and sulfur chlorides, as well as any spills of these materials.	Air, Groundwater, Soil, Surface Water.
SWMU 44	Vapam Plant Sump	This unit manages washwater, stormwater, and spills containing raw materials (carbon disulfide, hydrogen sulfide, sulfur, caustic and monomethylamine) and products (Vapam, GY-81, and Enzone).	Air, Groundwater, Soil, Surface Water.
SWMU 45	Fume Incinerator	This unit currently manages sulfur tail gases and nitrogen. The unit managed carbon disulfide still bottoms (D001) until 1986. Approximately 2000 gallons of carbon disulfide waste process oils (containing small amounts of carbon disulfide and sulfur) were incinerated each month.	Air, Groundwater, Soil, Surface Water.
SWMU 58	Main Hazardous Waste Storage Area	This unit manages carbon disulfide storage tank sludge (D001), waste hexane (D001), waste paint thinner (F003, F005), cooling tower sludge (D007), spent reactor carbon (D009), waste sulfur (D002), waste oil (D001), waste Vapam, and spent Vapam tank filters. The unit also manages debris contaminated with Vapam, Crystex, carbon disulfide, sulfuric acid, carbon tetrachloride, chlorine, and sulfur chlorides.	Air, Groundwater, Soil.
SWMU 59	Chlorine Plant Hazardous Waste Accumulation Area	This unit managed nonhazardous wastes and raw materials. This unit also formerly managed mercury-contaminated wastes. A waste pile was stored here from a release from the Chlorine Plant Leaf Filters East and West (SWMUs 29 and 30).	Air, Groundwater, Soil.
SWMU 60	Vapam Plant Hazardous Waste Accumulation Area	This unit manages washwater, stormwater, and spills containing raw materials (carbon disulfide, hydrogen sulfide sulfur, caustic and monomethylamine) and products (Vapam, GY-18, and Enzone).	Air, Groundwater, Soil.
SWMU 61	Crystex Plant Hazardous Waste Accumulation Area	Thus unit manages hazardous oil.	Air, Groundwater, Soil.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 62	Former Laboratory Hazardous Waste Accumulation Area	This unit managed Vapam and hexane wastes.	Air, Groundwater, Soil.
SWMU 63	Former Paint Shop Hazardous Waste Accumulation Area	This unit managed waste paint and paint thinner (F003, F005).	Air, Groundwater, Soil.
SWMU 64	Former Sulfuric Acid Plant Hazardous Waste Accumulation Area	This unit managed hazardous sludges containing approximately 100% sulfuric acid.	Air, Groundwater, Soil.
SWMU 65	Old Grain Fumigant Drum Storage Area	This unit managed corrosive liquids and inhibitors, and raw materials.	Air, Groundwater, Soil.
SWMU 66	Crystex Plant Drum Storage Area	This unit formerly managed waste sulfur and skimmer solids. Currently, this manages oil and waste oil.	Air, Groundwater, Soil, Surface Water.
SWMU 67	Former Sulfuric Acid Plant Warehouse Drum Storage Area	This unit managed cooling tower sludge and Vapam filters.	Air, Groundwater, Soil, Surface Water.
SWMU 68	Scrubber Blowdown Distillate Drum	Facility representatives were unable to identify the wastes managed in this drum.	Air, Groundwater, Soil.
SWMU 69	Former Laboratory Solid Waste Accumulation Area	The unit managed contaminated glassware which may have contained residues.	Air, Groundwater, Soil.
SWMU 70	Carbon Tetrachloride Plant Waste Accumulation Area	This unit formerly managed carbon tetrachloride tank sludge and currently manages nonhazardous waste.	Air, Groundwater, Soil, Surface Water.
SWMU 71	Former Sulfur Storage Area	This unit managed raw material and waste sulfur.	Air, Surface Water, Groundwater, Soil.
SWMU 72	Parking Area Hazardous Waste Dumpsters	This unit managed mercury wastes (D009), tank sludge, and other wastes associated with the demolition of the Chlorine and Carbon Tetrachloride Plants.	Air, Groundwater, Soil.
SWMU 73	Brine Mud Filter Building Hazardous Waste Dumpsters	This unit managed mercury waste (D009).	Air, Groundwater, Soil.
SWMU 74	Solid Waste Dumpsters	These units managed solid wastes, including paper, plastic, metal drums and various refuse.	Air, Groundwater, Soil.
SWMU 75	Sulfuric Acid Plant Demister	This unit manages sulfur dioxide, sulfur trioxide, and sulfuric acid mist.	Air, Groundwater, Soil.
SWMU 76	Vapam Plant Scrubber A	This unit manages caustic used in the production of GY-81 and Vapam.	Air, Groundwater, Soil.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 77	Vapam Plant Scrubber B	This unit manages caustic used in the production of GY-81 and Vapam.	Air, Groundwater, Soil.
SWMU 78	Sulfur Chlorides Plant Railcar Loading/Unloading Scrubber	This unit manages sulfur chlorides, carbon tetrachloride, and carbon disulfide vapors.	Air, Groundwater, Soil.
SWMU 79	Carbon Tetrachloride Plant Process Scrubber	This unit managed waste air emissions from the Carbon Tetrachloride and the Sulfur Chlorides Plants.	Air, Groundwater, Soil.
SWMU 80	Carbon Tetrachloride Plant Maintenance Scrubber	This unit manages waste air emissions from the Sulfur Chlorides Plant and formerly from the Carbon Tetrachloride Plant.	Air, Groundwater, Soil.
SWMU 81	Purafil Unit	This unit managed mercury-contaminated air.	Air, Groundwater, Soil.
SWMU 82	Mercury Cell House Sumps	These units managed mercury-contaminated water (D009).	Air, Groundwater, Soil, Surface Water.
SWMU 83	Chlorine Plant Check Ponds Carbon Adsorption Unit A	This unit managed carbon packing contaminated with mercury.	Air, Groundwater, Soil.
SWMU 84	Chlorine Plant Check Ponds Carbon Adsorption Unit B	This unit managed carbon packing contaminated with mercury.	Air, Groundwater, Soil, Surface Water.
SWMU 85	Chlorine Plant Check Ponds Carbon Adsorption Unit C	This unit managed carbon packing contaminated with mercury.	Air, Groundwater, Soil.
SWMU 86	Chlorine Plant Check Ponds Carbon Adsorption Unit D	This unit managed carbon packing contaminated with mercury.	Air, Groundwater, Soil.
SWMU 87	Chlorine Plant Check Ponds Carbon Adsorption Unit E	This unit managed carbon contaminated with mercury.	Air, Groundwater, Soil.
SWMU 88	Chlorine Plant Cell House Carbon Adsorption Units A	This unit managed carbon packing contaminated with mercury.	Air, Groundwater, Soil.
SWMU 89	Chlorine Plant Cell House Carbon Adsorption Units B	This unit managed carbon packing contaminated with mercury.	Air, Groundwater, Soil.
SWMU 92	Carbon Tetrachloride Storage Tank C Moat	This unit managed washwater, which in the past contained carbon disulfide and carbon tetrachloride until 1991. Currently, the washwater only contains carbon disulfide.	Air, Groundwater, Soil.
SWMU 93	Sulfur Pipeline	This unit managed sulfur.	Air, Groundwater, Soil, Surface Water.
SWMU 94	Acid Pipeline to Courtaulds	The unit manages sulfuric acid.	Air, Groundwater, Soil, Surface Water.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 95	Used Equipment Storage Yard	This unit manages used equipment parts, wooden pallets, scrap metal, and unscreened Claus catalyst supports.	Air, Groundwater, Soil, Surface Water.
SWMU 96	Former Scrap Vent Pipe Storage Area	The unit stored scrap vent pipes, which may have been contaminated with carbon disulfide, carbon tetrachloride, sulfur, various oxides of sulfur, and process oils.	Air, Groundwater, Soil, Surface Water.
SWMU 97	Old Carbon Disulfide Pond Debris Area	This unit managed concrete and bricks, which may be contaminated with carbon disulfide, sulfur, and process oils.	Air, Groundwater, Soil, Surface Water.
SWMU 98	LeMoyne Landfill Debris Area	This unit managed hose fittings, insulation, fire bricks, ceramic piping, charcoal from fires, and other miscellaneous bricks which may be contaminated.	Air, Groundwater, Soil, Surface Water.
SWMU 99	Main Maintenance Shop Pipe Storage Area	This unit manages scrap piping.	Air, Groundwater, Soil, Surface Water.
SWMU 100	Indoor Waste Oil Storage Area A	This unit managed waste oil.	Air, Groundwater, Soil.
SWMU 101	Indoor Waste Oil Storage Area B	This unit manages waste oil.	Air, Groundwater, Soil.
SWMU 102	Indoor Waste Oil Storage Area C	This unit manages waste oil.	Air, Groundwater, Soil.
SWMU 103	Indoor Waste Oil Storage Area D	This unit manages waste oil.	Air, Groundwater, Soil.
SWMU 104	Carbon Tetrachloride Plant Hazardous Waste Accumulation Area	This unit managed sulfur solids and hazardous wastes from the Carbon Tetrachloride Plant.	Air, Groundwater, Soil.
SWMU 105	Vapam Plant Tanker Truck Loading Area	This unit manages Vapam, sulfur, chlorides, carbon disulfide, and carbon disulfide still bottoms (D001).	Air, Groundwater, Soil.
SWMU 106	Vapam Plant Collection Tank	This unit manages washwater, stormwater, and spills containing raw materials (carbon disulfide, hydrogen sulfide, sulfur, caustic and monomethylamine) and products (Vapam, GY-81, and Enzone).	Air, Groundwater, Soil.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 107	Vapam Plant Railcar Loading/Unloading Area	This unit manages washwater, stormwater, and spills containing raw materials (carbon disulfide hydrogen sulfide, sulfur, caustic and monomethylamine) and products (Vapam, GY-81, and Enzone).	Air, Groundwater, Soil.
SWMU 108	Crystex Plant Sewage Collection Pit	This unit manages sanitary and oily wastes.	Air, Groundwater, Soil.
SWMU 109	Sulfuric Acid Pipeline	This unit managed sulfuric acid.	Air, Groundwater, Soil, Surface Water.
SWMU 110	Caustic Line near Salt House	This unit managed caustic.	Air, Groundwater, Soil, Surface Water.
SWMU 111	Sulfuric Acid Plant Railcar Washing Station Collection Box	This unit manages washwater containing residues from railcars which store and transport sulfuric acid.	Air, Groundwater, Soil.
SWMU 112	Chlorine Plant Railcar Washing Station Collection Box	This unit manages washwater containing residues from railcars which store and transport chlorine and caustic soda.	Air, Groundwater, Soil.
SWMU 113	Sulfur Chlorides Plant Railcar Washing Station Collection Box	This unit manages washwater containing residues from railcars which store and transport sulfur chlorides, carbon disulfide, and carbon tetrachloride. The washwaters also contained small amounts of chlorine.	Air, Groundwater, Soil.
SWMU 114	Skimmed Waste Oil Collection Area A	This unit managed waste oil skimmings.	Air, Groundwater, Soil.
SWMU 115	Skimmed Waste Oil Collection Area B	This unit manages waste oil skimmings.	Air, Groundwater, Soil.
SWMU 116	Skimmed Waste Oil Collection Area C	This unit manages oil skimmings.	Air, Groundwater, Soil.
SWMU 117	Crystex Plant Paint Building Drains	This unit manages washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 118	Crystex Plant Cooling Tower Blowdown Area Drains	This unit manages process wastewater.	Air, Groundwater, Soil, Surface Water.
SWMU 119	Crystex Plant Carbon Disulfide Decanter Area Drains	This unit manages process wastewater.	Air, Groundwater, Soil, Surface Water.
SWMU 120	Crystex Plant Bagging Area Drains	This unit manages washdown water.	Air, Groundwater, Soil, Surface Water.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 121	Crystex Plant Miscellaneous Drains	This unit manages process wastewater and washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 122	Crystex Plant Sanitary Drains	This unit manages sanitary and oily wastes.	Air, Groundwater, Soil, Surface Water.
SWMU 123	Vapam Plant Cooling Tower Blowdown Area Drains	This unit manages process wastewater.	Air, Groundwater, Soil, Surface Water.
SWMU 124	Vapam Plant Miscellaneous Drains	This unit manages process wastewater and washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 125	Sulfur Chlorides Plant Miscellaneous Drains	This unit manages process wastewater and washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 126	Sulfuric Acid Plant Final Product Storage Area Drains	This unit manages washdown water and stormwater.	Air, Groundwater, Soil, Surface Water.
SWMU 127	Sulfuric Acid Plant Cooling Tower Blowndown Area Drains	This unit manages process wastewater.	Air, Groundwater, Soil, Surface Water.
SWMU 128	Sulfuric Acid Plant Miscellaneous Drains	This unit manages process wastewater and washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 129	Carbon Disulfide Plant Purification Area Drains	This unit manages process wastewater.	Air, Groundwater, Soil, Surface Water.
SWMU 130	Carbon Disulfide Plant Miscellaneous Drains	This unit manages process wastewater and washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 131	Carbon Tetrachloride Plant Sulfur Recovery Area Drains	This unit managed process wastewater containing high chemical oxygen demand (COD), sulfur compounds, sulfides, and hydrochloric acid.	Air, Groundwater, Soil, Surface Water.
SWMU 132	Carbon Tetrachloride Plant Fume System Area Drains	This unit managed process wastewater.	Air, Groundwater, Soil, Surface Water.
SWMU 133	Carbon Tetrachloride Plant Purification Area Drains	This unit managed process wastewater.	Air, Groundwater, Soil, Surface Water.
SWMU 134	Carbon Tetrachloride Plant Miscellaneous Drains	This unit managed process wastewater and washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 135	Chlorine Plant Neutralizer Area Drains	This unit managed process wastewater.	Air, Groundwater, Soil, Surface Water.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 136	Chlorine Plant Miscellaneous Drains	This unit managed process wastewater and washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 137	Other Miscellaneous Buildings and Off-site Surface Runoff	This unit manages washdown water.	Air, Groundwater, Soil, Surface Water.
SWMU 138	Stormwater and Other Process Drain Pipes	This unit manages potentially contaminated stormwater run-off and process wastewater from the various plants at the facility.	Air, Groundwater, Soil, Surface Water.
SWMU 139	Chlorine Plant Brine Mud Dumpster Area	This unit managed brine muds (K071).	Air, Groundwater, Soil.
SWMU 141	Main Maintenance Shop Asbestos Gaskets and Aerosol Can Collection Drums	This unit manages used asbestos gaskets and spent aerosol cans.	Air, Groundwater, Soil.
SWMU 142	Parts Cleaners: A. Acid Shop Parts Cleaner. B. Main Shop Parts Cleaner. C. Crystex Shop Parts Cleaner. D. Chlorine Shop Parts Cleaner	These units manage naphtha-based solvent which has been used to clean parts.	Air, Groundwater, Soil.
SWMU 143	Current Paint Shop Satellite Accumulation Area	This unit manages waste paint solids and waste paint thinner.	Air, Groundwater, Soil.
SWMU 144	Crystex Dust Collection System Baghouse	This unit manages dust emissions from the Crystex product bagging operations.	Air, Groundwater, Soil.
SWMU 145	Used Battery Storage Area	This unit manages spent batteries.	Air, Groundwater, Soil.
SWMU 146	Carbon Disulfide Pump Pad Release	This unit managed carbon disulfide.	Air, Groundwater, Soil.
SWMU 147	MCA Plant Trash Compactor	This unit manages nonhazardous empty bags which were used to transport MCA flakes.	Air, Groundwater, Soil.
SWMU 148	Sulfur Chlorides Area Scrubber Wastewater Sump	This unit manages stormwater run-off and spent caustic washwater.	Air, Groundwater, Soil, Surface Water.
SWMU 149	Carbon Disulfide Isocontainer Loading Area	This unit manages carbon disulfide.	Air, Groundwater, Soil.
SWMU 150	Groundwater Intercept Wells (3) and Ancillary Piping	This unit manages groundwater contaminated with carbon disulfide and carbon tetrachloride.	Air, Groundwater, Soil.
SWMU 151	Current Laboratory SAA	The unit manages laboratory waste including D006 and D008 analytical wastes and syringes.	Air, Groundwater, Soil.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 152	Sulfuric Acid Temporary Neutralization Tank and Rolloff Box Area	This unit manages cleanout sludge from tanks which have been used to transport sulfuric acid.	Air, Groundwater, Soil.
SWMU 153	D009 Rolloff Storage Area	This unit managed mercury-contaminated debris, including metal pipe, sheeting, and wood, from the mercury cell house.	Air, Groundwater, Soil.
SWMU 154	Used Bulb Storage Area	This unit manages used fluorescent and mercury vapor bulbs.	Air, Groundwater, Soil.
SWMU 155	Carbon Disulfide Railcar Blowoff Tank Wastewater Sump	This unit manages blowoff containing carbon disulfide.	Air, Groundwater, Soil, Surface Water.
SWMU 156	Crystex Vacuum System Baghouse	This unit manages Crystex dust from the product bagging area.	Air, Groundwater, Soil.
AOC C	Carbon Tetrachloride Plant Demolition	This area managed washwater, stormwater, and spills containing raw materials (chlorine, carbon disulfide, waste sulfur chlorides), byproducts (sulfur and sulfur chlorides) and carbon tetrachloride.	Air, Groundwater, Soil, Surface Water.
AOC D	Chlorine Plant Demolition	This area managed washwater, stormwater, and spills containing raw materials (rock salt, mercury), intermediate products (sodium amalgam, brine), byproducts (brine muds) and chlorine and caustic soda.	Air, Groundwater, Soil, Surface Water.
AOC E	Former Paint Shop Spill Area	The paint shop managed waste paint and paint thinner (F003, F005).	Air, Groundwater, Soil, Surface Water.
AOC F	Painting Areas	These areas managed waste paint, paint thinner (F003, F005), and used sand.	Air, Groundwater, Soil, Surface Water.
AOC G	Underground Storage Tanks	These areas managed freon, gasoline, diesel fuel, and methyl mercaptan.	Air, Groundwater, Soil, Surface Water.
AOC H	New Firewater Pond	This area manages groundwater from the upper aquifer, which is known to contain contaminants in some area of the facility.	Air, Groundwater, Soil, Surface Water.
AOC I	Railcar Loading/Unloading Areas	These units manage sulfuric acid, carbon disulfide, sulfur chlorides, caustic, chlorine, Crystex, and Vapam. This unit formerly managed carbon tetrachloride.	Air, Groundwater, Soil, Surface Water.
AOC J	Tanker Truck Loading/Unloading Areas (2)	These areas manage sulfuric acid and carbon tetrachloride.	Air, Groundwater, Soil.

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SWMU/AOC NUMBER***	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
AOC K	Former Dock Loading/Unloading Area	This area managed chlorine, caustic, salt, sulfur, carbon disulfide, carbon tetrachloride, and sulfuric acid.	Air, Groundwater, Soil, Surface Water.
AOC L	Former Drum Loading/Unloading Area	This area managed potential spills of carbon disulfide and carbon tetrachloride.	Air, Groundwater, Soil.
AOC N	Sulfur Tanker Truck Unloading Area	This area manages waste sulfur.	Air, Groundwater, Soil, Surface Water.

***The Department reserves the right to update the SWMU and/or AOCs based on a future RFA.

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Table IV.3

The following Solid Waste Management Unit(s) (SWMU) and/or Area(s) of Concern (AOC) numbers and descriptions correspond with those noted in the RCRA Facility Assessment (RFA) Report. Where discrepancies exist, the permit will take precedence.

List of SWMUs and AOCs regulated by Parts II and III of this permit.

SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 9	New Brine Mud Pond	This unit managed brine mud (K071), and processed filter cakes.	Air, Surface Water, Groundwater, Soil.

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Table IV.4

The following Solid Waste Management Unit(s) (SWMU) and/or Area(s) of Concern (AOC) numbers and descriptions correspond with those noted in the RCRA Facility Assessment (RFA) Report. Where discrepancies exist, the permit will take precedence.

List of SWMUs and AOCs regulated under CERCLA:

SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 1	Old Carbon Tetrachloride Plant Wastewater Treatment Pond	This unit formerly managed process wastewater from the Carbon Tetrachloride Plant. The unit has also managed waste sulfur, sulfur sludge (containing carbon disulfide and carbon tetrachloride), and accumulated rainwater.	Air, Surface Water, Groundwater, Soil.
SWMU 2	New Carbon Tetrachloride Plant Wastewater Treatment Pond	This unit formerly managed process wastewater from the Sulfur Chlorides and Carbon Tetrachloride Plants. Approximately 300 cubic yards of sulfur sludge were stored at this unit. The pond was also used to aerate wastewater during periods when the LeCreek Wastewater Treatment Pond (SWMU 14) was shut down.	Air, Surface Water, Groundwater, Soil.
SWMU 3	Old Carbon Disulfide Plant Wastewater Treatment Pond.	The unit managed process wastewater from the Carbon Disulfide and the Carbon Tetrachloride Plants. Also, 2,000 to 3,000 cubic yards of sulfur sludge were stored at this unit.	Air, Surface Water, Groundwater, Soil.
SWMU 4	Old Chlorine Plant Wastewater Treatment Pond	This unit managed treated process wastewater from the Chlorine Plant. Approximately 200 – 4,000 cubic yards of mercury sulfide and brine mud waste material were used as fill material during closure of the unit.	Air, Surface Water, Groundwater, Soil.
SWMU 6	Chlorine Plant North Check Pond	This unit managed treated wastewater from the Chlorine Plant. Analysis of the wastewater in the pond indicated trace amounts of mercury (D009).	Air, Surface Water, Groundwater, Soil.

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SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 8	Old Brine Mud Pond	This unit managed brine purification muds (K071) and wastewater treatment sludge from the mercury cell process in chlorine production (K106).	Air, Surface Water, Groundwater, Soil.
SWMU 11	Groundwater Improvement Pond	This unit manages contaminated groundwater containing trace amounts of carbon disulfide, carbon tetrachloride, and suspended solids.	Air, Surface Water, Groundwater, Soil.
SWMU 12	Old Firewater Pond	The unit managed Sulfuric Acid Plant process wastewater containing trace amounts of chromium, zinc, and iron and stormwater run-off.	Air, Surface Water, Groundwater, Soil.
SWMU 13	Unnamed Tributary	This unit manages stormwater run-off from the facility. Releases to this creek have included carbon disulfide, sulfur, process oils, carbon tetrachloride, mercury (D009), brine mud purification solids (K071), chromium, zinc, iron, suspended solids, and mercury-contaminated wastewater (K106).	Air, Surface Water, Groundwater, Soil.
SWMU 14	LeCreek Wastewater Treatment Pond	This unit manages partially treated process wastewater from the facility. Analysis of the wastewater in the pond indicates trace amounts of carbon disulfide, carbon tetrachloride, mercury, oils, and suspended solids.	Air, Surface Water, Groundwater, Soil.
SWMU 15	LeCreek Outlet Effluent Treatment Tank	This unit manages treated wastewater containing trace amounts of carbon disulfide, carbon tetrachloride, mercury, oils, and suspended solids.	Air, Surface Water, Groundwater, Soil.
SWMU 16	LeCreek Inlet Effluent Treatment Tank	This unit primarily manages pre-treated wastewater containing trace amounts of carbon disulfide, carbon tetrachloride, mercury, oils, and suspended solids.	Air, Groundwater, Soil.
SWMU 46	LeMoyne Landfill	The unit managed brine muds, activated carbon, spent graphite, absorption oil, bauxite catalyst, waste sulfur, ceramic tower packing, and miscellaneous trash. The unit also managed naphtha waste from the methane purification unit.	Air, Surface Water, Groundwater, Soil.

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SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 47	LeMoyne Swamp	This unit managed waste sulfur. In the past it managed run-off from two landfills and a salt storage pad. It is suspected that this unit also has received releases of sulfuric acid from the Sulfuric Acid Pipeline (SWMU 109).	Air, Surface Water, Groundwater, Soil.
SWMU 48	Former Halby Plant Treatment Pond	This unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant. Miscellaneous debris from the demolition of the plant and soil are suspected to have been used as fill.	Air, Surface Water, Groundwater, Soil.
SWMU 49	Former Halby Plant Sump A	The unit may have managed sulfides, cyanide, and other chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.
SWMU 50	Former Halby Plant Sump B	The unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.
SWMU 51	Former Halby Plant Sump C	The unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.
SWMU 52	Former Halby Plant Sump D	The unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.
SWMU 53	Former Halby Plant Sump E	The unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.
SWMU 54	Former Halby Plant Underground Tank	This unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.
SWMU 55	Former Halby Plant Railcar Loading/Unloading Area	The unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.

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SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 56	Former Halby Plant Open Trench	The unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.
SWMU 57	Former Halby Plant Septic Tank and Associated Drainage Field	The unit may have managed sulfides, cyanide, and other dye chemicals which were produced at the plant, as well as sanitary wastes.	Air, Surface Water, Groundwater, Soil.
SWMU 90	LeMoyne Swamp Sulfur Spill Area	This unit managed waste sulfur.	Air, Surface Water, Groundwater, Soil.
SWMU 91	LeMoyne Landfill Sulfur Spill Area	This unit managed waste sulfur.	Air, Surface Water, Groundwater, Soil.
SWMU 140	Cold Creek Swamp	The unit managed various wastes from the Akzo facility and wastewaters from the Syngenta facility. The primary wastes managed by this unit were: carbon disulfide, sulfurs, process oils, carbon tetrachloride, mercury (D009), brine mud purification solids (K071), chromium, zinc, iron and mercury contaminated wastewaters	Groundwater, Soil.
AOC B	Former Halby Plant Demolition	This area of concern managed sulfides, cyanide, and other dye chemicals which were produced at the plant.	Air, Surface Water, Groundwater, Soil.

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PART V

CORRECTIVE MEASURES IMPLEMENTATION

V.A. APPLICABILITY

The conditions of this Part apply to SWMUs and AOCs identified in Table V.1.

V.B. GENERAL CONDITIONS

1. The Permittee is required to perform corrective measures for the SWMUs and AOCs identified in Condition V.A. The approved remedy for these defined units, waterway areas, or land parcels, includes any and all actions set forth in this permit and in the approved Interim Measures Plans, Corrective Measures Studies (CMSs), and Corrective Measures Implementation (CMI) Plans approved by the Department, as noted below:

Applicable SWMU/AOC	CMS/CMI	Approval Date
AOC M	Corrective Measures Implementation Plan	January 2006
AOC A	Corrective Measures Implementation Plan Revised CMI Plans	July 2006 July 2, 2018 XX/XX/XXXX
SWMU 20*	Corrective Measures Implementation Plan	July 2006

*ADEM issued a no-further-action letter dated June 9, 2009.

2. Remedial Cleanup Levels

   Upon approval, pursuant to Condition IV.E., of the CMI Plan designating applicable cleanup level(s), the cleanup level(s) for the areas specific to the CMI Plan will be deemed to be a condition of this permit.

3. Groundwater Monitoring and Remediation

   Where required pursuant to Conditions V.B.1. and V.C. of this permit, the Permittee shall comply with the general groundwater monitoring requirements of Part III of this permit.

4. Land Use Controls

   Where required pursuant to Conditions V.B.1. and V.C. of this permit, the Permittee shall establish appropriate land use controls to achieve protection of human health and the environment. The Permittee shall comply with Conditions V.B.5. and V.B.6. of this permit when implementing corrective measures requiring land use controls. In the event an off-site property owner does not allow an environmental covenant to be imposed, the Permittee shall notify the Department within 14 calendar days of receipt of such written notification of the refusal by the off-site property owner. If the property owner does not provide a written refusal of the request to allow an environmental

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covenant to be imposed, the Permittee shall notify the Department within 14 days of delivery of the request to the off-site property owner. In such cases, the Department may allow the Permittee to propose an alternate area-specific land use control subject to the Department's review and approval.

5. Survey Plat

For corrective measures where residual concentrations of contaminants will remain in-place at levels greater than those appropriate for unrestricted land use, or for corrective measures that rely on land use controls, the Permittee must:

a. Within 90 calendar days following the effective date of a permit modification addressing remedy selection, submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Department, a survey plat indicating the location and dimensions of the SWMUs, AOCs, and capped or partially remediated areas with respect to permanently surveyed benchmarks, the locations of sampling points, and the concentrations of hazardous constituents detected. This plat must be prepared and certified by a professional land surveyor registered in the State of Alabama. The plat must be filed with the local zoning authority or the authority with jurisdiction over local land use and must contain a note, prominently displayed, which states the Permittee's obligation to limit the property to the specified restricted uses.

b. Maintain the survey plat as described in Condition V.B.5.a. of this permit and in the Appendix A-5 until the Permittee has demonstrated, to the satisfaction of the Department, that the levels of hazardous constituents in all contaminated media are within limits appropriate for unrestricted land uses.

6. Environmental Covenant

No later than the submission of the survey plat required in Condition V.B.5., the Permittee must:

a. Record in the probate judges office of the county in which the property, or a portion therof, is located an environmental covenant in accordance with ADEM Admin. Code r. 335-5 that will in perpetuity notify any potential purchaser of the property that:

i. The land is contaminated with hazardous constituents in concentrations that exceed unrestricted use standards;

ii. The use of the property is restricted by this permit for certain residential, municipal, or industrial purposes and may lead to an increased risk of exposure to hazardous constituents depending upon the activities initiated at the site. Such activities may yield an increased level of human health risk to the owner;

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iii. The potential purchaser or entity that desires to work in the contaminated area should notify the Permittee before mobilizing to the area covered by the land use control.

b. Submit to the Department a certification, signed by the Permittee in accordance with Permit Condition I.C.11., that the environmental covenant specified in this part has been performed. This certification must include a copy of the document in which the notation has been placed.

c. Maintain the environmental covenant described in Permit Condition V.B.6. until the Permittee has demonstrated, to the satisfaction of the Department, that the levels of hazardous constituents in all contaminated media are within limits appropriate for unrestricted land uses.

7. Security

Security measures, where required by Conditions V.B.1. and V.C. of this permit, will be conducted in accordance with ADEM Admin. Code r. 335-14-5-.02(5) and as prescribed in the approved CMI Plan.

8. Inspection

Where corrective measures addressed in Conditions V.B.1. include provisions to cap in place or partially remediate properties or land areas, whether owned or not owned by the Permittee, the Permittee shall specify inspection protocols on a scheduled basis to ensure continued integrity of the remedy and to ensure that land use remains appropriately restricted per the environmental covenant established pursuant to Permit Condition V.B.6. Inspection provisions shall be as prescribed in the approved CMI Plan

V.C. AREA SPECIFIC CONDITIONS (RESERVED)

V.D. CORRECTIVE MEASURES IMPLEMENTATION (CMI) REPORTS

1. CMI Progress Reports

If the time required to complete implementation of a specific set of corrective measures, as described in the Department-approved CMI Plan, is greater than 180 calendar days, the Permittee shall provide ADEM with progress reports according to the schedule in the ADEM-approved CMI Plan. If no schedule has been approved as part of the associated plan, progress reports shall be submitted monthly. The progress reports shall, at a minimum, contain the following information:

a. A description of the portion of CMI Plan completed;

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b. Summaries of and deviations from the approved CMI Plan during the reporting period;

c. Summaries of current and potential problems, including recommended solutions and alternatives as well as corrective actions undertaken;

d. Any monitoring data (soil, air, dust, water) collected for any reason during the construction period for the purposes of monitoring potential for human and ecological exposure; and,

e. Projected work for the next period and impacts to the approved schedule.

2. Final CMI Reports

Upon completion of construction of corrective measures systems, implementation of land use controls, interim removal actions, or other short-term activities required by this permit and/or the approved CMI Plan, the Permittee shall submit to the Department a Final CMI Report containing, at a minimum, the following:

a. A description of activities completed;

b. For cap and cover remedies, as-built construction drawings presenting the final in-place three-dimensional location of contaminated material. A plan view of the remediated areas shall be presented in addition to a cross section of the in-place capped areas;

c. Waste manifests indicating the handling of any excavated material that has been shipped off-site to a Department-approved, certified landfill;

d. For remedies involving land use controls, a copy of the survey plat and environmental covenant required by Condition V.B. of this permit;

e. Monitoring data (soil, air, dust, water) collected for any reason during the construction period for the purposes of monitoring potential for human and ecological exposure; and

f. Certification, prepared in accordance with ADEM Admin. Code r. 335-14-8-02 (2)(d) by the Permittee and an independent professional engineer registered in the State of Alabama, that the corrective measures implementation phase (*i.e.,* construction) required by this permit is complete and that the approved system and/or facilities are ready for operation in accordance with the intended design (*i.e.,* CMI Plan).

3. Corrective Measures (CM) Effectiveness Reports

a. For corrective measures that have been fully implemented and where the corrective measures system must operate for a period of time to achieve cleanup goals or levels, the Permittee shall submit CM Effectiveness Reports annually, unless otherwise approved by the

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Department, within 360 calendar days after corrective action is initiated and continue until corrective action is completed. The overall CM Effectiveness Reports shall include, at a minimum, the following information for each SWMU and/or AOC included in the report:

i. A detailed narrative presenting an evaluation of the effectiveness of the selected remedy;

ii. Summaries of compliance with and progress toward achieving cleanup goals;

iii. Any significant revisions, adjustments, or proposed modifications to the selected remedy;

iv. Tabulated environmental sampling and monitoring data including, but not limited to, groundwater quality, elevation data, and a graphical representation of all constituents detected during each sampling event from recovery wells, monitoring wells, drinking water wells, and other locations;

v. Chain of custody, field reports, and laboratory data sheets to include the date of collection, the date the sample was extracted, and the date of sample analysis for samples collected during the reporting period;

vi. Any monitoring data (soil, air, dust, water) collected for any reason during the post-construction period for the purposes of monitoring potential for human and ecological exposure;

vii. Isoconcentration maps depicting the distribution of parameters for each sampling event;

viii. Time versus concentration plots for each monitoring parameter for each recovery well and a representative number of effectiveness wells;

ix. Tabulated volumetric data on groundwater pumped and pumping rates (monthly and cumulative) for each recovery well;

x. Records of any groundwater recovery system operation time, including shutdown periods, not including any minor (less than 24 hours) shutdowns for repairs, maintenance, etc.;

xi. Potentiometric surface maps;

xii. Description of land use during the reporting period at the designated area requiring corrective measures; and,

xiii. Findings of the Permittee's investigation into the continued effectiveness of land use controls per Condition V.B.

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b. If, at any time, the Permittee determines that any remedy selection specified in Condition V.B or V.C. of this permit no longer satisfies the applicable requirements of ADEM Admin. Code r. 335-14-5-.06(12) or this permit for releases of hazardous waste or hazardous constituents originating from SWMUs or AOCs, the Permittee must, within 90 calendar days, submit an application for a permit modification, pursuant to Permit Condition I.I, to make any appropriate changes to the CMI Plan.

c. The application for changes in the CMI Plan, including changes in inspection and monitoring provisions of the CMI Plan, shall be submitted as an application for a permit modification pursuant to the requirements of ADEM Admin. Code r. 335-14-8-.04.

4. Final Report of Corrective Measures

Within 90 calendar days following attainment of cleanup levels or goals as outlined in this Permit and the approved CMI Plan, the Permittee shall submit to the Department a Final Report of Corrective Measures (FRCM). The FRCM shall contain a certification by the Permittee and an Alabama-registered independent professional engineer that all remedial measures required by this permit and the approved CMI Plan have been completed. The FRCM shall outline any procedures and schedules for dismantling of corrective measures systems, groundwater monitoring or recovery systems, removal of land use controls, and any other remedial systems or controls required by this permit or the approved CMI Plan.

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Table V.1.

The following Solid Waste Management Unit(s) (SWMUs) and/or Area(s) of Concern (AOCs) numbers and descriptions correspond with those noted in the RCRA Facility Assessment (RFA) Report. Where discrepancies exist, the permit will take precedence.

List of SWMUs and AOCs requiring Corrective Measures.

SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
AOC M*	Carbon Disulfide Vertical Storage Tank # 4 Area	This area managed carbon disulfide.	Air, Groundwater, Soil, Surface Water.
AOC A**	Carbon Disulfide Transfer Tanks Area	This area managed washwater, stormwater, and spills containing raw materials (chlorine, carbon disulfide, waste sulfur chlorides), byproducts (sulfur and sulfur chlorides) and carbon tetrachloride.	Air, Groundwater, Soil, Surface Water.

*CMI work plan was approved January 2006

**CMI work plan was approved July 2006. A revised CMI work plan was approved on July 2, 2018 and XX/XX/XXXX to incorporate a new remedy.

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PART VI

SUMMARY OF DEADLINES

The summary information provided herein is intended only as a guide to the requirements of this permit. It is not intended to be all inclusive, nor is it intended to be used as a substitute for the full text of this permit.

PERMIT CONDITION	ITEM	DUE DATE
I.C.2.b.	Reapply for a renewal	180 calendar days before the expiration of the current permit.
I.C.12.a.	Give notice to the Department of any planned physical alterations or additions to the permitted facility and any solid waste management units.	As soon as possible
I.C.12.f.	Report any noncompliance with this permit that may endanger human health or the environment.	Orally within 24 hours from the time the Permittee becomes aware of the circumstances. Written submission shall also be provided within 5 calendar days of the time that the Permittee becomes aware of the circumstances
I.F.	Waste Minimization Certification	Annually
I.G.	Update cost estimates	Annually, as required by ADEM Admin. Code Rules 335-14-5-.08(3)(b), 335-14-5-.08(5)(b), and 335-14-5-.08(10)(b) and no later than 30 calendar days after the Department has approved a modification to the Closure Plan, Post-Closure Plan, or Corrective Action Plan, or any other plan required or referenced by this permit, if the change in the plan results in an increase in the amount of the cost estimate.
I.I.	Submit a written request for a permit modification pursuant to the requirements of ADEM Admin. Code r. 335-14-8-.04(2).	At least 60 calendar days prior to a proposed change in facility design or operation.
II.C.2	Inspect closed unit(s).	At least weekly, after storms, and in accordance with the inspection schedule.
III.B.1.a.iii.	Notification of damaged groundwater monitoring wells.	Immediately in writing, which includes a description of the well repair activities to be conducted. The well repair procedures must be approved by the Department prior to implementation. Arepair report must be submitted within 30 calendar days of repair.

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PERMIT CONDITION	ITEM	DUE DATE
III .B.1.d.	Install additional groundwater monitoring wells	As necessary to assess changes in the rate and extent of any plume of contamination, or as otherwise deemed necessary. Note: a permit modification request must be submitted at least 90 calendar days prior to installation of additional groundwater monitoring well(s).
III.B.1.e.	Install wells PM-1, PM-2, PM-3, PM-4, SVE-1, SVE-2, SVE-3, SVE-4, SVE-5, SVE-6, and SVE-7	Within 90 calendar days after the effective date of this permit. Submit report within 120 calendar days after the effective date of this permit. Submit well installation report within 30 calendar days after installation is completed.
III.B.2.a.	Determine groundwater surface elevation.	At least semi-annually and each time a well is sampled.
III.B.2.b.	Determine groundwater flow rate and direction.	At least annually.
III.B.6.b.	Submit groundwater monitoring report	Within 60 calendar days of the first sampling event and annually thereafter.
III.B.6.c.	Submit progress reports.	Within 90 calendar days after the effective date of this permit and monthly thereafter. See permit condition for start/stop/resume provisions.
III.C.1.a.	Sample all point of compliance wells and background wells and analyze for the constituents listed in Table III.2. of this permit.	Semi-annually
III.C.1.b.	Sample and analyze for temperature (degrees F or C), specific conductance (Mhos/cm), and pH (standard units), at all background and point of compliance monitoring well locations.	Each time the well is sampled.
III.C.2.a.	Determine whether there is a statistically significant evidence of contamination above background levels at each monitoring well.	Within 45 calendar days after completion of each sampling event.
III.E.2.b.	Implement corrective action plan	No later than 120 calendar days after the effective date of this permit.
III.E.3.a.	Sample all boundary, point of compliance/effectiveness and recovery wells and analyze for the constituents listed in Table III.2 and Table III.3 of this permit.	Quarterly beginning within 120 calendar days of the effective date of this permit.
III.E.3.b.	Sample all boundary wells and analyze for the constituents listed in Table Table III.3. of this permit.	Quarterly beginning within 120 calendar days of the effective date of this permit.

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PERMIT CONDITION	ITEM	DUE DATE
III.E.3.c.	Sample and analyze for temperature (degrees F or C), specific conductance (Mhos/cm), and pH (standard units), at all point of compliance, effectiveness, recovery, and boundary monitoring well locations.	Each time the well is sampled.
III.E.4.a.	Submit corrective action effectiveness reports.	Annually within 360 calendar days after corrective action is initiated and continue until corrective action is completed
IV.B.1.	Notify the Department, in writing, of the discovery of any additional AOCs	Within 15 calendar days of discovery
IV.B.2.	Notify the Department, in writing, of the discovery of any additional SWMUs	Within 15 calendar days of discovery
IV.B.3.	Submit a SWMU Assessment Report (SAR) for each SWMU identified under IV.B.2.	Within 90 calendar days of notification.
IV.C.1.	Notify the Department, in writing, of any newly discovered release(s) of hazardous waste or hazardous constituents from SWMUs or AOCs discovered during the course of groundwater monitoring, field investigations, environmental audits, or other means.	Within 15 calendar days of discovery
IV.D.7.	Submit RFI Progress Reports.	Monthly beginning in the second month following the initiation of the RFI
IV.D.8.	Submit RFI Report	Within 60 calendar days from the completion of investigation activities.
IV.E.2.	Submit CMI Plan	Within 120 calendar days following the Permittee's submittal of the RFI Report indicating that hazardous constituents have come to be located at any area of the Permittee's facility, or beyond the facility, at concentrations exceeding those appropriate for the protection of human health and the environment, or within 120 calendar days following notification from the Department that a CMI Plan is required, whichever occurs earlier.
IV.E.4.	Demonstrate financial assurance for completing the approved remedy.	Within 60 calendar days after this Permit has been approved.
IV.F.1.	Submit IM Work Plan	Within 30 calendar days upon notification by the Department.
IV.F.3.	Submit IM Report	Within 90 calendar days of completion of IM.

DRAFT

PERMIT CONDITION	ITEM	DUE DATE
V.B.5.a.	Submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Department, a survey plat indicating the location and dimensions of the SWMUs, AOCs, and capped or partially remediated areas with respect to permanently surveyed benchmarks, the locations of sampling points, and the concentrations of hazardous constituents detected	Within 90 calendar days following the effective date of a permit modification addressing remedy selection.
V.B.6.a.	Record environmental covenant	No later than the submission of the survey plat required in Condition V.B.5.
V.B.6.b.	Submit to the Department a certification that the environmental covenant has been performed.	No later than the submission of the plat required in Condition V.B.5.
V.D.2.	Submit Final CMI Report	Upon completion of construction of corrective measures systems
V.D.3.	Submit Corrective Measures Effectiveness Reports	Annually within 360 calendar days after corrective action is initiated and continue until corrective action is completed
V.D.4.	Submit a Final Report of Corrective Measures (FRCM)	Within 90 calendar days following attainment of cleanup levels or goals

DRAFT

Part A and Part B Post-Closure Permit Renewal Application (Volume 1 of 2)

Nouryon Chemicals, LLC

LeMoyne Site

13440 Highway 43 North

Axis, Alabama 36505

USEPA ID No. ALD008161176

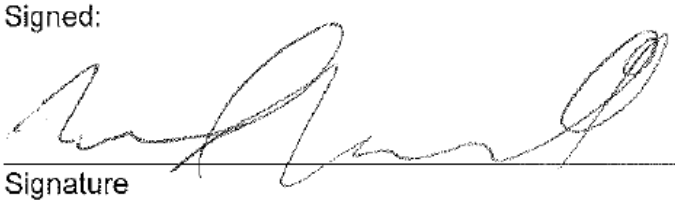
February 29, 2024

Nouryon

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signed:



Signature

Michael Mitchell

Printed Name

Site Director

Title

2/28/24

Date

United States Environmental Protection Agency
RCRA SUBTITLE C SITE IDENTIFICATION FORM

1. Reason for Submittal (Select only one.)

☐	Obtaining or updating an EPA ID number for on-going regulated activities (Items 10-17 below) that will continue for a period of time.
☐	Submitting as a component of the Hazardous Waste Report for _____ (Reporting Year)
	☐ Site was a TSD facility, a reverse distributor, and/or generator of ≥ 1,000 kg of non-acute hazardous waste, > 1 kg of acute hazardous waste, or > 100 kg of acute hazardous waste spill cleanup in **one or more months of the reporting year** (or State equivalent LQG regulations)
☐	Notifying that regulated activity is no longer occurring at this Site
☐	Obtaining or updating an EPA ID number for conducting Electronic Manifest Broker activities
☑	Submitting a new or revised Part A (permit) Form

2. Site EPA ID Number

A	L	D	0	0	8	1	6	1	1	7	6

3. Site Name

Nouryon Functional Chemicals, LLC

4. Site Location Address

Street Address	**13440 Highway 43 North**				
City, Town, or Village	**Axis**			County	**Mobile**
State	**AL**	Country	**US**	Zip Code	**36505**
Latitude	**30.751159 N**	Longitude	**- 88.02500 W**	☐ Use Lat/Long as Primary Address	

5. Site Mailing Address ☐ Same as Location Street Address

Street Address	**13440 Highway 43 North**				
City, Town, or Village	**Axis**				
State	**AL**	Country	**US**	Zip Code	**36505**

6. Site Land Type

☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

7. North American Industry Classification System (NAICS) Code(s) for the Site (at least 5-digit codes)

A. (Primary) **325180**	C.
B.	D.

8. Site Contact Information

☐ Same as Location Address

First Name	MI	Last Name
S. Renee		Johnston
Title: HSE Advisor		
Street Address: 13440 Highway 43 North		
City, Town, or Village: Axis		
State: AL	Country: US	Zip Code: 36505
Email: samantha.johnston@nouryon.com		
Phone: 251-679-4315	Ext	Fax

9. Legal Owner and Operator of the Site

A. Name of Site's Legal Owner

☑ Same as Location Address

Full Name	Date Became Owner (mm/dd/yyyy)
Nouryon Functional Chemicals, LLC	10/9/2018

Owner Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

Street Address: 525 West Van Buren Street		
City, Town, or Village: Chicago		
State: IL	Country: US	Zip Code: 60607-3823
Email		
Phone: 312-544-7000	Ext	Fax
Comments		

B. Name of Site's Legal Operator

☑ Same as Location Address

Full Name	Date Became Operator (mm/dd/yyyy)
Nouryon	10/9/2018

Operator Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other

Street Address: 13440 Highway 43 North		
City, Town, or Village: Axis		
State: AL	Country: US	Zip Code: 36505
Email		
Phone: 251-675-1310	Ext	Fax
Comments		

10. Type of Regulated Waste Activity (at your site)

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities

☑ Y ☐ N	1. Generator of Hazardous Waste—If "Yes", mark only one of the following—a, b, c	
☑	a. LQG	-Generates, in any calendar month, 1,000 kg/mo (2,200 lb/mo) or more of non-acute hazardous waste (includes quantities imported by importer site); or - Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lb/mo) of acute hazardous waste; or - Generates, in any calendar month or accumulates at any time, more than 100 kg/mo (220 lb/mo) of acute hazardous spill cleanup material.
☐	b. SQG	100 to 1,000 kg/mo (220-2,200 lb/mo) of non-acute hazardous waste and no more than 1 kg (2.2 lb) of acute hazardous waste and no more than 100 kg (220 lb) of any acute hazardous spill cleanup material.
☐	c. VSQG	Less than or equal to 100 kg/mo (220 lb/mo) of non-acute hazardous waste.
☐ Y ☑ N	2. Short-Term Generator (generates from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section. *Note: If "Yes", you MUST indicate that you are a Generator of Hazardous Waste in Item 10.A.1 above.*	
☑ Y ☐ N	3. Treater, Storer or Disposer of Hazardous Waste—Note: Part B of a hazardous waste permit is required for these activities.	
☐ Y ☑ N	4. Receives Hazardous Waste from Off-site	
☐ Y ☑ N	5 Recycler of Hazardous Waste	
☐	a. Recycler who stores prior to recycling	
☐	b. Recycler who does not store prior to recycling	
☐ Y ☑ N	6. Exempt Boiler and/or Industrial Furnace—If "Yes", mark all that apply.	
☐	a. Small Quantity On-site Burner Exemption	
☐	b. Smelting, Melting, and Refining Furnace Exemption	

B. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g. D001, D003, F007, U112). Use an additional page if more spaces are needed.

D001	**D002**	**D003**	**D018**	**D009**	**D039**	**P022**
F003	**F005**					

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes. Please list the waste codes of the State hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

11. Additional Regulated Waste Activities (NOTE: Refer to your State regulations to determine if a separate permit is required.)

A. Other Waste Activities

☐ Y ☑ N	1. Transporter of Hazardous Waste—If "Yes", mark all that apply.
☐	a. Transporter
☐	b. Transfer Facility (at your site)
☐ Y ☑ N	2. Underground Injection Control
☐ Y ☑ N	3. United States Importer of Hazardous Waste
☐ Y ☑ N	4. Recognized Trader—If "Yes", mark all that apply.
☐	a. Importer
☐	b. Exporter
☐ Y ☑ N	5. Importer/Exporter of Spent Lead-Acid Batteries (SLABs) under 40 CFR 266 Subpart G—If "Yes", mark all that apply.
☐	a. Importer
☐	b. Exporter

B. Universal Waste Activities

☐ Y ☑ N	1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) - If "Yes" mark all that apply. Note: Refer to your State regulations to determine what is regulated.
☐	a. Batteries
☐	b. Pesticides
☐	c. Mercury containing equipment
☐	d. Lamps
☐	e. Aerosol Cans
☐	f. Other (specify) _____
☐	g. Other (specify) _____
☐ Y ☑ N	2. Destination Facility for Universal Waste Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities

☐ Y ☑ N	1. Used Oil Transporter—If "Yes", mark all that apply.
☐	a. Transporter
☐	b. Transfer Facility (at your site)
☐ Y ☑ N	2. Used Oil Processor and/or Re-refiner—If "Yes", mark all that apply.
☐	a. Processor
☐	b. Re-refiner
☐ Y ☑ N	3. Off-Specification Used Oil Burner
☐ Y ☑ N	4. Used Oil Fuel Marketer—If "Yes", mark all that apply.
☐	a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
☐	b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Pharmaceutical Activities

☐ Y ☑ N	1. Operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals—if "Yes", mark only one. Note: See the item-by-item instructions for definitions of healthcare facility and reverse distributor.
☐	a. Healthcare Facility
☐	b. Reverse Distributor
☐ Y ☑ N	2. Withdrawing from operating under 40 CFR Part 266, Subpart P for the management of hazardous waste pharmaceuticals. Note: You may only withdraw if you are a healthcare facility that is a VSQG for all of your hazardous waste, including hazardous waste pharmaceuticals.

12. Eligible Academic Entities with Laboratories—Notification for opting into or withdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262, Subpart K.

☐ Y ☑ N	A. Opting into or currently operating under 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories— If "Yes", mark all that apply. Note: See the item-by-item instructions for definitions of types of eligible academic entities.
☐	1. College or University
☐	2. Teaching Hospital that is owned by or has a formal written affiliation with a college or university
☐	3. Non-profit Institute that is owned by or has a formal written affiliation with a college or university
☐ Y ☑ N	B. Withdrawing from 40 CFR Part 262, Subpart K for the management of hazardous wastes in laboratories.

13. Episodic Generation

☐ Y ☑ N	Are you an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves you to a higher generator category. If "Yes", you must fill out the Addendum for Episodic Generator.

14. LQG Consolidation of VSQG Hazardous Waste

☐ Y ☑ N	Are you an LQG notifying of consolidating VSQG Hazardous Waste Under the Control of the Same Person pursuant to 40 CFR 262.17(f)? If "Yes", you must fill out the Addendum for LQG Consolidation of VSQG hazardous waste.

15. Notification of LQG Site Closure for a Central Accumulation Area (CAA) (optional) OR Entire Facility (required)

☐ Y ☑ N	LQG Site Closure of a Central Accumulation Area (CAA) or Entire Facility.
	A. ☐ Central Accumulation Area (CAA) or ☐ Entire Facility
	B. Expected closure date: _____ mm/dd/yyyy
	C. Requesting new closure date: _____ mm/dd/yyyy
	D. Date closed : _____ mm/dd/yyyy ☐ 1. In compliance with the closure performance standards 40 CFR 262.17(a)(8) ☐ 2. Not in compliance with the closure performance standards 40 CFR 262.17(a)(8)

16. Notification of Hazardous Secondary Material (HSM) Activity

☐ Y ☑ N	Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 260.30, 40 CFR 261.4(a)(23), (24), (25), or (27)? If "Yes", you must fill out the Addendum to the Site Identification Form for Managing Hazardous Secondary Material.

17. Electronic Manifest Broker

☐ Y ☑ N	Are you notifying as a person, as defined in 40 CFR 260.10, electing to use the EPA electronic manifest system to obtain, complete, and transmit an electronic manifest under a contractual relationship with a hazardous waste generator?

18. Comments (include item number for each comment)

19. Certification I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. **Note: For the RCRA Hazardous Waste Part A permit Application, all owners and operators must sign (see 40 CFR 270.10(b) and 270.11)**.

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy) **2/22/2024**
Printed Name (First, Middle Initial Last) **Michael Mitchell**	Title **Site Director**
Email **michael.mitchell@nouryon.com**	

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial Last)	Title
Email	

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT PART A FORM

1. Facility Permit Contact

First Name	**S Renee**	MI		Last Name	**Johnston**
Title	**HSE Advisor**				
Email	**samantha.johnston@nouryon.com**				
Phone	**251-679-4315**	Ext		Fax	

2. Facility Permit Contact Mailing Address

Street Address	**13440 Highway 43 North**		
City, Town, or Village	**Axis**		
State **AL**	Country **US**	Zip Code **36505**	

3. Facility Existence Date (mm/dd/yyyy)

4. Other Environmental Permits

A. Permit Type	B. Permit Number	C. Description
	A L 3 0 1 9 6 1	**NPDES Permit**
	5 0 3 - 5 0 0 9	**Title V Permit**

5. Nature of Business

Nouryon is a global, specialty chemicals leader. Markets and consumers worldwide rely on our essential solutions to manufacture everyday products, such as personal care, cleaning goods, paints and coatings, agriculture and food, pharmaceuticals, and building products. Wastes are generated from:
Chemical Conversion - process waste from different units, off spec products, and tank cleaning
Painting - Waste Paint and Solvents from on site painting
Universal Waste - Batteries and Lamps
Maintenance - Parts Washer and Aerosol Cans

6. Process Codes and Design Capacities

Line Number		A. Process Code			B. Process Design Capacity		C. Process Total Number of Units	D. Unit Name
					(1) Amount	(2) Unit of Measure		
0	1	D	8	0	2.22	B	01	New Brine Mud Pond

7. Description of Hazardous Wastes (Enter codes for Items 7.A, 7.C and 7.D(1))

Line No.		A. EPA Hazardous Waste No.				B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes								
								(1) Process Codes								(2) Process Description (if code is not entered in 7.D1))
																Not Applicable

8. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.

9. Facility Drawing

All existing facilities must include a scale drawing of the facility. See instructions for more detail.

10. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas. See instructions for more detail.

11. Comments

ADEM Post-Closure Care Permit is for one closed unit. Hazardous waste is not generated from post-closure care of the closed unit. ADEM corrective action for two Areas of Concern (AOC A and AOC M).

Part B Post-Closure Permit Renewal Application

Nouryon Chemicals, LLC

LeMoyne Site

13440 Highway 43 North

Axis, Alabama 36505

USEPA ID No. ALD008161176

February 29, 2024

Part B Post-Closure Permit Renewal Application

Nouryon Chemicals, LLC

LeMoyne Site

Axis, Mobile County, Alabama

USEPA ID No. ALD008161176

February 29, 2024

Prepared By:
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1143 1st Avenue South, Suite 109
Birmingham
Alabama 35233
Phone: 205 930 5700
Fax: 205 930 5707

Prepared For:
Nouryon Chemicals, LLC.
LeMoyne Plant
13440 Highway 43 North
Axis, Alabama 36505
United States

Jason M. Hughes, PG
Project Manager
Alabama Professional Geologist No. 1118

Jason Cosgrove, PE
Principal Engineer
Alabama Licensed Professional Engineer No. 50101

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Volume 2

Appendix B **Post-Closure and Corrective Measures Monitoring and Analysis Plan**

Appendix C **AOC A Corrective Measures Implementation Plan**

Appendix D **AOC M Corrective Measures Implementation Plan**

Acronyms and Abbreviations

AMSL	Above Mean Sea Level
ADEM	Alabama Department of Environmental Management
AHWMMA	Alabama Hazardous Waste Management and Minimization Act
AOC	Area of Concern
AST	Aboveground Storage Tank
BKG	Background
BMP	Best Management Practices
CCP	Cold Creek Plant
CCS	Cold Creek Swamp
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMI	Corrective Measures Implementation
CMIP	Corrective Measures Implementation Plan
CMS	Corrective Measures Study
CNA	Courtaulds North America
CS2	Carbon Disulfide
DOT	Department of Transportation
EFF	Effectiveness
EPA	Environmental Protection Agency
ESD	Explanation of Significant Difference
EXT	Extraction
FS	Feasibility Study
FT	Foot/Feet
GPS	Global Positioning System
H2S	Hydrogen Sulfide
HSWA	Hazardous and Solid Waste Amendments
HWMU	Hazardous Waste Management Unit
IAROD	Interim Action Record of Decision
IN	Inch/Inches
LP	LeMoyne Plant
MACT	Maximum Achievable Control Technology

MCA	Monochloroacetic Acid
MLSTZ	Middle Lower Swamp Transition Zone
MMA	Methyl Methacrylate
NaSH	Sodium Hydrosulfide
NaCl	Sodium Chloride
NBMP	New Brine Mud Pond
NPDES	National Pollutant Discharge Elimination System
NFA	No Further Action
NPL	National Priorities List
OU	Operable Unit
PIN	Preliminary Information Needs
POC	Point of Compliance
PVC	Polyvinyl Chloride
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SWMU	Solid Waste Management Unit
SVE	Soil Vapor Extraction
TSD	Treatment Storage Disposal
TSDF	Treatment Storage Disposal Facility
UASZ	Upper Arm Swamp Zone
US	United States
USGS	United States Geological Survey
UST	Underground Storage Tank
VSI	Visual Site Inspection

1 General Information

The following information has been prepared in accordance with requirements of the Alabama Department of Environmental Management (ADEM) Administrative Code R. 335-14 for renewal of an Alabama Hazardous Waste Management and Minimization Act (AHWMMA) Post-Closure Permit for Nouryon Functional Chemicals, LLC LeMoyne Plant located in Axis, Mobile County, Alabama (ALD 008 161 176). The Post-Closure Permit ("the Permit") requires post-closure care of Unit 5EP202 ("the New Brine Mud Pond") and corrective action for two Areas of Concern (AOC A and AOC M).

1.1 Description of the Facility

[335-14-8-. 02(5)(b) 1., 335-14-8-. 02(5)(a)]

The Nouryon Functional Chemicals, LLC LeMoyne Plant (referenced as "Nouryon", "Nouryon Chemicals" "Nouryon LeMoyne", or "LeMoyne Plant" for the remainder of this document) is located in the unincorporated community of Axis in the northeast section of Mobile County, Alabama, approximately 20 miles north of Mobile, 6 miles south of Mt. Vernon, and 5 miles north of Creola. Nouryon is situated between United States (US) Highway 43 to the west and the Mobile River to the east. The surrounding area is sparsely populated and consists primarily of river-bottom marsh and industrial sites. Surrounding land use near the site is industrial, a solid waste landfill, and chemical manufacturing and processing.

The Nouryon property was previously owned by Stauffer Chemical Company (Stauffer) which operated the chemical manufacturing plant (LeMoyne Plant) from 1953 until 1987. In 1987, Akzo Chemie America, Inc. (Akzo), which later became Akzo Nobel Chemicals (Akzo Nobel) in 1994, purchased the property and continued to operate as a multi-product chemical manufacturing plant. In 2018, Akzo Nobel spun off their specialty chemicals business, which became Nouryon.

The LeMoyne Plant began operations in 1953 with a retort Carbon Disulfide (CS_2) Plant followed by a reactor CS_2 process in 1956. Several other production facilities were subsequently added, including a Sulfuric Acid Plant (online in 1957), a Carbon Tetrachloride Plant (online in 1964), a Caustic/Chlorine plant (online in 1964, also referred to as a chloro/alkali plant), Crystex® Plant (online in 1974; a proprietary sulfur compound), and a Metam Sodium process (online in 1984). Akzo Chemie America (Akzo Nobel, Inc.) acquired the LeMoyne Plant in 1987. Since that time, the caustic/chlorine and carbon tetrachloride manufacturing processes have been discontinued (1991 and 1992, respectively) and the Monochloroacetic Acid Unit was brought on-line (1994). Sodium Hydrosulfide (NaSH) production was added in 2002. Nouryon has owned and operated the property and chemical manufacturing plant since 2018.

Detailed descriptions of each facility process, waste generation, and associated waste codes for each process are provided in the *Attachment B Preliminary Information Needs Response* (PIN Response) submitted to the ADEM in January 2024 (Arcadis, 2024). Detailed descriptions of generated hazardous waste, processes, Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) are provided in the PIN Response and **Appendix A-8**.

1.1.1 Post-Closure Care and Corrective Action Descriptions

The Post-Closure Permit is for post-closure care of Unit 5EP202 (New Brine Mud Pond) and corrective action for Area of Concern AOC A and AOC M. Summaries of the units requiring post-closure care and corrective action are provided in Sections 1.1.1.1 through 1.1.1.3.

1.1.1.1 New Brine Mud Pond

Effective September 30, 1988, the LeMoyne Plant became a Resource Conservation and Recovery Act (RCRA) permitted facility under ADEM regulatory authority. The facility was permitted to treat, store, and dispose of hazardous wastes in the three units. In 1991, the manufacturing process that generated the hazardous waste requiring treatment, storage, disposal facility (TSDF) designation was shut down and two of the three units were clean closed. One waste management unit, the *New Brine Mud Pond (5EP202) Hazardous Waste Management Unit* (NBMP), was closed in-place and designed to store a maximum of 3 million gallons of Listed Hazardous Waste (K071) generated on-site from the electrolytic production of chlorine and caustic. The unit was certified closed in-place in 1992 in accordance with a permitted Closure Plan and is subject to post-closure care under ADEM AHWMMA Permit ALD 008 161 176. A routine inspection and detection groundwater monitoring program have continued under the Permit. Correspondence from ADEM and AkzoNobel for the closure certification of the NBMP are provided in **Appendix A-1**.

1.1.1.2 AOC M

In March 1992, the Unites States Environmental Protection Agency (EPA) completed a RCRA Facility Assessment (RFA) of the LeMoyne Plant. A total of 139 Solid Waste Management Units (SWMUs) and 14 AOCs were identified during the RFA. No further action was recommended for 106 SWMUs and 6 AOCs, and confirmatory sampling was suggested for 25 SWMUs and 8 AOCs. A RCRA Facility Investigation (RFI) was suggested for an additional 8 SWMUs. Additional confirmatory sampling was recommended for another 8 SWMUs and 3 AOCs unless adequate documentation of proper demolition could be provided.

In September 1999, ADEM and TechLaw, Inc. (an EPA Contractor) completed a RFA of the LeMoyne Plant and issued a revised RFA report dated April 5, 2001, which was subsequently revised and dated February 22, 2002. The revised RFA suggested a RFI for AOC M and SWMU 146. AOC M is the area of the LeMoyne Plant designated “Vertical Storage Tank #4” and is located along the LeMoyne Plant’s southern property boundary. ADEM's subsequent notification letter dated November 25, 2002 and AkzoNobel's Permit at that time specified completion of an RFI at AOC M and SWMU 146.

An RFI Workplan for AOC M and SWMU 146 was submitted to ADEM on June 9, 2003. ADEM approved the RFI Workplan in correspondence dated September 2, 2003. The results of the RFI of AOC M and SWMU 146 were presented in a RFI Report dated May 28, 2004. ADEM approved the RFI Report, and due to the concentration of carbon disulfide in wells in the area of AOC M, required a Corrective Measures Implementation Plan (CMIP) for this area in correspondence to Akzo Nobel dated July 20, 2004. Background information pertaining to AOC M is provided in **Appendix D**.

The selected remedy for AOC M is groundwater recovery, hydraulic control, and treatment (i.e., pump-and-treat). Intercept well IW-6 was installed in AOC M in April 2006 in accordance with the CMIP for AOC M dated November 2004. Well IW-6R was installed as a replacement to IW-6 in July 2014 at a location closer to Vertical Storage Tank #4 and continues to provide hydraulic control and extraction of groundwater for treatment.

1.1.1.3 AOC A

AOC A is the “Carbon Disulfide Transfer Tanks Area” and located in the southwest portion of the main production area of the LeMoyne Plant manufacturing area. This unit consists of a below grade concrete vault that is approximately 70 feet (ft) wide by 70 ft long and 10.5 ft deep (from grade). The concrete walls of the structure extend 2.5 ft above grade resulting in a total wall height of 13 ft. Twelve cylindrical carbon disulfide tanks were formerly located within the vault in a horizontal orientation on concrete saddles. When operational, the unit was filled with water to prevent any release of carbon disulfide from coming in contact with air.

The EPA 1992 RFA recommended confirmatory sampling for AOC A based on the observation of staining and stressed vegetation during the 1991 Visual Site Inspection (VSI). The south side of the former tank vault is both topographically and hydraulically downgradient of this feature. Therefore, in accordance with the Confirmatory Sampling Workplan, two soil borings were installed along the south wall of the former tank vault on March 24, 2004. Subsurface soil samples contained concentrations of carbon disulfide that exceeded the ADEM Migration to Ground Water Preliminary Screening Value (PSV) of 32 milligrams per kilogram (mg/kg). Based on the results of confirmatory sampling, a RFI was recommended for AOC A — Carbon Disulfide Transfer Tanks Area in the October 2004 Confirmatory Sampling Report.

The RFI of AOC A commenced on March 30, 2005. Stormwater was pumped from the vault and the interior surfaces were cleaned for inspection. The RFI of AOC A included collection and analysis of soil samples to horizontally and vertically delineate carbon disulfide detected in subsurface soil on the south/southeast (downgradient) side of the vault during the March 2004 confirmatory sampling event. Soil sampling events were conducted on March 30, 2005 and July 13, 2005. The RFI also included evaluation of groundwater quality in the area of AOC A. The results of the RFI indicated that vadose zone soil on the southern side of AOC A contained concentrations of carbon disulfide that exceeded the Migration to Groundwater PSV of 32 mg/kg. RFI sampling results indicated that affected soil extends from an approximate depth of 11 ft below grade to the surface of the water table at approximately 30 ft below grade. Additionally, the concentration of carbon disulfide in groundwater in the area of AOC A exceeded the site's groundwater criteria for carbon disulfide (per the EPA Record of Decision) of 700 micrograms per liter (µg/L). Based on the results of the RFI, the September 23, 2005 RFI Report recommended development of a CMI Plan for AOC A.

A CMIP for AOC A was submitted and approved by ADEM in 2006. Implementation of corrective measures at AOC A commenced on April 28, 2008. The approved corrective measure consisted of in-situ chemical oxidation by a modified Fenton's Reaction (injection of acidified ferrous sulfate, potable water and hydrogen peroxide [<7%]). In June 2011, the remedial approach was supplemented by addition of soil vapor extraction (SVE). Though the SVE process was successful in recovering vapor phase carbon disulfide, the process was inefficient due to limitations from use of converted oxidant injection wells. These limitations included well design, well location/frequency, and prior use of the wells for oxidant injection (possible mineral fouling and/or short-circuiting). In 2018, the Permit was modified to include a revised CMIP for enhanced SVE. The modified SVE system operated almost continuously from 2019 to 2022 until damage from a lightning strike in late 2022.

In a letter dated April 3, 2023, ADEM requested a repair plan for the damaged SVE system. In a response dated May 22, 2023, Nouryon asked ADEM for an extension to the due date for a revised remedial plan to February 2024 to coincide with this renewal application and allow for completion of a corrective measure study (CMS). ADEM approved submittal of the revised remedial plan with the renewal application and requested Nouryon provide quarterly progress updates to the ADEM for status of the AOC A CMS and remedial design. The CMS

was completed from June 2023 through December 2023 with quarterly CMS updates provided to the ADEM. The updated AOC A CMIP is included as **Appendix C.**

1.2 Waste Analysis

The waste material placed in the post-closure care unit (NBMP) was sludge generated from the purification of salt (sodium chloride, NaCI) for the mercury cell production of caustic/chlorine. Muds stored in the NBMP had a concentration of 0.1 milligrams per liter (mg/L) mercury until August of 1990. At that time, the EPA Land Disposal Restriction (LDR) for K071 waste required that the brine muds be treated to a mercury level of less than or equal to 0.025 mg/L prior to disposal in the NBMP. The unit contains a double liner system to meet the minimum technology requirements of Hazardous and Solid Waste Amendments (HSWA) promulgated by EPA in 1984. This unit was closed by placement of a cover, which meets EPA and ADEM requirements, and post-closure care of the NBMP has been implemented under the AHWMMA Permit. Closure certification documentation is referenced in **Appendix A-1**.

Summary Table of NBMP Waste

ADEM/EPA Hazardous Waste Number/Code	Material	Units
K071	Brine purification muds from the mercury cell process in chlorine production.	Brine Mud Slurry Pit and Tank, New Brine Mud Pond, Chlorine Plant Surge Pond

1.3 Security Procedures

[335-14-8-.02(5)(b)4., 335-14-5-.02(5)(b)1, 335-14-.02(5)(b)2]

Site access for the LeMoyne Plant is through a security gate and an in-person sign-in check which is staffed 24 hours per day by security guards. All visitors must sign in, perform site orientation (if needed based on last date of orientation), and have appropriate Nouryon escorts, as required.

The post-closure unit (NBMP) has 6-ft high chain link fence around the perimeter and includes posted warning signs, all of which are inspected weekly to detect deterioration such as fading of signs and holes in the fence. Fencing and signs are replaced as necessary. All locks on the entrance gate to the unit and on the unit's monitoring wells are inspected weekly with log sheets for monitoring well inspections. Groundwater monitoring wells are inspected semi-annually to coincide with semi-annual groundwater detection monitoring events. If any fence or well locks are broken or not functioning, they are replaced.

1.4 NBMP Inspection Schedule

335-14-8-.02(5)(b)5., 335-14-5-.02(6)(b)1.

The NBMP cap, leachate collection system, leachate storage tank, monitoring wells, and security fence are inspected on a weekly basis. Semi-annual inspections are also completed to coincide with semi-annual groundwater detection monitoring events. Inspections are documented in accordance with recordkeeping

requirements. Any deficiency noted during inspections are corrected as soon as practicable after each inspection. Weekly and semi-annual NBMP inspection logs are included in **Appendix A-3**.

1.5 Facility Location

1.5.1 Topographic Map

335-14-8-.02(5)(b)19., 335-14-8-.02(5)(c)3., 335-14-8-.02(5)(c)4.(i)-(ii), 335-14-8-.02(5)(d)1.(i)

The Site topography is shown on **Figures A1 through A6**. Additionally, **Figures A1 though A6** include the necessary information to convey information required in 335-14-8-.02(5)(b)19 to include A2 EPA Form 2F Storm Water Drainage Basins and Sampling Points, A3 100-Year Floodplain, A4 Wind Rose, and A5 LeMoyne Topographic Mapping including the NBMP (5EP202). Figures for SWMUs, AOCs, and hazardous waste units are provided in **Appendix A-8**.

- Scale 1 in. less than or equal to 200 ft.
- Contours sufficient to show surface water flow.
- Extend 1000 ft. beyond property.
- Map scale
- Map date
- 100-year floodplain-
- Surface waters
- Surrounding land use
- Wind rose
- Map orientation
- Legal boundaries
- Location of access control
- Injection and withdrawal wells
- Buildings
- Structures
- Sewers
- Loading and unloading areas
- Fire control facilities
- Floor control or drainage barriers
- Run-off control systems
- Locations of hazardous waste units
- Access and internal roads

1.5.2 Location Information

[335-14-8-.02(5)(b)11.]

The facility is located in the unincorporated community of Axis, Alabama. Mobile County is the political and governmental services jurisdiction. **Figure A7** provides land use and land cover of Nouryon and the surrounding area. **Figure A8** shows the building and tank layout at Nouryon.

1.5.3 Floodplain Standards

[335-14-8-.02(5)(b)11.(iii), 335-14-5-.02(9)]

The LeMoyne Plant is located at longitude 088°01'30" and latitude 030°58'17". The manufacturing facility is not located in the 100-year floodplain. See **Figures A1 through A6** .

Figures A1 through A6 have been reviewed and 335-14-8-.02(5)(b)11.(iii) is not applicable to the LeMoyne site because the RCRA facilities are not in the 100-year floodplain. .

1.6 RCRA Contingency Plan

A Contingency Plan required by Rule 335-14-5-.04 is included as **Appendix A-2**. The Emergency Response Plan is also included in **Appendix A-2**.

1.7 NBMP Post Closure Plan

[335-14-8-.02(5)(b)13., 335-14-8-.02(5)(b)15., 335-14-8.02(5)(b)14.

335-14-8.02(5)(b)16., 335-14-8-.02(8)(f), 335-14-8-.02(9)(h)

335-14-8-.02(11)(t), 335-14-8-.02(12)(e), 335-14-5-.07(6)

335-14-5-.07(9), 335-14-5-.11(9)(b), 335-I4-5-.11(9)(c)

335-14-5-.13(11)(c), 335-14-5-.14(11)(b), 335-14-5-.07(7)

335-14-5-.07(8), 335-14-5-.07(10), 335-14-5-.07(11)

335-14-5-.12(9)(b),335-14-5-.07(9)(b)3., 335-14-5-.07(9)(d),335-14-5-.07(9)(b]

The NBMP, Unit Identification 5EP202, Hazardous Waste Management Unit (HWMU) was certified as closed (see **Appendix A-1**) by an Alabama-Licensed Professional Engineer in May 1992. These procedures were prepared in accordance with the requirements of 40 CFR 265.228(c)(1) and 335-14-5-.07(9) and approved by ADEM in a letter dated October 19, 1993. The NBMP (5EP202) has been capped with a multi-layered cap of permeability less than or equal to the bottom-liner system. The bottom-liner system consists of a 36-mil Hypalon® liner, 30-mil PVC liner, and 3-ft. of clay backfill. The cap consists of an Amoco 2002 Filter® fabric placed on top of the stabilized sludge. This is covered by 1-ft. of select fill, 2-ft. of compacted clay sealer, 6 in. of sand, followed by a 30 mil PVC liner, 12 in. of sand and 2-ft. of select fill and topsoil. Post-closure use of the property will not be allowed to disturb the integrity of the liner unless the requirements of R.335-14-5-.07(8)(c) are met. A detection groundwater monitoring program consisting of semi-annual groundwater sample collection is conducted to detect a release from the NBMP (**Appendix B**).

The post-closure documentation file is maintained at the facility until the post-closure care period ends. Two copies of the Post-Closure Plan implementation file are maintained at Nouryon.

1.7.1 Notification List

During the post-closure period, the following department will retain and update the Post-Closure Plan for this facility:

Environmental Department
Nouryon Chemicals LLC
LeMoyne Plant
13440 U.S. Highway 43 North
Axis, AL 36505
(251) 675-1310

The Post-Closure Plan will be amended if events during the post-closure care period affect the Post-Closure Plan. In that case, the request for modification of the Post-Closure Plan will be made to ADEM within 60 days of the event affecting the plan. Updated post-closure plans will be submitted to ADEM.

Post-closure care will continue unless ADEM finds that a reduced period is enough to protect human health and the environment per 335-14-5-.07(8)(a)2. (i). Nouryon recognizes that the Department also has the option to lengthen the time period as stated in 335-14-5-.07(8)(a)2. (ii).

1.7.2 NBMP Specific Post Closure Requirements

The Post-Closure Plan for this impoundment has been implemented. The unit is to continue to be inspected under Post-Closure Maintenance (see **Appendix A-3**, New Brine Mud Pond Inspection Form).

1.7.2.1 Surface Impoundments

[335-14-8-.02(8)(f), 335-14-5-.07(9)(a)(b) &(c), 335-14-5-.11(9)(c)1.]

Inspection of the closed impoundment will be conducted weekly. Benchmarks, the leachate collection system, and groundwater monitoring well integrity will be inspected weekly. See **Appendix A-3**, New Brine Mud Pond Inspection Form.

1.7.2.2 Waste Piles

[335-14-8-.02(9)(h), 335-14-5-.12(9)(b), 335-14-5-.07(9)(a), (b)&(c), 335-14-5-.11(7)(d)]

The LeMoyne Plant does not operate waste piles. Nouryon continues to immediately containerize waste as it is generated.

1.7.2.3 Landfills

[335-14-8-.02(12)(e), 335-14-5-.14(11)(b), 335-14-5-.07(9)(a)(b)&(c), 335-14-5-.14(11)(c)]33-14-8-02(5)(b)5, 335-14-5-.02(6)(b)(1)

This section describes the inspections to be conducted during the post-closure period for the regulated impoundment, as well as the frequency and the inspection procedure. Weekly and semi-annual inspections and

maintenance activities will be recorded on a form and placed in a notebook. The inspector will sign each form. Inspections will be completed once per calendar week and semi-annually. The NBMP Inspection forms for the weekly and semi-annual inspections are included in **Appendix A-3**.

1.7.2.4 Land Treatment Facilities

[335-14-8-.02(1l) (f), 335-14-5-.13(1l) (c), 335-14-5-.07(9)(a), (b)&(c)]

The LeMoyne Plant does not conduct land treatment.

1.7.3 NBMP Operations & Maintenance (O&M) Procedures

Procedures for maintenance and repair of final cover 335-14-5-.14(11)(d)1.

A detailed visual inspection of the cover for erosion will be conducted once per calendar week. Erosion will be corrected by replacing fill material and re-seeding the resulting barren areas. The slope will be maintained at a minimum of 3 percent and a maximum of 5 percent to facilitate runoff and prevent erosion. The cover will also be inspected for burrowing animal control, subsidence, and settling. The holes will be plugged with a bentonite clay and soil mixture. If the synthetic liner membrane has been breached, a large enough area of the soil cover will be exposed to allow a patch to be properly centered and installed over the hole.

Monitoring and maintenance procedures for the leak detection system 335-14-5-.14(11)(d)2-3.

A leak detection system is present to detect a leak in the liner system of the NBMP. The sump of the leak detection system for the NBMP will be checked semi-annually for the collection of liquids. To date, no liquid has been detected in the sump during previous inspections performed throughout the post-closure monitoring period of more than 32 years.

If liquid is found in the leak detection sump, it will be containerized and tested immediately for pH and total mercury. The collection sump will be cleaned, dried, inspected, and repaired as necessary. Notification will be made to the ADEM within 14 days if pH and total mercury are detected in the leak detection system.

Groundwater monitoring system inspections, maintenance, and repair 335-14-5-.14(11)(d)4.

Groundwater monitoring wells will be inspected visually once per calendar week. If a well is found to be compromised, ADEM will be notified and the damaged well will be grouted and replaced with another well of similar construction. Monitoring well markings will be inspected for legibility, and markings will be replaced as necessary. Locks are to be replaced if damaged or not functioning to secure the well casing cap. Inspections of groundwater monitoring well condition will be recorded on log sheets semi-annually during detection monitoring events.

Procedures for preventing final cap erosion due to run-on and run-off 335-14-5-.14(11)(d)5.

The vegetative cover overlaying the closed unit will be inspected once per calendar week and documented in an inspection logbook. During the growing season, the cover will be mowed as required, and at least three times per year.

Groundwater monitoring system benchmark integrity335-14-5-.14(11)(d)6.

Benchmarks will be checked weekly. Surveys of wells will be updated every 5 years. No repair or replacement is anticipated during the post-closure care period.

Procedures for landfill monitoring equipment inspections 335-14-5-14(11)(d)7

Documentation will be maintained that the NBMP and associated monitoring equipment will be visually inspected weekly and/or semi-annually, and that such inspections will be documented on an inspection log (see **Appendix A-3**)

Post-Closure Training and Contingency Plans

Nouryon has included the following documents as the plans developed specific to the closed NBMP (5EP202): *Post- Closure Contingency Plan* and *Post-Closure Personnel Training Plan*. These documents can be found in **Appendix A-2 and A-4**, respectively.

Compliance with Chapter 335-14-8-.06 (special forms of permits TSDF)

Nouryon has reviewed the provisions and determined that special permits and forms for TDSF are non-applicable to Nouryon LeMoyne, as the following activities are not conducted:

- Emergency Permits-Not Applicable (N/A)
- Hazardous Waste Incinerator Permits - N/A
- Permits for land treatment demonstrations using field test or laboratory analysis - N/A

1.7.4 Notices Required for Disposal Facilities

1.7.4.1 Notice to Local Zoning Authority (Survey Plat)

335-14-5-.07(7)

A Certificate of Recording was submitted to ADEM in November 1992 documenting the notice to local zoning authority and the notice to deed property. See **Appendix A-5**.

1.7.4.2 Notice Deed to Property

335-14-8-.02(5)(b) l4., 335-14-5-.07(10)

Notification to the deed was completed and submitted to the ADEM in November 1992. See **Appendix A-5**

1.7.4.3 Notice of Certification of Completion of Post-Closure Care

335-14-5-.07(11)

Certification that post-closure care for the hazardous waste disposal unit was performed in accordance with the specifications in the approved Post-Closure Plan was submitted to ADEM in May 1992 (**Appendix A-1**). An independent registered professional engineer and a Nouryon representative both signed the certification. Documentation supporting the independent registered professional engineer's certification was included. A copy of the documented closure of the unit will be maintained at Nouryon LeMoyne until Nouryon is released by ADEM from the financial assurance requirements for post-closure care.

1.7.4.4 Post-Closure Cost Estimate

335-14-8-.02(5)(b) l6., 335-14-5-.08(5), 335-14-5-.08(l)(a)

The Post-Closure and Corrective Action Estimate is provided **Appendix A-6** to include Post-Closure and Corrective Action cost estimate summary and financial assurance. The cost estimate was updated and developed by a licensed environmental remediation contractor in the State of Alabama (Arcadis, U.S., Inc., Alabama Licensed Environmental Remediation Contractor no. 45391). The cost estimate includes construction of the active source treatment corrective measure (SVE) at AOC A in year 1 with 5 years of operation, then demolition of the system in year 5. AOC A and AOC M remedies effectiveness monitoring, SWMU 9 detection monitoring, post closure care, permit compliance, and reporting continue during the 5 years of AOC A SVE operation. Following shutdown of the AOC A SVE system at the end of year 5, corrective measures effectiveness monitoring transitions to monitored natural attenuation (MNA) with continued groundwater extraction associated with the CERCLA OU1 remedy (also for AOC A and AOC M). In the 10 years following the MNA monitoring program, the groundwater monitoring program transitions to monitoring the permitted well system for constituents of concern at boundary and point of compliance monitoring wells. Costs for post closure care, permit compliance, site maintenance, monitoring and intercept well maintenance, SWMU 9 detection monitoring, and reporting are included for the entire 30-year post-closure period.

1.7.4.5 Financial Assurance Mechanism for Post-Closure

335-14-8-.02(5)(b) l6., 335-14-5-.08(6), 335-14-5-.08(12)

Appendix A-6 provides a copy of the financial assurance mechanism.

1.7.4.6 Post-Closure Letter of Credit

335-14-5-.08(6)(c), 335-14-5-.08(12)(d)

Nouryon establishes and files annually an irrevocable standby letter of credit, in accordance with 335-14-5-.08(12)(d) and 40CFR 264.151(d). See **Appendix A-6** for a copy of the required notification and ADEM approval.

2 Additional Information

2.1 General Hydrogeologic Information

335-14-8-.02(5)(c)1.-2, 335-14-8-.02(5)(c)2

Low river terrace and alluvial deposits, which are approximately110 to 130 feet thick, underlie Nouryon LeMoyne and form the shallow water bearing zone or watercourse aquifer. These deposits thin to a thickness of about 50 feet adjacent to the Mobile River (located about 1 mile east of the manufacturing area). The deposits consist of unconsolidated, fine to very coarse sands that contain some interbedded, discontinuous clay seams as well as some gravel zones. The lowermost sands, generally between 80 feet below ground surface and the base of the watercourse aquifer, are the most highly permeable materials in the sequence. These sands are overlayed with a variable thickness of from 0 to 50 feet of moderate to low permeability materials consisting of fine to medium sands, fine sandy silts, silty clays, and clays.

A very stiff, dense, bluish gray clay underlies the alluvial deposits. In the central plant area, the top of this thick (20 ft or greater thickness) impervious clay stratum is about 115 to 125 feet below ground surface. The clay stratum exists over a wide area and serves to isolate the alluvial deposits from other stratigraphic units below.

Surface elevations range from highs of around 45 feet to lows of less than 10 feet in a marshy area that is within one-half mile of the Mobile River. Most of the area containing plant facilities (about 1 mile west of the river) is at an elevation of between 30 and 40 feet. However, surface drainage does not flow easterly from the plant area to the river.

Drainage from several hundred acres of land, the southwestern part of the LeMoyne property, the northwestern part, some of the northcentral part of the adjacent EcoSouth property (Formerly Courtaulds of North America), and a part of the adjacent US. Highway 43 right-of way forms an unnamed stream that flows in an easterly direction, south of the LeMoyne Plant area. This stream (Unnamed Tributary) turns northward and flows generally north—northwest through a 20-acre marsh area at an elevation of 18 to 20 feet. Flow from the marsh area joins Cold Creek, which flows northeasterly and then easterly to discharge into the Mobile River at a location over 1 mile upstream from the eastern extension of the Nouryon LeMoyne property.

The Mobile is extremely humid. Rainfall is distributed fairly evenly through the year, and normal annual rainfall exceeds 65 inches. Localized intense storm systems resulting in rainfall of several inches per hour for several hours are not at all uncommon. Overall, average annual precipitation exceeds average annual evaporation by more than 20 inches.

The low river terrace and alluvial deposits contain a substantial amount of near-surface groundwater. The water in this largely unconfined aquifer consists of mainly rainwater that has infiltrated the ground locally as well as on the higher elevation areas to the west and to the north. This water is of fair to high quality, containing less than 50 parts per million of total dissolved solids.

Although surface water flow is to the east and then to the north and northwest around the plant area, the direction of groundwater flow directly beneath the LeMoyne Plant manufacturing area is to the south-southeast. Historically, this localized direction of groundwater movement was essentially controlled by the relatively large volume of water removed from the aquifer by the Acordis (formerly Courtaulds of North America) well field located to the south, and to a lesser extent by the more moderate volume of water removed by the LeMoyne Plant wells.

With the closure of the Acordis (formerly Courtaulds) facility and the shutdown of its groundwater extraction wells, groundwater flow direction under the plant is directly attributable to the LeMoyne Plant extraction wells.

Groundwater in the general area of the NBMP, AOC A, and AOC M flows south towards extraction well IW-6R at an average gradient of about 0.5 percent. The rate of groundwater movement is calculated to be in the range of 1.5 to 2.0 ft per day.

Both the general direction and rate of groundwater flow in the general area of the closed surface impoundment are based on hydrogeological investigations conducted within about 1,000 feet of the area of the closed surface impoundment (GWA, 1979). Groundwater flow direction has been determined based on approximately 30 years of groundwater water elevation data.

2.2 Topographic Map Requirements

[335-14-8-.02(5)(c)2.,3.,4., 335-14-8-.02(5)(b)19.

The topographic map requirements specific to the Groundwater Monitoring Section are shown on a separate copy of the topographic base map used for other sections of the application.

In the area of the closed surface impoundment, which is required to have monitoring wells, the direction of groundwater flow is generally south and is shown on the series of historic contour maps in **Appendix A-7** (2014 - 2022). The flow direction at the facility is indicated with an open arrow, and the closed New Brine Mud Pond 5EP202 surface impoundment, also known as the Hazardous Waste Management Unit (HWMU), is labeled. The point of compliance is depicted as a dashed line drawn through down gradient wells O-62, O-63, O-64, O-81, O-82, O-83, and O-84. The New Brine Mud Pond Detection Monitoring Well System is shown on **Figure A9**. Groundwater monitoring wells are located in appropriate places upgradient and downgradient of the closed surface impoundment. Each well is shown with a symbol and well number (**Figure A9**).

2.3 NBMP Groundwater Monitoring Data

335-14-8-.02(5)(c)1.

A universal serial bus (USB) flash drive containing monitoring reports from the previous 10-year permit period (2014 through 2022) is provided as **Appendix A-7**. The data are presented in reports submitted for the last 10 years, with each sample and monitoring date included. Semiannual and annual groundwater data have been submitted in annual reports to ADEM during the current Permit period. Monitoring reports for AOC A and AOC M corrective measures effectiveness are also included on the USB flash drive.

2.4 NBMP Constituent Plume Description

[335-I 4-8-.02(5)(c)4.]

No plumes are shown on the topographic map associated with the NBMP. The NBMP has operated under a detection-monitoring program since 1986. Mercury has been non-detect below the project reporting limit of 0.5 micrograms per liter (µg/L), not detected as a statistically significant increase, below the Alabama Drinking Water Standard maximum contaminant level (MCL), and below the Groundwater Protection Standard (GWPS) of 2.0 µg/L listed in the Permit. Carbon disulfide and carbon tetrachloride plumes associated with EPA Operable Unit 1 are shown on **Figures A10** and **A11**, respectively.

2.5 NBMP General Monitoring Program Requirements

[335-14-5-.06(1)(b)2(i), (ii), (iii), (iv), (v), (vi)] Waiver from Groundwater Monitoring Requirements

Nouryon is providing information for ADEM consideration of a waiver from the groundwater monitoring requirements for the NBMP as allowed by the applicant and set forth in the referenced regulations.

(i) is an engineered structure

The New Brine Mud Pond (5EP202) is an engineered structure designed and constructed with two liners a leachate collection system, and a liner leak detection system. The unit was placed in operation in 1981. The unit has been inspected by ADEM on multiple occasions for over 30 years and certified as closed in accordance with the Closure Plan in May 1992. [Ref: Documentation and Closure Certification for the New Brine Mud Pond (5EP202), and Brine Mud Slurry Pit and Tank (5EP200) submitted to ADEM May 22, 1992, and located in **Appendix A-1**].

(ii) does not receive or contain liquid waste or waste containing free liquids

The documentation and closure certification for the New Brine Mud Pond (EP202) was submitted to ADEM in May 1992. As part of this closure, all free liquids were removed from the pond and the remaining muds solidified. As documented in the closure certification, the unit does not receive or contain free liquids.

(iii) is designed and operated to exclude liquid. precipitation. and other` run-on and run-off

The NBMP was closed with the waste materials in place (solidified) and covered with a multi-layered cap. The cap consists of an Amoco® 2002 Filter fabric placed on top of the stabilized sludge. This is covered by 1-ft. of select fill, 2-ft. of compacted clay sealer, 6 in. of sand, followed by a 30 mil PVC liner, 12 in. of sand and 2-ft. of select fill and topsoil. The purpose of the cap and final cover is to:

- Control mitigation of waste
- Control surface water infiltration
- Prevent erosion after closure
- Minimize need for post-closure maintenance

(iv) has both inner and outer layers of containment enclosing the waste

The NBMP has inner and outer layers of containment enclosing the wastes. The bottom line consists of a 36-mil Hypalon liner, 30-mil PVC liner and 3-ft. clay backfill. The cap consists of an Amoco® 2002 Filter fabric placed on top of the stabilized sludge. This is covered by 1-ft. of select fill, 2-ft. of compacted clay sealer, 6 "of sand, a 30 mil PVC liner, 12" of sand and 2-ft. of select fill and topsoil.

(v) has a leak detection system built into each containment layer

The bottom layer consists of a 36-mil Hypalon® liner, 30-mil PVC liner and 3-ft. clay backfill. Between the bottom liners is a perforated four-inch diameter PVC leak detector pipe that drains to a covered leak detection sump.

(vi) the owner or operator will provide continuing operation and maintenance of these leak detection systems during the active life of the unit and the closure and post-closure care periods and

Nouryon has provided maintenance and inspection of the leak detection systems for more than 30 years. This practice is documented in the post-closure period through inspections on the New Brine Mud Pond Inspection

Forms found in **Appendix A-3**. Routine inspection records have indicated no liquids observed in the leak detection sump.

(vii) to a reasonable degree of certainty, will not allow hazardous constituents to migrate beyond the outer containment layer prior to the end of the post-closure care period.

Based on the engineering design and operation of the impoundment, the weekly post-closure care procedure, and available inspection records, Nouryon is confident reasonable certainty that the unit will not allow hazardous constituents to migrate beyond the outer containment layer prior to the end of the post-closure care period.

No mercury has been detected above the project reporting limit of 0.5 µg/L at the groundwater monitoring wells associated with the New Brine Mud Pond (5EP202) since the Detection Monitoring Program was implemented in 1986.

2.5.1 NBMP Description of Wells

335-14-5-.06(8)(a),(b),(c), 335-14-8-.02(5)(c)5, 335-14-50.06(6)

1. The impoundment 5EP202 is monitored by 10 wells, three upgradient and seven downgradient, which were installed in 1981 and 1987. Additionally, two observation wells are used for development of the potentiometric map. No other monitoring wells have been installed since that time. The waste management for the impoundment 5EP202 is indicated as being just outside of the outside toe of slope of the closed structure. (Allowance has been made for roads, buried pipelines, changes in slope, or other obstructions). The monitoring wells were installed to measure groundwater downgradient from the unit. The wells are located within 100 feet, in the downgradient direction from the downgradient edge of waste management.
2. The locations of the monitoring wells are shown on **Figure A9** and the Groundwater Potentiometric Contour Maps (**Appendix A-7**).
3. Monitoring Well depths are found on monitoring well table in **Appendix B**.
4. Wells O-59 through O-64 are constructed of 4-inch diameter schedule 40 PVC pipe. For the most part, bell-end pipe in nominal 20-foot lengths was used. Material used in the screen sections was 0.010-inch or 0.012-inch machine-slotted.
5. Wells O-81 through O-84 are constructed of 4-inch diameter PVC schedule 40 pipe in 10- foot lengths with threaded joints. Screens are 0.010-inch machine-slotted.
6. The direction of groundwater flow through the areas of the hazardous waste impoundment was known prior to the installation of any wells used for the unit. Upgradient wells O-59, O-60, and O-61 have been monitored since 1982. Mercury has been non-detect during the post-closure care monitoring period.
7. Compliance point groundwater measurements have been taken for each groundwater sampling event since 1986 [wells O-62, O-63, and O-64 were the original downgradient, point of compliance (POC) wells]. However, wells O-81,O-82, O-83, and O-84 were added in 1987. The POC is represented as a line drawn through these seven wells). Mercury has been non-detect during the post-closure care monitoring period.

2.5.2 NBMP Description of Sampling/Analysis Procedures

[335-14-5-.06(8)(d)]

A *Post-Closure and Corrective Measures Monitoring and Analysis Plan* has been included in **Appendix B**.

An example of the form used during field sampling of the monitoring wells is found in **Appendix B**. (see Monitoring Well Sampling and Inspection Log, well O-59).

At the time of this permit renewal, the analytical method for mercury analysis is SW-846, 7470A analytical method (**Appendix B**) and it will be followed. In the event that this method is revised or deleted, the recommended guidance/method from SW846 will be followed.

Currently the sampling frequency for all NBMP monitoring wells is semi-annual (AOC A and AOC M are monitored quarterly), with groundwater flow rate and direction being determined annually. See **Appendix B** (Annual Determination of Groundwater Flow Velocity and Direction) and **Appendix A-7** (Historical Groundwater Monitoring Reports), Groundwater Potentiometric Contour Plans (for New Brine Mud Pond).

2.5.3 NBMP Procedures for Establishing Background Quality

[335-14-5-.06(8)(g)]

On October 9, 1986, the EPA issued a RCRA Part B Permit to Stauffer Chemical Company (now Nouryon). Prior to that date, the facility operated interim status. This interim status operation was based on an Alternate Groundwater Quality Assessment Plan, which was implemented by Stauffer in November of 1981. The program consisted of quarterly sampling of all upgradient and downgradient monitoring wells. Groundwater monitoring data collected under interim status were presented in the RCRA Part B Permit Application (August 1985).

The indicator parameters that were monitored under interim status are as follows: ph., specific conductance, total dissolved solids, and total dissolved mercury. Statistical evaluation of the data using the student-t Test resulted in mercury being the only indicator parameter for the NBMP due to false positive hits on the remaining indicator parameters. Assessment of the data indicated that plant discharge practices prior to 1975 (which included the discharge of high chlorides, high TDS, and variable pH water to surface drainage), resulted in these parameters being present in the groundwater in varying concentrations in the area of the designated hazardous waste management facilities. Most importantly, the only hazardous material contained in the hazardous waste treatment facility was mercury. Therefore, the only indicator parameter that is considered to provide a reliable indication of the presence of the hazardous constituent in the groundwater is the constituent itself (mercury).

In March of 1999, a statistical evaluation of the groundwater data for the NBMP was conducted using the Analysis of Variance (ANOVA). Results of the evaluation show pH is the only reliable indicator parameter for the unit. Although, it was concluded that the pH results are not a function of the material contained in the impoundment (Brine Muds from listed process K106). The parameter pH continues to be measured during the semi-annual groundwater monitoring events.

Nouryon will continue to use ANOVA methods in accordance with the EPA guidance document *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance March 2009 EPA 530/R-09-007* to evaluate the data and determine if a statistically significant increase has occurred. Mercury will remain the indicator parameter for the NBMP.

A *Post-Closure and Corrective Measures Monitoring and Analysis Plan* has been included in **Appendix B**.

2.5.4 NBMP Statistical Procedures

335-14-5-.06(8)(h)

Nouryon will evaluate the data using ANOVA in the referenced EPA guidance and in accordance with ADEM regulations. A *Post-Closure and Corrective Measures Monitoring and Analysis Plan* has been included in **Appendix B**.

2.5.5 NBMP List of Indicator Parameters. Waste Constituents, Reaction Products to be Monitored, including:

335-14-8-.02(5)(c)6. (i), 335-14-5-.06(9)(a)

The indicator parameter for the detection-monitoring program is total soluble mercury. Samples for total soluble mercury are collected as unfiltered samples. The Nouryon LeMoyne laboratory reporting limit (RL) for mercury analysis is 0.5 (µg/L) for the detection monitoring program, which is a continuation of the RL used during the previous permit period.

2.5.6 NBMP Description of Groundwater Monitoring System

[335-14-8-.02(5)(c)6. (ii)]

The *Post-Closure and Corrective Measures Monitoring and Analysis Plan* has been included in **Appendix B**.

The site-specific groundwater flow direction in the area of the closed surface impoundment is to the south. The existing groundwater monitoring well network consists of 10 wells, including three upgradient and seven downgradient wells, at varying completion depths. General details for each well are presented in Table 1 Summary Table of LeMoyne RCRA Groundwater Monitoring Wells, **Appendix B** in this submittal.

1. Number of Wells: Ten wells are used to monitor groundwater quality at the New Brine Mud Pond; three were used to monitor groundwater quality upgradient of the closed surface impoundment, seven wells were used to monitor the downgradient groundwater quality.
2. Locations: Groundwater monitoring wells are located in appropriate places upgradient and downgradient of the closed surface impoundment. Well number on the topographic map locates all ten monitoring wells for the Groundwater Monitoring Section (**Appendix B**).
3. Depths: Monitoring well depths range from 65 feet to 123 feet. Each well is designated as shallow, mid, and deep depending on the well completion depth. The depth of each well is shown in Table 1: Summary Table of LeMoyne RCRA Groundwater Monitoring Wells, **Appendix B** in this submittal.
4. Casing description: Monitor wells O-59 through O-64 were constructed of 4-inch diameter, schedule 40 PVC pipe with glued joints. For the most part, bell-end pipe in nominal 20-foot lengths was used. Material used in the screen sections was 0.010-inch or 0.012-inch machine-slotted schedule 40 PVC pipe in nominal 10-foot lengths. Wells O-81 through O-83 were constructed of 4-inch diameter PVC pipe with threaded joints. Screens were 0.010-inch machine-slotted.
5. Assurance of unaffected background water measurement: The wells installed for background water measurements were installed at least 100 feet up-gradient from the closed surface impoundment. These wells are believed to provide measurements of background groundwater that have not been affected by leakage from the former regulated unit if leakage occurred.
6. Assurance of compliance point groundwater measurement: The wells installed to provide groundwater measurement at the compliance point were generally installed within 50 feet in the downgradient direction from the downgradient boundary of the closed surface impoundment. It is believed that these wells were located to indicate the effect of leakage from the former regulated unit if leakage ever occurred.

2.5.7 NBMP Background Groundwater Concentration Values for Proposed Parameters

335-I 4-8-.02(5)(c)6. (iii)

The *Post-Closure and Corrective Measures Monitoring and Analysis Plan* has been included in **Appendix B**.

2.5.8 NBMP Description of Proposed Sampling, Analysis, and Statistical Comparison Procedures

[335-I 4-8-.02(5)(c)6. (iv)]

The *Post-Closure and Corrective Measures Monitoring and Analysis Plan* has been included in **Appendix B**.

2.5.9 NBMP Procedures to be Implemented if a Statistically Significant Increase in any Constituent or Parameter is Identified at any Compliance Point Monitoring Well

If a significant increase were indicated by the statistical evaluation procedure, the sampling and analysis procedure described in **Appendix B** would be repeated with a fresh sample from the same compliance well. If the second set of analyses confirms a statistically significant difference in the indicator parameter, the ADEM will be contacted within 7 days of the confirmation. Unless it can be demonstrated that the source is other than the regulated unit, a Compliance Monitoring Program, then Corrective Action Program will be developed, as appropriate, and submitted to ADEM.

2.5.10 NBMP Compliance Monitoring Program for Facilities Which Have Detected the Presence of Hazardous Constituents

[335-14-8-.02(5)(c)7., 335-14-5-.06(10)]

This specifically addresses compliance monitoring for facilities, which have detected the presence of hazardous constituents. Groundwater monitoring conducted since 1986 shows no statistical increase in mercury for the NBMP and the data is reported as non-detect or less than or equal to reporting limit of 0.5 µg/L.

2.6 Corrective Action Program (AOC A and AOC M)

335-14-8-.02(5)(c)8.; 335-14-5-.06(11)

The Corrective Action Program is to address the carbon disulfide at AOC A and AOC M. The ongoing Corrective Action Program and corrective action effectiveness monitoring at Nouryon for AOC A and AOC M are described in the following documents:

- The *Post-Closure Detection and Corrective Measures Monitoring and Analysis Plan* has been included in **Appendix B**
- AOC A – *AOC A Corrective Measures Implementation Plan* for AOC A (**Appendix C**)

- AOC M – *AOC M Corrective Measures Implementation Plan for AOC M* – Carbon Disulfide Vertical Storage Tank #4- Submitted November 2004 (**Appendix D**) .

3 Solid Waste Management Information

335-14-8-.02(5)(d), 335-14-8-.02(5)(d)1.(i)-(v), 335-14-8-.02(5)(d)2., 335-14-8-.02(5)(d)3.

The current listing of SWMUs, AOCs, and current status of each are provided in the Alabama Hazardous Waste AHWMMA Permit. **Appendix A-8** provides a summary description and status of SWMUs and AOCs and is to be used as a key for the Figures A9-A through A9-C that show SWMU and AOC locations. Additionally, the PIN Response submitted to the ADEM provides detailed descriptions of processes, waste unites, SWMUs, and AOCs (Arcadis, 2024).

4 References

Arcadis. 2024. Preliminary Information Needs Response. Revised February 7.

Sovereign. 2019. Corrective Measures Implementation Report (Construction Complete Report) Remediation for AOC A –Former Carbon Disulfide Transfer Tank Area Nouryon Functional Chemicals LLC – LeMoyne Plant. Prepared by Sovereign Consulting, Inc. September 2019.

EPA Fifth Five-Year Review Report for Stauffer Chemical Co. (Cold Creek Plant) and Stauffer Chemical Co. (LeMoyne Plant) Superfund Sites Mobile County Alabama. Prepared by U.S. EPA Region 4. September 30, 2021.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008161176 OU-1. Prepared by U.S. EPA Region 4. September 27, 1989.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008161176 OU-3. Prepared by U.S. EPA Region 4. September 17, 1993.

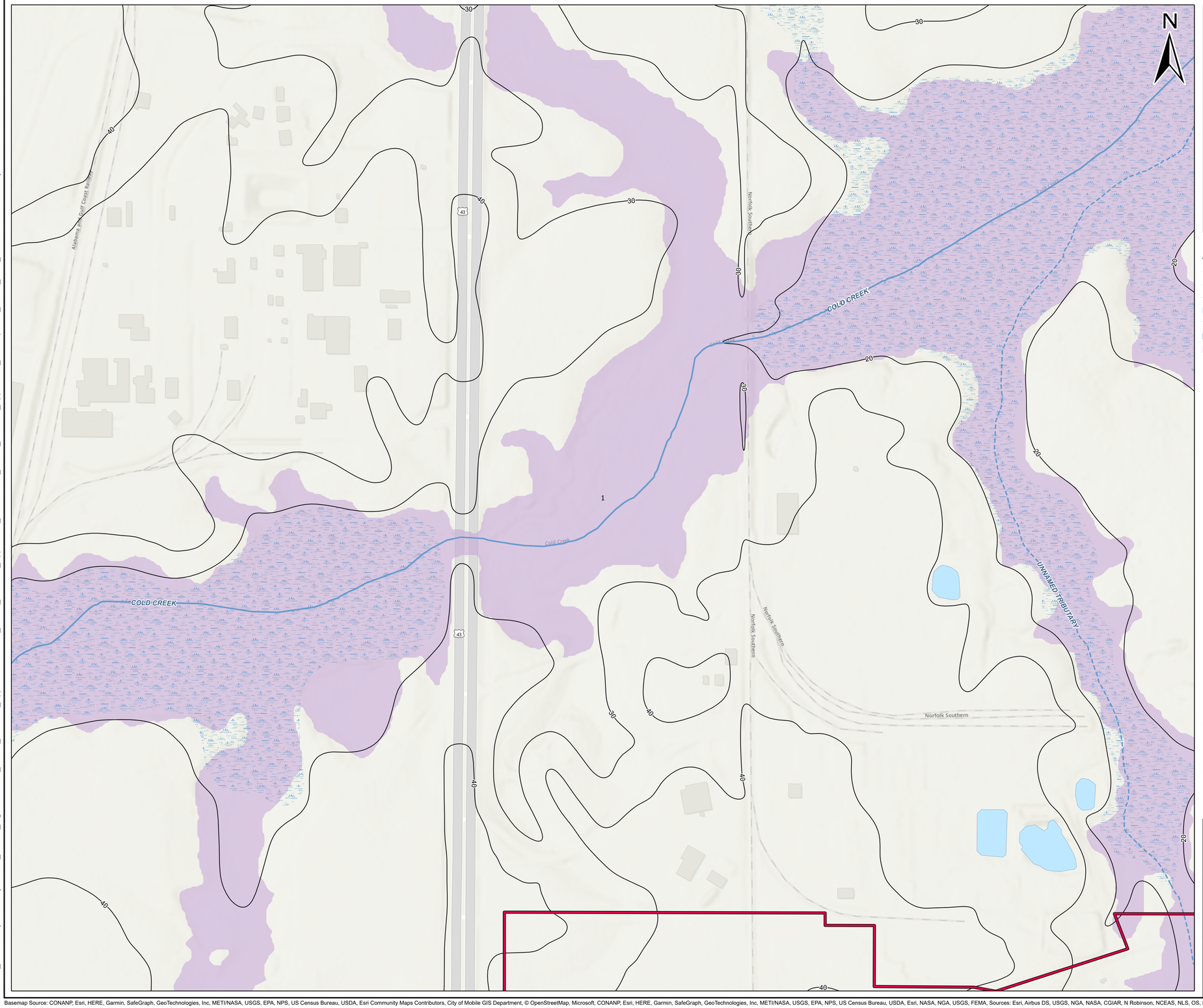
EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008161176 OU-2. Prepared by U.S. EPA Region 4. March 18, 1999.

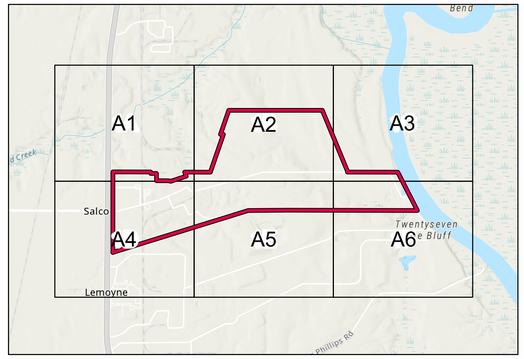
Final RCRA Facility Assessment for Akzo Nobel Functional Chemicals, LLC. Prepared by the ADEM. September 24, 2014.

RCRA Part B Post-Closure Permit Visual Site Inspection Response. Prepared by Akzo Nobel Functional Chemicals, LLC. December 19, 2013.

Operations and Maintenance Plan for OU-1 Groundwater Operable Unit. Nouryon Chemicals, LLC. LeMoyne Plant. Revised March 2020.

Figures



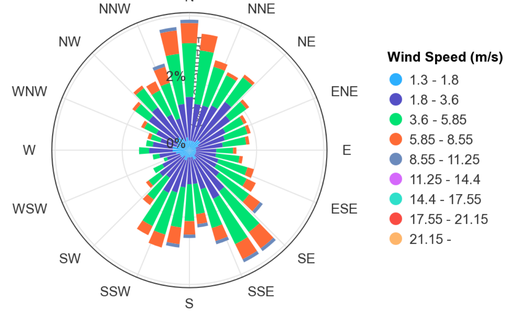


LEGEND

- Site Boundary
- 10-Foot Topographic Elevation Contour (feet AMSL)
- Intermittent Stream/River
- Perennial Stream/River
- Lake/Pond
- Swamp/Marsh
- HUC-12 Hydrologic Unit Boundary
- 1% Annual Flood Risk Zone

MOBILE RGNL AP (AL) Wind Rose

Sep. 1, 2013 - Sep. 1, 2023



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GRAPHIC SCALE IN FEET

NOTES:

1. All locations and dimensions are approximate.
2. AMSL = Above Mean Sea Level
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SITE TOPOGRAPHY

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FIGURE
A1

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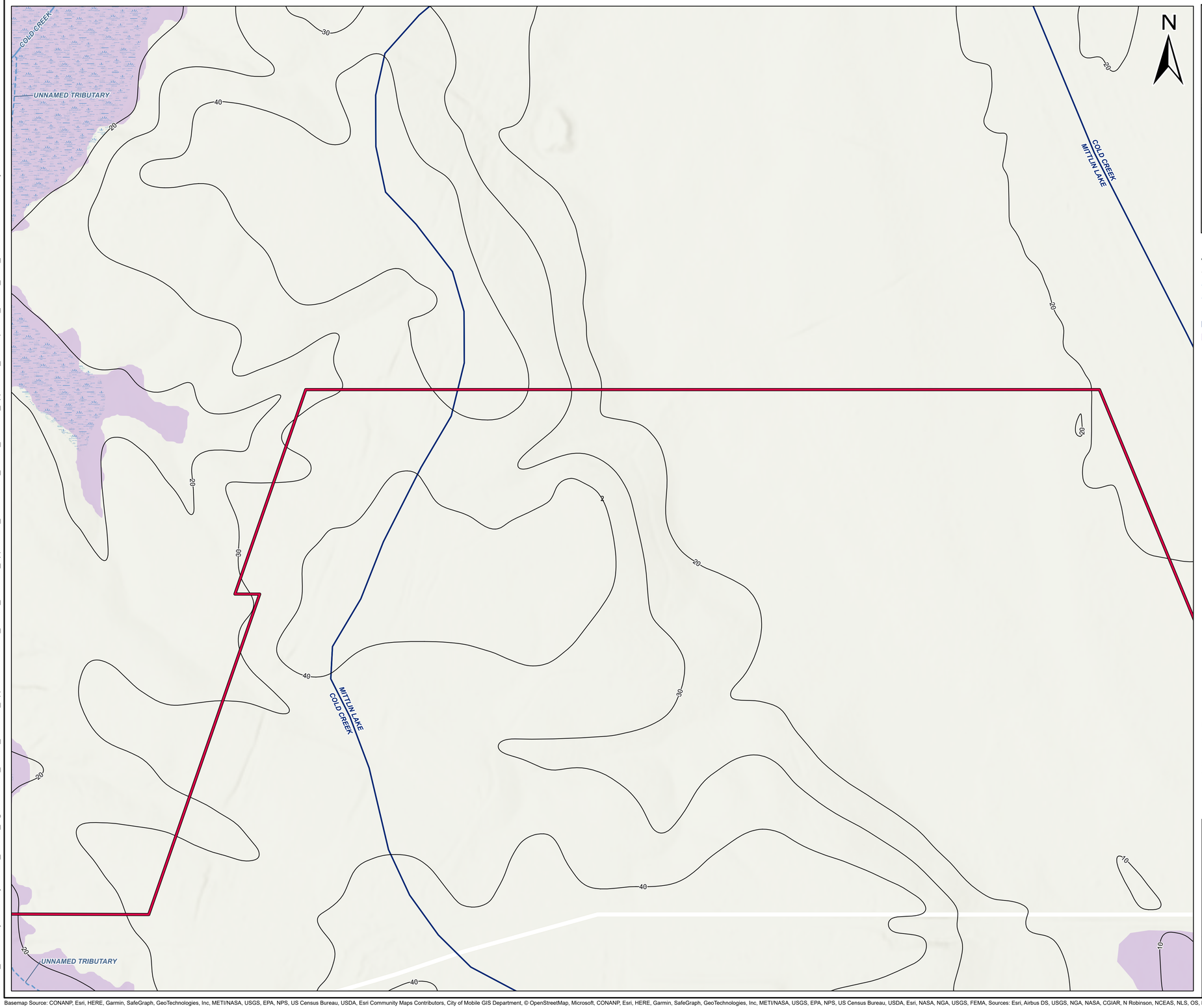

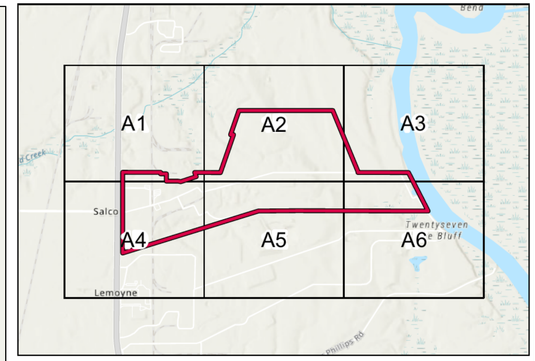

LEGEND

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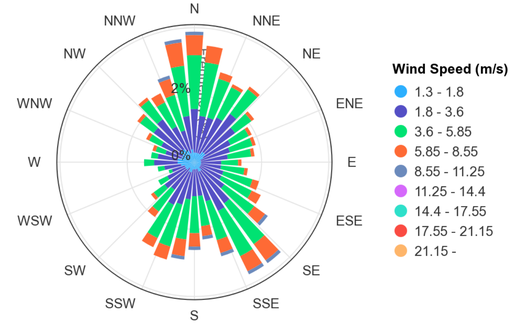
MOBILE RGNL AP (AL) Wind Rose

Sep. 1, 2013 - Sep. 1, 2023



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SITE TOPOGRAPHY

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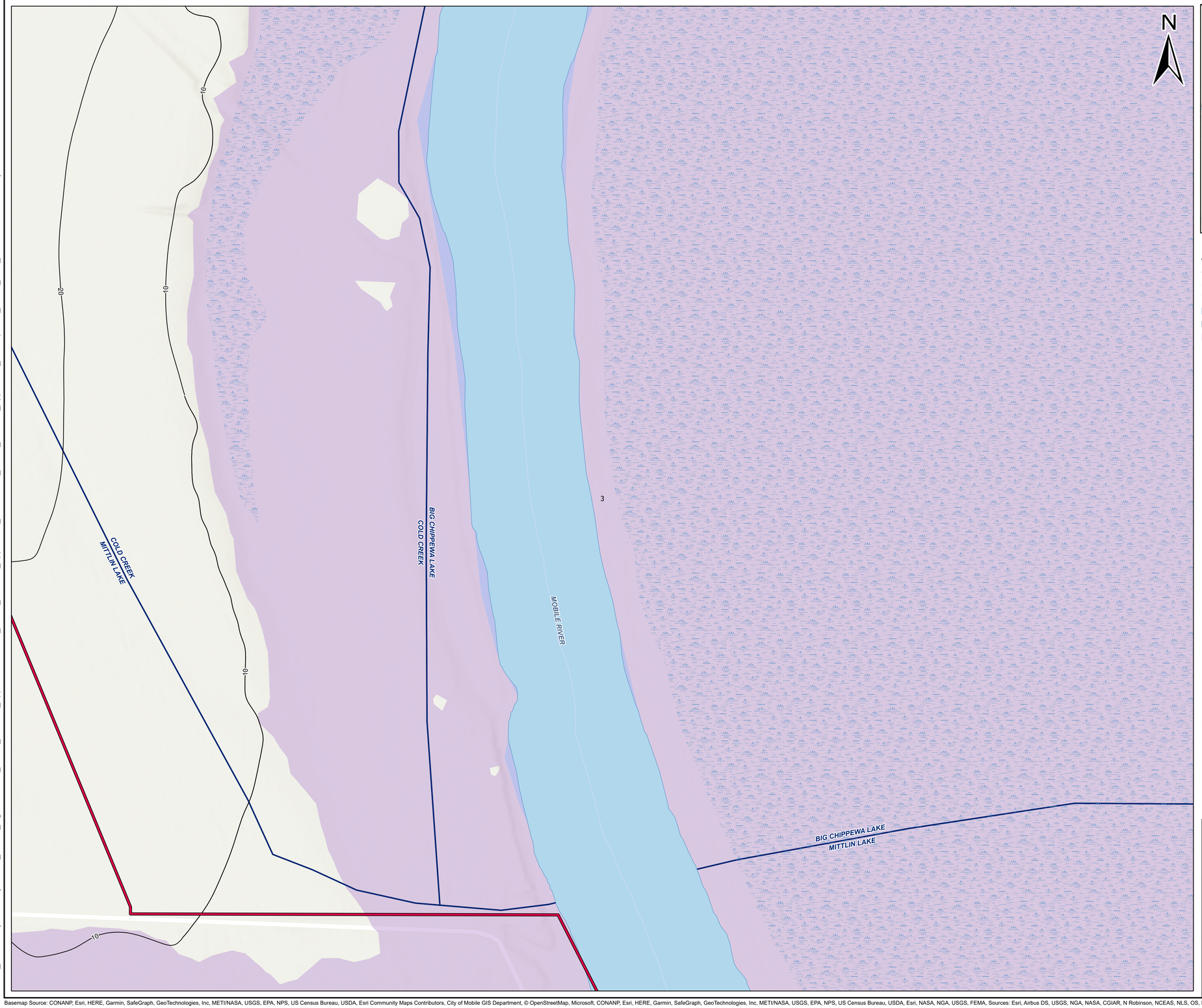

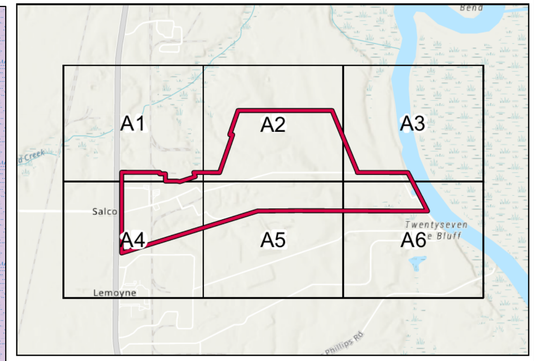

LEGEND

- Site Boundary
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MOBILE RGNL AP (AL) Wind Rose

Sep. 1, 2013 - Sep. 1, 2023

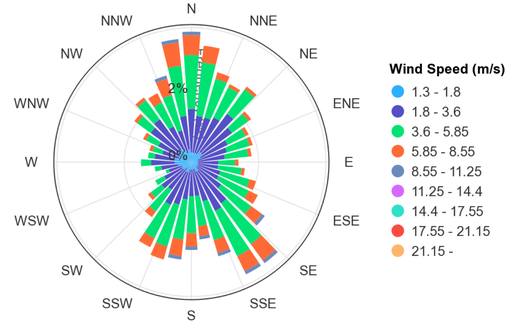

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FIGURE
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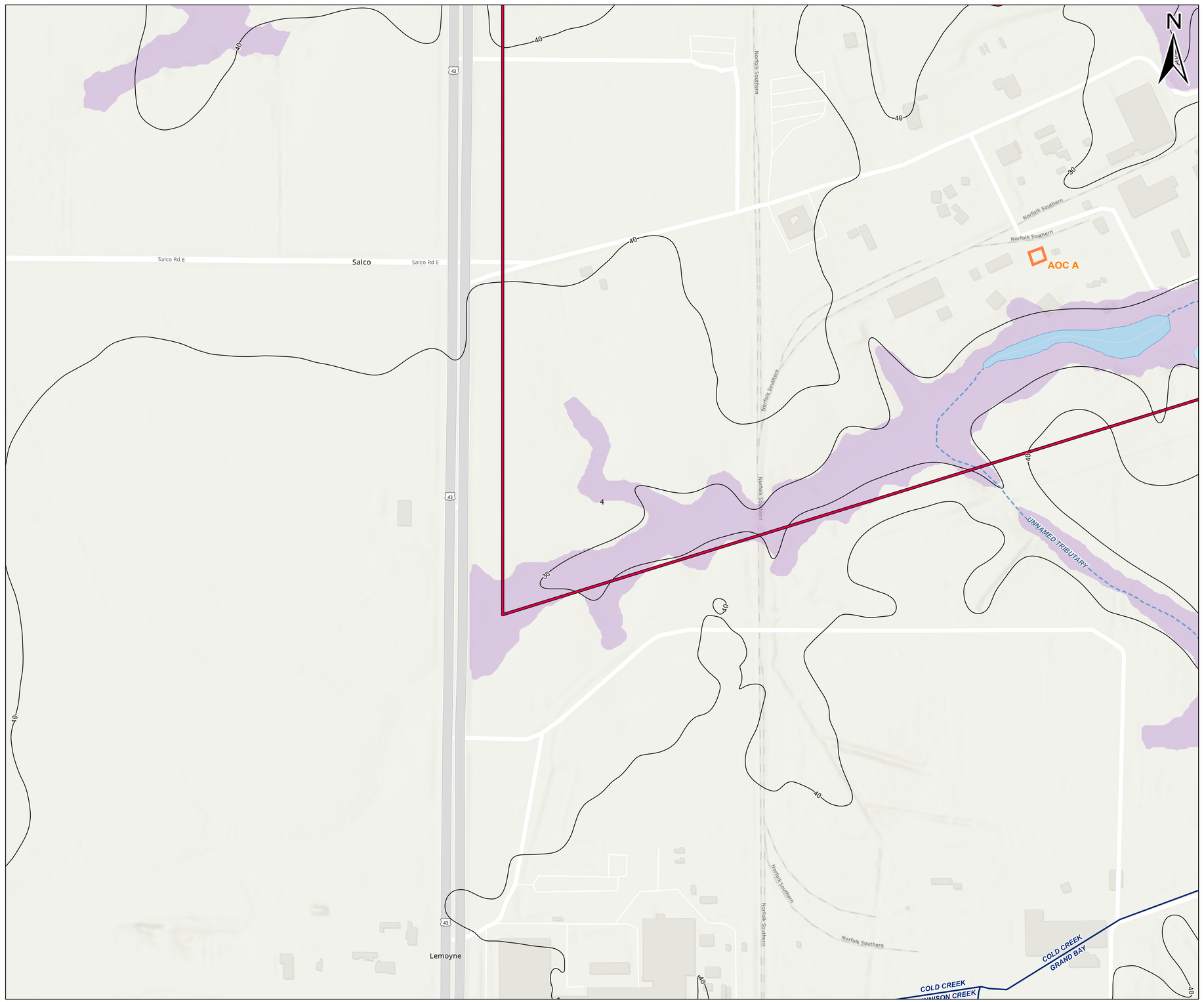

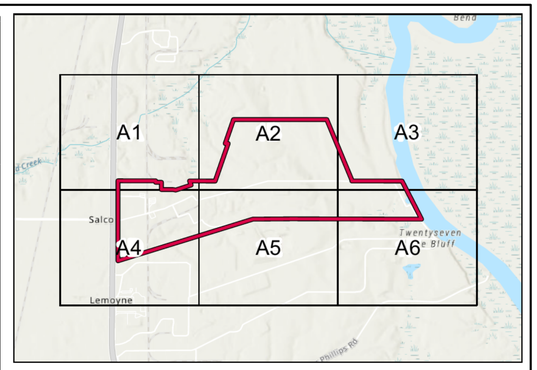

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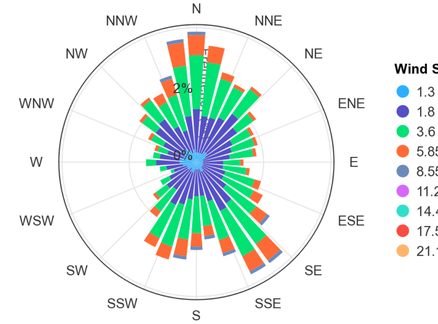

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FIGURE
A4

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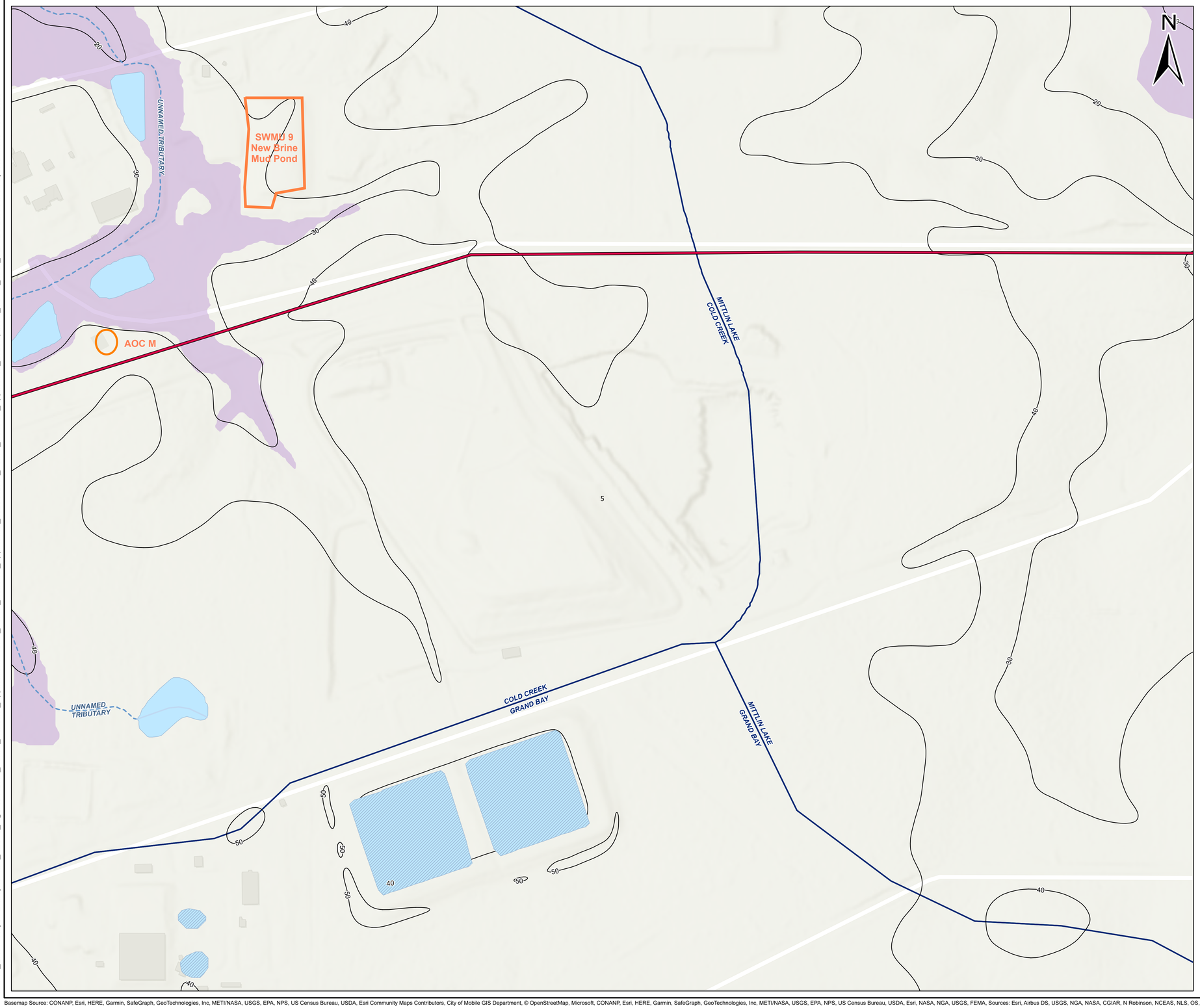
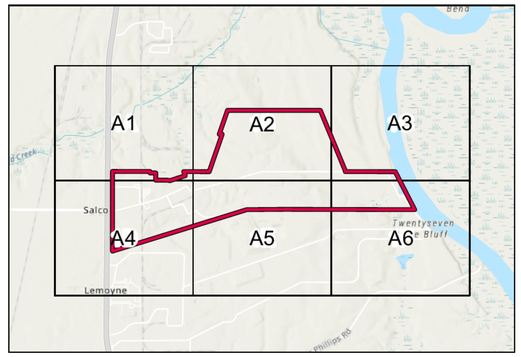
Basemap Source: CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri Community Maps Contributors, City of Mobile GIS Department, © OpenStreetMap, Microsoft, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, accessed 10/6/2023.



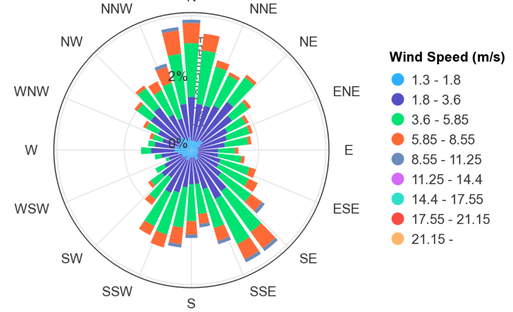


LEGEND

- Site Boundary
- 10-Foot Topographic Elevation Contour (feet AMSL)
- Intermittent Stream/River
- Artificial Path
- Lake/Pond
- Reservoir
- HUC-12 Hydrologic Unit Boundary
- 1% Annual Flood Risk Zone

MOBILE RGNL AP (AL) Wind Rose

Sep. 1, 2013 - Sep. 1, 2023



0 200 400 600 800

GRAPHIC SCALE IN FEET

NOTES:

1. All locations and dimensions are approximate.
2. AMSL = Above Mean Sea Level
   HUC = Hydrologic Unit Code
   RCRA = Resource Conservation and Recovery Act
3. Projection: NAD 1983 State Plane Alabama West, US Feet
4. Data Sources:
   Federal Emergency Management Agency (FEMA) - Flood Hazard Data
   Midwestern Regional Climate Center (MRCC) - Wind Direction and Speed Data
   Nouryon Functional Chemicals, LLC. - Site Boundary
   United States Geological Survey (USGS) - Topographic Elevation Contours, National Hydrography Dataset Data, Watershed Boundary Dataset Data

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

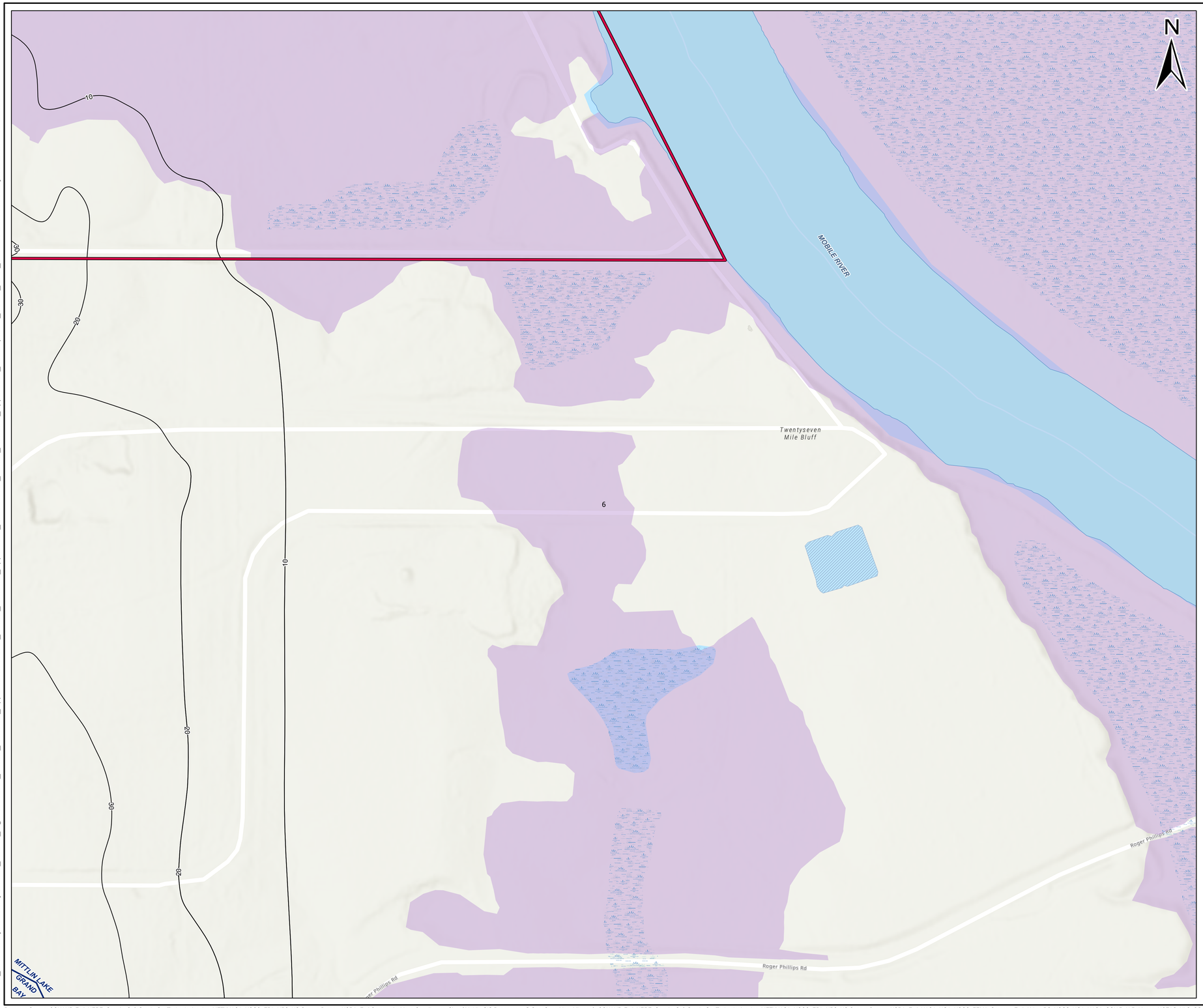
SITE TOPOGRAPHY

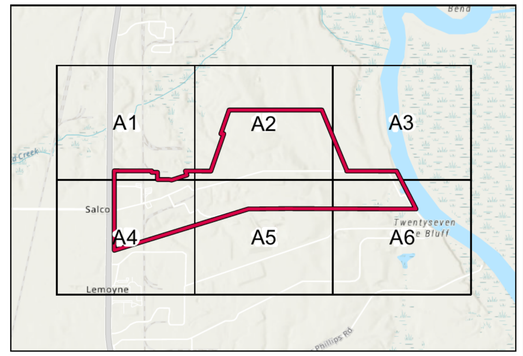
ARCADIS

FIGURE
A5

Path: T:_ENV\Nouryon\LeMoynePlant_AL\Pro_Figures\RCRA_Permit_Renewal_Applications\RCRA_Permit_Renewal_Application_2023\RCRA_Permit_Renewal_Application_2023.aprx\F1_TOPO_MAP_SERIES Last Saved By: ACarlone 10/6/2023

Basemap Source: CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri Community Maps Contributors, City of Mobile GIS Department, © OpenStreetMap, Microsoft, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, accessed 10/6/2023.



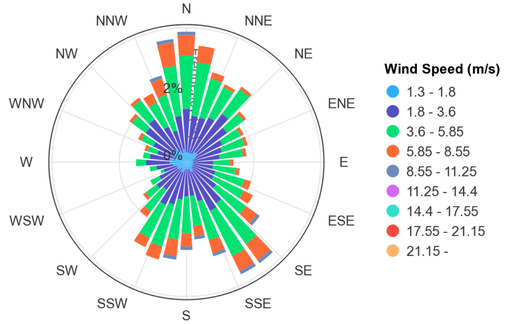


LEGEND

- Site Boundary
- 10-Foot Topographic Elevation Contour (feet AMSL)
- Artificial Path
- Reservoir
- Swamp/Marsh
- Stream/River
- HUC-12 Hydrologic Unit Boundary
- 1% Annual Flood Risk Zone

MOBILE RGNL AP (AL) Wind Rose

Sep. 1, 2013 - Sep. 1, 2023



0 200 400 600 800

GRAPHIC SCALE IN FEET

NOTES:

1. All locations and dimensions are approximate.
2. AMSL = Above Mean Sea Level
   HUC = Hydrologic Unit Code
   RCRA = Resource Conservation and Recovery Act
3. Projection: NAD 1983 State Plane Alabama West, US Feet
4. Data Sources:
   Federal Emergency Management Agency (FEMA) - Flood Hazard Data
   Midwestern Regional Climate Center (MRCC) - Wind Direction and Speed Data
   Nouryon Functional Chemicals, LLC. - Site Boundary
   United States Geological Survey (USGS) - Topographic Elevation Contours, National Hydrography Dataset Data, Watershed Boundary Dataset Data

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

SITE TOPOGRAPHY

ARCADIS

FIGURE
A6

Path: T:_ENV\Nouryon\LeMoynePlant_AL\Pro_Figures\RCRA_Permit_Renewal_Applications\RCRA_Permit_Renewal_Application_2023\RCRA_Permit_Renewal_Application_2023.aprx\F1_TOPO_MAP_SERIES Last Saved By: ACarlone 10/6/2023

Basemap Source: CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri Community Maps Contributors, City of Mobile GIS Department, © OpenStreetMap, Microsoft, CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, accessed 10/6/2023.

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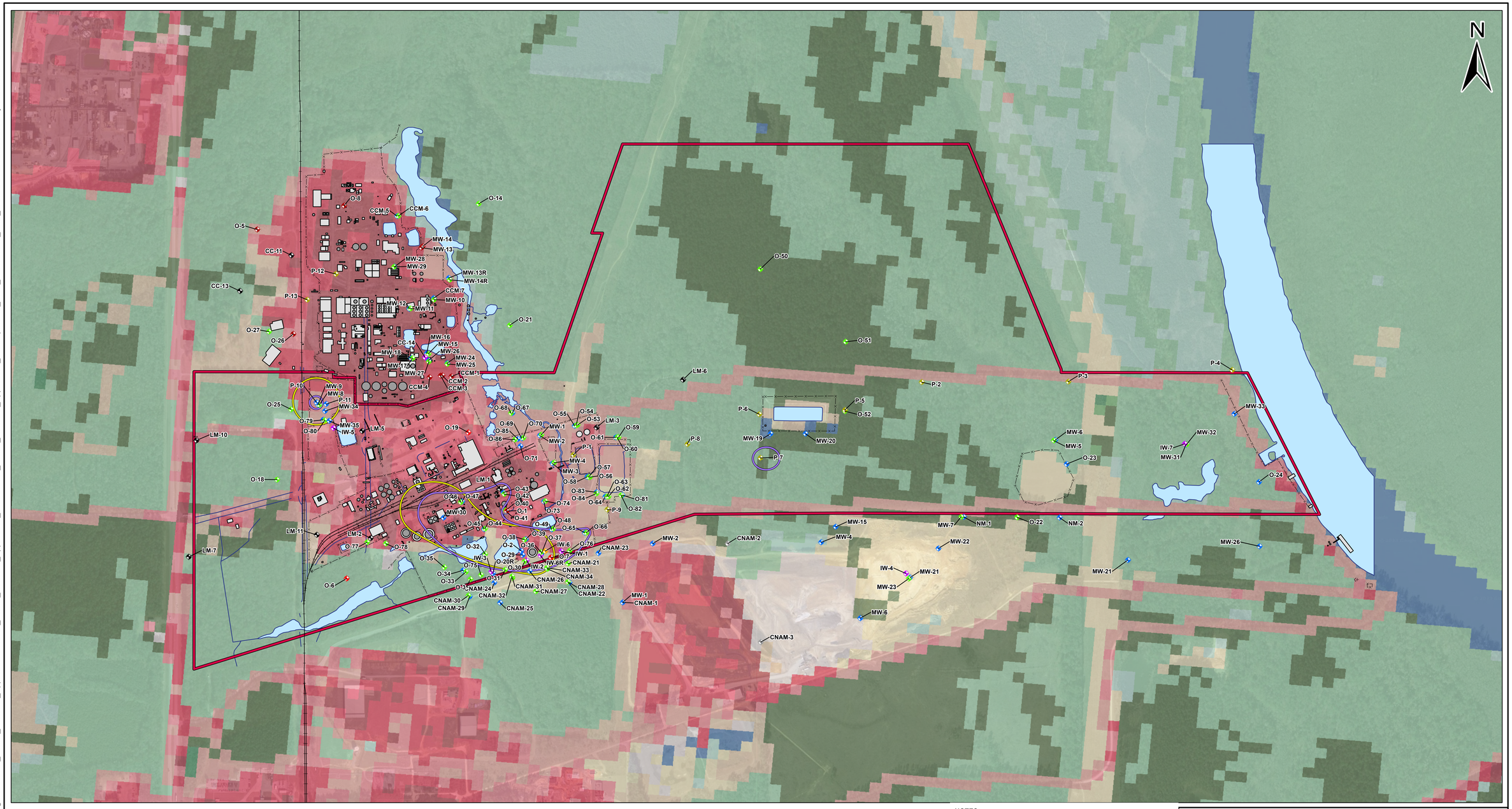


LEGEND

- DEEP MONITORING WELL
- SHALLOW MONITORING WELL
- PLANT PRODUCTION WELL
- PIEZOMETER
- INTERCEPT WELL
- FORMER IW-6 - ABANDONED
- WELL NOT ON NEW SURVEY
- OFFSITE WELL
- WELL NO LONGER IN SERVICE

USA NLCD LAND COVER TYPE

- OPEN WATER
- PERENNIAL SNOW/ICE
- DEVELOPED OPEN SPACE
- DEVELOPED LOW INTENSITY
- DEVELOPED MEDIUM INTENSITY
- DEVELOPED HIGH INTENSITY
- BARREN LAND
- DECIDUOUS FOREST
- EVERGREEN FOREST
- MIXED FOREST
- DWARF SCRUB
- SHRUB/SCRUB
- GRASSLAND/HERBACEOUS
- SEDGE/HERBACEOUS
- LICHENS
- MOSS
- PASTURE/HAY
- CULTIVATED CROPS
- WOODY WETLANDS
- EMERGENT HERBACEOUS WETLANDS

- STREAM
- WATER BODY
- BUILDING
- TANK
- FENCE
- RAILROAD
- PROPERTY LINE
- CARBON TETRACHLORIDE PLUME EXTENT >5.0 ug/L (APRIL 2023)
- CARBON DISULFIDE PLUME EXTENT >10.0 ug/L (APRIL 2023)

NOTES:

1. All locations and dimensions are approximate.
2. AMSL = Above Mean Sea Level
   HUC = Hydrologic Unit Code
   RCRA = Resource Conservation and Recovery Act
3. Projection: NAD 1983 State Plane Alabama West, US Feet
4. Data Sources:
   Arcadis - Carbon Disulfide and Carbon Tetrachloride Plume Extents
   National Land Cover Database - Land Cover Data
   Nouryon Functional Chemicals, LLC. - Site Layout, Well Network

0 450 900 1,350 1,800

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

SITE FEATURES AND LAND COVER

ARCADIS

FIGURE
A7

Basemap Source: CONANP, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA, Google, accessed 10/11/2023.

#	PERMIT NAME AND DESCRIPTION
X003	CS2 PLANT OPERATING PERMIT/INCINERATOR
Z005	ACID PLANT OPERATING PERMIT
Z012	CTX PLANT OPERATING PERMIT
Z013	CTX PLANT PACKAGED HEATER #6H200
Z014	CTX PACKAGE BOILER
Z015	SULFUR CHLORIDES OPERATING PERMIT
Z037	VAPAM OPERATING PERMIT
X042	CS2 DRUM LOADING FACILITY
X043	CS2 ISO-CONTAINER LOADING
X044	MCA TRAY SCRUBBER
X045	80% MCA STORAGE TANK
X046	CS2 STORAGE TANK - 8T510
X047	CS2 STORAGE TANK - 8T511
X048	CS2 STORAGE TANK - 8T520
X049	CS2 STORAGE TANK - 8T522
X050	CS2 STORAGE TANK - 8T530
X051	CTX STANDBY METHAIN BOILER
X052	NEW SELAS FURNACE A
X053	NEW SELAS FURNACE B
X054	VS-5 CS2 STORAGE TANK - #8T095
X055	VS-6 CS2 STORAGE TANK - #8T096

LEGEND

- PROPERTY LINE
- FENCE
- RAILROAD
- BUILDING
- TANK

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET
3. BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY, ACCESSED 2/7/2024

N

0 100 200 300 400

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION

BUILDING AND TANK LAYOUT

ARCADIS

FIGURE
A8

Path: T:_ENV\Nouryon\LeMoynePlant_ALL\Pro_Figures\PIN Response\PIN_Response_2023_SiteFeatures_Bldgs.aprx\FX_BUILDING_AND_TANK_LAYOUT Last Saved By: ACarlone 2/7/2024

LEGEND

- DEEP MONITORING WELL
- SHALLOW MONITORING WELL
- FENCE
- RAILROAD
- STREAM
- WATER BODY
- SOLID WASTE MANAGEMENT UNIT
- BUILDING
- TANK

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   SWMU = SOLID WASTE MANAGEMENT UNIT
3. PROJECTION: NAD 1983 STATE PLANE ALABAMA WEST, US FEET
4. DATA SOURCES:
   NOURYON FUNCTIONAL CHEMICALS, LLC. - SITE LAYOUT, WELL NETWORK

0 100 200

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

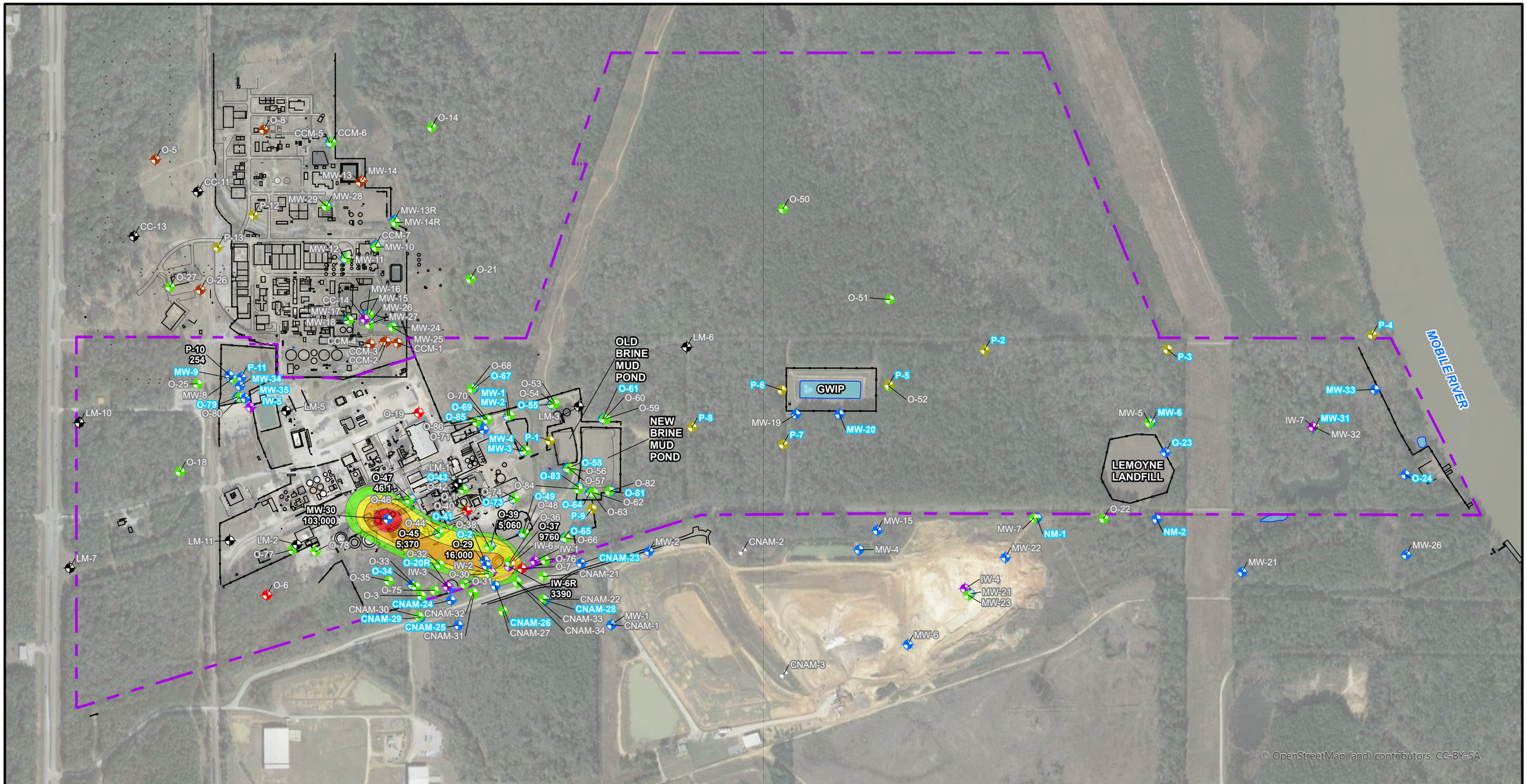
NEW BRINE MUD POND PERMIT AREA

ARCADIS

FIGURE
A9

Path: T:_ENV\Nouryon\LeMoynePlant_AL\Pro_Figures\RCRA_Permit_Renewal_Applications\RCRA_Permit_Renewal_Application_2023\RCRA_Permit_Renewal_Application_2023_permitted_units.aprx\F1_BRINE_MUD_POND_LAYOUT Last Saved By: ACarlone 2/1/2024

Basemap Source: Esri, NASA, NGA, USGS, FEMA, Google, City of Mobile GIS Department, CONANP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS, accessed 2/1/2024.



LEGEND

- DEEP MONITORING WELL
- PLANT PRODUCTION WELL
- PIEZOMETER
- SHALLOW MONITORING WELL
- INTERCEPT WELL
- FORMER IW-6 - ABANDONED
- WELL NOT ON NEW SURVEY
- OFFSITE WELL
- WELL NO LONGER IN SERVICE
- PROPERTY LINE
- FENCING
- BUILDING
- SITE FEATURE
- POND

CARBON SULFIDE ISOPLETH

- 100,000 AND UP
- 10,000 TO 100,000
- 1,000 TO 10,000
- 700 TO 1,000

NOTES:
1. BLUE WELL IDs - CONCENTRATIONS REPORTED BELOW LABORATORY LIMIT OF DETECTION.
2. CARBON DISULFIDE CONCENTRATIONS ARE REPORTED IN µg/L (MICROGRAMS PER LITER).
3. 700 µg/L = CARBON SULFIDE GROUNDWATER PROTECTION STANDARD

0 700 1,400
Feet

N

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA

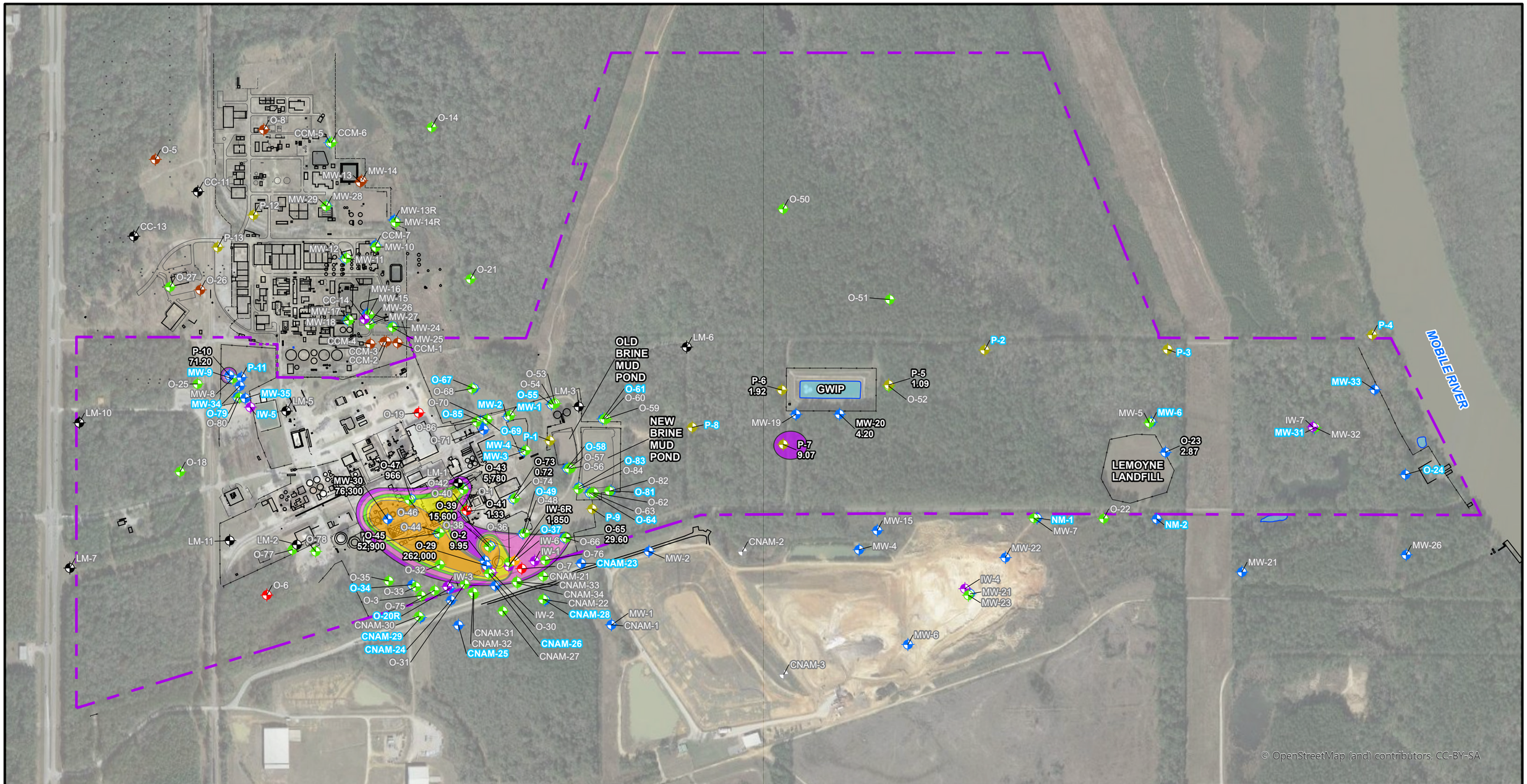
2023 ANNUAL PLUME SAMPLING

CARBON DISULFIDE CONCENTRATIONS IN GROUNDWATER SHALLOW WELLS

ARCADIS

FIGURE
A10

CITY:(DEN-TECH) DIV/GROUP:(ENV/GIS) DB: ACARLONE LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Nouryon\LeMoynePlant_AL\ProProjects\2023AnnualPlumeSampling.aprx



LEGEND

- DEEP MONITORING WELL
- PLANT PRODUCTION WELL
- PIEZOMETER
- SHALLOW MONITORING WELL
- INTERCEPT WELL
- FORMER IW-6 - ABANDONED
- WELL NOT ON NEW SURVEY
- OFFSITE WELL
- WELL NO LONGER IN SERVICE
- PROPERTY LINE
- FENCING
- BUILDING
- SITE FEATURE
- POND

CARBON TETRACHLORIDE ISOPLETH

- 100,000 AND UP
- 10,000 TO 99,999
- 1,000 TO 10,000
- 100 TO 1,000
- 10 TO 100
- 5.0 TO 10

NOTES:
1. BLUE WELL IDs - CONCENTRATIONS REPORTED BELOW LABORATORY LIMIT OF DETECTION.
2. CARBON TETRACHLORIDE CONCENTRATIONS ARE REPORTED IN µg/L (MICROGRAMS PER LITER).
3. 5.0 µg/L = CARBON TETRACHLORIDE GROUNDWATER PROTECTION STANDARD

0 700 1,400
Feet

N

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA

2023 ANNUAL PLUME SAMPLING

CARBON TETRACHLORIDE CONCENTRATIONS IN GROUNDWATER SHALLOW WELLS

ARCADIS

FIGURE
A11

CITY:(DEN-TECH) DIV/GROUP:(ENV/GIS) DB: ACARLONE LD: PIC: PM: TM:
PROJECT: PATH: T:_ENV\Nouryon\LeMoynePlant_AL\ProProjects\2023AnnualPlumeSampling.aprx

Appendix A-1

New Brine Mud Pond Closure Certification

ADEM
ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Le[illegible]gues, Director

Jim Folsom
Governor

Mailing Address:
PO BOX 301463
MONTGOMERY AL
36130-1463

Physical Address:
1751 Cong. W. L.
Dickinson Drive
Montgomery, AL
36109-2608

(205) 271-7700
FAX 271-7950
270-5612

Field Offices:

110 Vulcan Road
Birmingham, AL
35209-4702
42-6168
1603

400 Well Street
P.O. Box 953
Decatur, AL
35602-0953
(205) 353-1713
FAX 340-9359

2204 Perimeter Road
Mobile, AL
36615-1131
(205) 450-3400
FAX 479-2593

October 19, 1993

Mr. Brian Love
Environmental Supervisor
Akzo Chemicals Inc.
P.O. Box 100
Axis, Alabama 36505

Dear Mr. Love

Re: Closure Certification for Slurry Tank and Sludge Pond
Akzo Chemicals Inc., Axis, Alabama
EPA ID No. ALD 008 161 176

The Alabama Department of Environmental Management (ADEM) Land Division has completed the review of the closure certification for the brine mud slurry tank closure and the brine mud pond closure located at Akzo's facility in Axis, Alabama. Based upon this review and the certification of closure inspection performed by Messrs. Tommy Arthur and Stephen Cobb on October 7, 1993, ADEM has determined that the closure of these units was performed in substantial compliance with the requirements of the approved Closure Plan and applicable regulations. Therefore, ADEM hereby accepts Akzo's certification of closure for the two units at Akzo's facility in Axis, Alabama.

Upon receipt of this letter it will no longer be necessary for Akzo Chemicals to perform the daily operating unit inspections associated with the above mentioned closed units, as required by the operating permit.

Since Akzo has now closed all operating units, ADEM suggests that Akzo Chemicals submit a modification request to remove all the operating portions from the facility's permit in order to alleviate any confusion that might exist during routine inspections.
As a result of this modification only the Hazardous and Solid Waste Amendments (HSWA) and the post closure portions of the permit would remain.

Should questions arise, feel free to contact Mr. Tommy Arthur of the Engineering Services Branch at (205) 271-7749.

Sincerely,

Leigh Pegues
Director

LP/ATA:cb/HW#533p2

Printed on Recycled Paper

c: James S. Kutzman
EPA Region IV

Steven O. Jenkins, Chief
RCRA Compliance Branch
Land Division, ADEM

File: Akzo Chemicals, Inc./Mobile County/TSD

ADEM

orig → file

ALABAMA
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

Pegues, Director

Guy Hunt
Governor

175 Gong. W. L. Dickinson Drive
Montgomery, AL
36130
(205) 271-7700
FAX 271-7950
270-5612

Field Offices:

110 Vulcan Road
Birmingham, AL
35209
(205) 942-6168
FAX 941-1603

P.O. Box 953
Decatur, AL
35602
(205) 353-1713
FAX 340-9359

2204 Perimeter Road
Mobile, AL
[illegible]79-2336
FA[illegible]-2593

May 22, 1992

RECEIVED
MAY 28 1992
By_____

Mr. Marshall Rainwaters
Plant Manager
Akzo Chemicals, Inc.
P. O. Box 100
Axis, Alabama 36505

Dear Mr. Rainwaters:

RE: Documentation and Closure Certification for the Brine Mud Pond (5EP202) and Brine Mud Slurry Tank (5EP200)
Akzo Chemicals, Axis, Alabama
EPA ID No. ALD 008 161 176

On May 18, 1992 the Department received 1 copy of the above referenced document dated May 15, 1992. The Department will review this material and provide comments.

If you should have any questions concerning this matter, please contact Clyde Sherer of the Engineering Services Branch at (205) 271-7726.

Sincerely,

Wm. Gerald Hardy, Chief
Engineering Services Branch
Land Division

WGH/WCS:cb/#CB117

File: Part B/ Section VII/ Mobile Co.

Printed on Recycled Paper

NOTE: Ref: Federal Express bill No. 158508781 - two boxes - each containing two notebooks.

AKZO

Chemicals Division

May 15, 1992

Alabama Dept. of Environmental Management
1751 Cong. W.L. Dickinson Dr.
Montgomery, Al 36130

Attn: Mr. Leigh Pegues, Director

Reference: AKZO CHEMICALS INC., LEMOYNE FACILITY
Axis, Al.
EPA ID No. ALD 008 161 176

Dear Mr. Pegues:

Enclosed is the documentation for our closure of our Brine Mud Pond (5EP202) and Brine Mud Slurry Tank (5EP200). This documentation consists of a single volume for the Brine Mud Slurry Tank closure and three volumes for the Brine Mud Pond Closure (volumes 1 and 2 plus photographic record). A separate Statement of Certification is included for each closure.

If there are questions concerning this closure, please contact Steve Perry at (205)675-1310.

Yours truly,

Marshall Rainwaters

Marshall Rainwaters
Plant Manager

MR:bb

Akzo Chemicals Inc.
P.O. Box 100
Axis, Alabama 36505
Tel (205) 675 1310
Fax (205) 679 1305

Appendix A-2

RCRA Contingency and Emergency Response Plan

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1.0 PURPOSE

This procedure will provide the needed personnel contacts, emergency preparedness, and response steps to a number of different emergency situations that may occur within the site or surrounding area. The primary focus to any emergency response is the care of any injured persons and the safety of others. The second duty is action to confine the effects of the fire, explosion or other hazard to the smallest possible area and the protection of plant property.

The proper handling of public relations during a major emergency is also very important. Information given to the press and radio should be factual and accurate, and released only by the Site Manager or Communications Officer. The families of any injured employees should be notified before releasing names for publication.

Roads leading to and from the plant must be kept open and visitors and spectators kept out both for their own safety as well as causing interference with efforts to control the emergency.

In coping with an emergency of disaster proportions, prompt action is required to minimize injuries and damage to equipment. This calls for an understanding of possible hazards and corrective action required. It also calls for plans made in advance to summon help and assignment of responsibility for various tasks.

You are urged to study this plan carefully and review it frequently so if you should be called upon to respond to an emergency situation you will be in a position to do your full part.

2.0 DEFINITIONS

- **ADEM**: Alabama Department of Environmental Management

3.0 REFERENCES

ADEM Admin. Code r. 334-14-3-.14

12.01.1.OP01 Event Reporting In The Enablon Incident Management Module

12.01.1.RT01 HSE Definitions

12.01.5.SP01 Emergency Response and Community Awareness

12.01.5.OP02 Emergency and Incident Management

12.01.5.OP03 MIR3 Urgent Notification System

12.01.5.TR02 Toolbox Needed For Emergency Management Preparation

12.01.5.TR03 Toolbox Needed During Emergency Management

12.01.5.RT04 Templates Serious Incident Investigation

SAF516 LeMoyne Plant Site Security Plan

SIT128 Organization Appointments within the LeMoyne Site

ENV033 List of Reportable Quantities at LeMoyne Site

SPCC LeMoyne Site Spill Prevention Control and Countermeasure Plan

BMPPLAN LeMoyne Site Best Management Practices

GEN011 LeMoyne Firewater System P&ID

4.0 INTRODUCTION

This plan provides a basic framework of action for coping with a major plant emergency and for emergencies that cannot be effectively controlled by personnel and/or equipment on hand.

i. A serious fire or explosion.
ii. Release of toxic or hazardous chemicals.
iii. RCRA Contingency
iv. Major damage to plant from air tornadoes, hurricanes or other types of storms.
v. Power failure which may cause any of above.
vi. Bomb threat.
vii. Security threat

5.0 OBJECTIVES

i. To safeguard the lives and well-being of the plant personnel and neighboring community and facilities.
ii. To minimize damage and/or destruction of the plant material and equipment.
iii. To minimize the economic loss in production by expediting safe resumption of interrupted operations.
iv. To coordinate effectively, action with outside agencies, Fire Department, Police, Ambulance, Doctors, newsmen, etc.
v. To insure that we have a competent, well trained organization to carry out our established procedures.
vi. To ensure that changes to the existing process or new processes are evaluated to review the potential impact to the site, neighboring facilities and community from chemical spills, leaks, explosions or other emergency incidents. These changes are to be completed by the use of the Management of Change (MOC) and/or Project HAZOP's and/or Pre-startup Safety Reviews (PSSR).
vii. To maintain site security systems as need to keep plant secure.

6.0 EMERGENCY ALARM ACTIVATION

This section is to insure that all site personnel know the proper requirements for activating the siren system and communicating emergency needs. In case of a major emergency as defined in the introduction, the Emergency Action Plan (EAP) will be put into effect. The main consideration is that each Incident Command (I/C) officer reacts as quickly as possible to cope with the emergency.

Steps to follow in activating the site emergency alarm system and communication of alarms.

6.1 Major EAP Alarm System

The EAP alarm system should be sounded in case of an emergency or disaster. When in doubt about gravity of a situation, sound the alarm.

Any employee may turn in the EAP alarm.

The alarm system may be activated by the use of any dial station (phone) within the LeMoyne Plant.

6.2 Operating The EAP Alarm System

6.2.1 Fire Siren

If the disaster or emergency is of a fire nature, the following steps are to be followed.
(Note: **Fire Siren** is a cycling alarm)

1. Dial Extension **747** - you will hear the normal "rings" which you would hear when calling any other number.
2. Allow the phone to ring (siren will be operating) twenty to thirty (20-30) seconds.
3. Hang up the phone.
4. Dial Extension **600** (Public Address System) - Page
5. Announce the emergency **in detail** on the public address system. Be sure to talk **calmly** for **clarity** and state the **nature** and **location** of the emergency, **repeat the message**.
6. Hang up phone and seek help.
7. All visitors/contract personnel/delivery personnel should exit the plant and assemble in safe assembly areas. They should ensure that they are accounted for and remain in the area as requested.

6.2.2 Gas Siren

If the disaster or emergency is a gas release in nature, the following steps are to be followed:
(Note: **Gas Siren** is a continuous alarm)

1. Dial Extension **757** - you will hear the normal "rings" which you would hear when calling any other number.
2. Allow the phone to ring (siren will be operating) for twenty (20)_to thirty (30) seconds.
3. Hang up the phone.
4. Dial Extension **600** (Public Address System) - Page

5. Announce the emergency **in detail** on the public address system. Be sure to talk **calmly** for **clarity** and state the **nature** and **location** of the emergency, **repeat the message**.

6. Hang up phone and seek help.

If the disaster is both fire and gas or any other grave emergency, dial extension **757** (gas release) and follow the steps above for gas release. For any **train derailment**, front office personnel should immediately evacuate the building until additional information provided by I/C allows for safe occupation of the building.

6.2.3 Shelter-in-Place

If the disaster requires, Incident Command (I\C) will make a determination if shelter-in-place is needed for an emergency situation whereby the protection of individuals is better served by staying indoors. This applies to gas releases from neighboring companies as well as on-site. If I\C makes this determination, both radio and P.A. announcements will be made. In addition, headcount will be completed only as directed by I\C. See additional notations\instructions below.

<u>Incident Command</u>

1. I/C shall ensure all departments are notified of actions and shelter-in-place notifications. Notifications will be done via phone, P.A. and radio as needed.
2. Responsible for providing an all-clear.

<u>Operations Chief</u>

1. Notify areas to shutdown A/C, bathroom\kitchen vents, etc. and any equipment which draws air into shelter-in-place buildings.
2. Assure hot-work, excavation, confined space, and line-entry permits are reviewed\cancelled and new permits re-issued, as needed after an all-clear is provided.

7.0 PERSONNEL HEADCOUNT AND RESPONSIBILITIES

7.1 Emergency Response Teams

7.1.1 Fire and Rescue Team

The Fire and Rescue Team is composed of a group of volunteer members of which several are deputy marshals who function under the direction of the Fire Marshall. The Fire and Rescue Team is specially trained to respond to the emergency scene and provide assistance in controlling the emergency, as well as rescuing injured or trapped employees in emergency situations. All members of this team have attended required fire response training and received multi-media first aid, C.P.R., and 24 Hour HAZWOPER Technician level training.

7.1.2 Medical Response Team

The Medical Response Team is composed of a group of volunteer members who function under the direction of the Medical Response Team leader. The Medical Response Team includes qualified Emergency Medical Technicians (EMT's), 40 hour 1st Responders, and a coordinator.

7.1.3 Headcount

The Primary Assembly Area Coordinator (PAAC) will coordinate headcount per their protocols as required.

i. The area supervisor, engineer, or 1st class operator will account for individuals in the control room.
ii. The senior person in each building not involved directly with specific response duties during the emergency.
iii. Contractors, drivers, visitors, etc. will be handled similar to LeMoyne employees, each liaison is responsible to assure they account for contractors, drivers, or visitors.
iv. Use **Appendix I** to complete headcount

7.1.4 Emergency Call In Procedure

In the event an emergency or disaster occurs at night or on weekends, the following procedure should be used to call in personnel.

1. The Shift Supervisor should activate the Emergency Action Plan Pager System (**SAF200** and **Appendix II**)

2. All disaster control personnel will maintain and carry an up-to-date call-in-list. (**Appendix IV**)

3. The shift supervisor or delegate will use the **Swift 911 Mobile App** and notify the proper individual(s)/ groups to respond to the emergency event.

4. If the disaster involved more than one location or the magnitude of the emergency warrants; additional personnel should be called.

5. If outside help is needed refer to "Outside Agencies Emergency Call List". (**Appendix VII**).

6. If the emergency or disaster threatens the neighboring plants they should be called immediately. (Arkema, FMC, Alabama Power Company - Barry Steam Plant, EcoSouth, SSAB, Lenzing, U.S. Amines).

Note: Use the interplant emergency radio.

7. If the emergency or disaster threatens the neighboring community, activate the LeMoyne Industrial Park Emergency Siren System. Immediately call the Mobile County Emergency Management Agency at 460-8000 and notify them of the status. Let them know that the sirens have been activated per the Protocol established under the section LeMoyne Industrial Park". Note: See section 8, index "LeMoyne Industrial Park".

8. For emergencies potentially requiring additional fire & rescue or medical response, activate the fire team using **Swift911**or by **cell phone** for additional support. This applies to daytime hours as well as nights and weekends (as deemed by the emergency).

7.1.5 Headquarters For Disasters

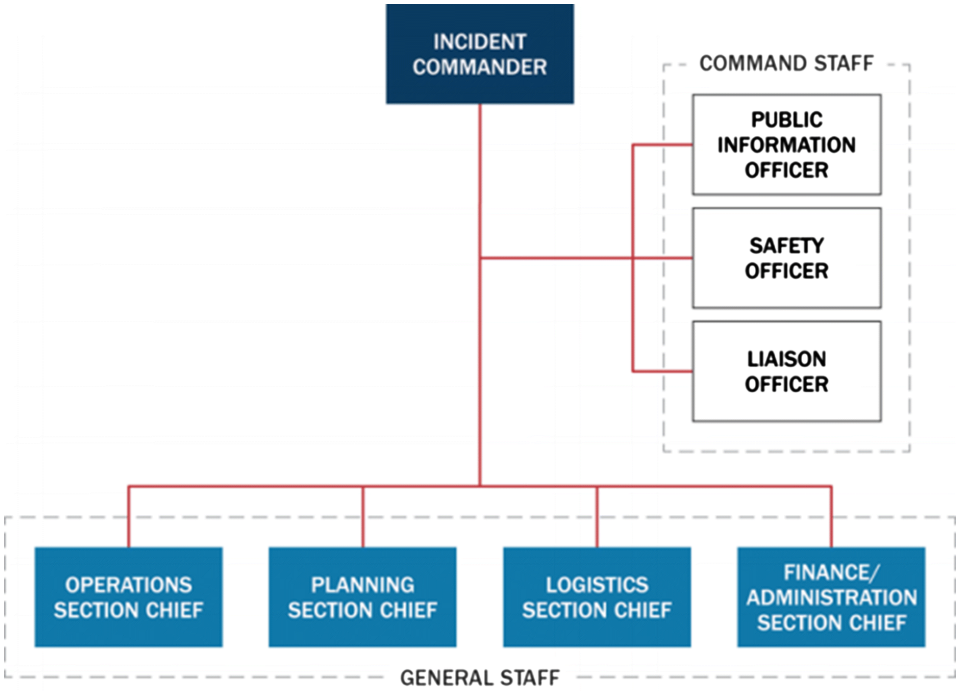
A Command Post, or Emergency Operating Center (EOC), will be designated by the Incident Commander in a location far enough away so as to be of no threat to personnel responding to the disaster (During normal work hours). During off hours and weekends, the person making the call-ins should indicate to the individual called where the command post is located.

Locations for the EOC could be (but not limited to):

i. Shift Supervisors Office
ii. Main Office
iii. Engineering Lunchroom
iv. Company House

7.1.6 Emergency Response Organization

The organization and assignment of the duties are established to ensure that each person understands what his responsibilities are during an emergency. To improve coordination of response efforts, the Incident Command System titles as designated in the National Interagency Incident Management Systems (NIIMS) have been included in the organization charts (below) to supplement the site response organization.



7.1.7 Incident Commander

Positions within site that would step-in as IC

1. Site Director
2. PQC Manager
3. Shift Foreman

Responsibilities:

i. Coordinator of all Incident Command activities.
ii. Executive of Disaster Plan in time of emergency.
iii. Director of deputy disaster control officers.
iv. Receives complete head count from supervisors.
v. Disaster Coordinator for Plants
    a. Coordinates activities among plants.
    b. Shutdown of operations.
    c. Resumption of plant operations.

7.1.8 Operations Section Chief

Positions within site that would step-in as Operations Section Chief

1. Acid / MCA Production Supervisor
2. CS2 / NaSH / SxCl Production Supervisor
3. Crystex Production Supervisor

Responsibilities:

i. Organizing, Assigning and supervising the tactical response activities
    1. Each production supervisor serves as Operations Section Chief for his respective plant.
    2. Directs activities of Fire Marshall and brigades within their plant.
    3. Takes steps to cut out source of fire.
ii. Evacuation of Plants and head count
    1. Each production supervisor will ensure that all personnel in his respective plant are evacuated to safety. Each supervisor or designate will make a head count.
iii. General Plant Disasters Coordinator
    1. Each production supervisor will direct the activities of emergencies that occur within his plant.
iv. Assumes command in absence of Site Director / PQC Manager / Shift Foreman
v. Investigation – in coordination with Site Director and HSE Advisor
    1. Establish Investigation committee to determine what caused disaster.
    2. Assist outside authorities, who have Bonafede interest in the investigation.
    3. Compile all information gathered.
    4. Make write-up and submit all necessary reports.
    5. Corrective action should be taken as a result of investigation to assure against recurrence.

7.1.9 Planning Section Chief

Positions within site that would step-in as Planning Section Chief

1. Operations Manager
2. Maintenance Manager

Responsibilities:

i. Security – in coordination with Environmental Engineer; guard shack & security personnel.
ii. Organize communication with mutual aid organization(s)
iii. Ensure site headcount has been completed
iv. Preparing and documenting Incident Action Plans
v. Managing information and maintaining situational awareness for the incident

vi. Tracking resources assigned to the incident
vii. Maintaining incident documentation
viii. Developing plans for demobilization

7.1.10 Logistics Section Chief

Positions within site that would step-in as Logistics Section Chief
1. Supply Chain Planner
2. Operations Manager

Responsibilities:
i. Equipment Coordinator.
ii. Organize rescue team.
iii. Transfer Injured from disaster area to first aid station.
iv. Maintain adequate first aid supplies and equipment.
v. Make emergency vehicles have access to property.
vi. Keep unauthorized personnel out.

7.1.11 Finance Section Chief

Positions within site that would step-in as Finance Section Chief
1. Site Controller
2. Procurement

Responsibilities:
i. Ordering supplies
ii. Tracking cost of event

7.1.12 Public Informations Officer

Positions within site that would step-in as Public Informations Officer
1. HRBP
2. Site Director

Responsibilities:
i. Public Relations & Information
    1. Notify proper officers at company headquarters.
    2. Notify insurance carriers.
    3. Make provisions for press, radio and TV announcements and channel such information given by Plant Manager.
    4. Notify families of injured personnel.
    5. Keep log of important happenings.

7.1.13 Liaison Officer

Positions within site that would step-in as Liaison Officer
1. HSE&S Manager
2. Legal

Responsibilities:
i. Restrict incoming and outgoing calls to those essential to emergency.
ii. Call neighboring plants.
iii. Environmental Reporting

7.1.14 Safety Officer

Positions within site that would step-in as Safety Officer

1. HSE Advisor
2. HSE&S Manager

Responsibilities:

i. Suspend or terminate a response action if unsafe conditions are identified
ii. First Aid and Medical Services
    1. Administering whatever first aid is necessary to safeguard lives.
    2. Establish first aid and treatment center.
    3. Develop team of aids to include training so all medical responders hold current and valid cards at all times.
    4. Keep records of injured personnel and treatment given.
iii. Transportation
    1. Provide necessary vehicles to transport injured to doctors and hospitals.

7.1.15 Emergency Response Activities

Safe Response - Emergency response personnel should respond to the nearest safe area with emergency equipment. Wind direction, head counts, and radio availability should be considered.

Establish and Maintain Cold, Hot and Warm Zones - The cold zone should be established at a great enough distance so that people inside of the cold (safe) zone will not be subject to injury should the emergency increase in scope.

Establish a Command Post - The command post should be established (by Incident Commander) and located in a safe area (cold zone) and serve as a local point for emergency response planning. The following Deputy I/C Officers should assemble at the command post to assist in the coordination and planning of the emergency response:

i. Command Staff
ii. General Staff

The command post will initially be set up by the Fire Marshall and the Medical Response (formerly First Aid) Team will be available at the command post unless an evacuation is initiated. The Medical Response Team announces their location via the radio. If it becomes necessary to move the command post closer to the emergency scene, this will be completed as required (after review).

If the emergency is located within the process area, including storage areas, the plant superintendent is the Disaster Coordinator. If the emergency is located at a loading facility, the loading superintendent, with assistance from the plant superintendent, acts as the Disaster Coordinator.

> **Note**: The incident commander will normally be the Site Manager, PQC Manager or Shift Supervisor. Initially the first most senior individual will take I/C responsibilities. CHAIN OF COMMAND: ► Fire Marshall ► Superintendent with Radio ► Supt. of Area ► Production Supervisor ► Production Engineer ► 1st Class Operator

Establish Lines of Communication - Communication between the various emergency response groups should be established as soon as possible through designated radios as listed in the EAP guide section 10 "GAS". The Medical Response Team, Emergency Vehicle, and the Fire/Rescue Teams are assigned to the emergency channel "Channel 6" on most radios, and the headcount, control rooms, and other transmissions to "Channel 1" the LeMoyne Frequency.

> **Note**: Once control rooms have reported their headcount, they should switch to the emergency channel frequency.

The Plant Superintendent with radio duties in charge at the emergency scene will be responsible for providing the initial categorization and information to the Engineering Supervisor at the guard house so the neighboring plants can be notified. Necessary information for notifying the neighboring plants is listed as the "Area Plant's Emergency Notification" in "**Section 8.1**" of the EAP.

During off-hours the shift supervisor must provide the necessary information for the neighboring plants notification to the guard who will notify these plants. Also, if the situation warrants, the shift supervisor should put the EAP call-in procedure to effect. Note: If the release could possibly affect the neighboring community the LeMoyne Industrial Park Siren System would be activated with response as directed by the Shift Supervisor.

As additional information becomes available during an emergency, this information should be relayed to the neighboring plants as required.

Assess Emergency - Plant personnel with assistance from the Fire and Rescue Team as necessary, should assess the emergency situation as quickly as possible. Assessing the emergency should be done in a safe manner as follows.

1. Use necessary protective clothing, i.e. slicker suit, totally encapsulated suits, fire suit.
2. Use necessary respiratory equipment, i.e. 60 minute SCBA or supplied air.
3. Do not send personnel into emergency area alone, a buddy system should be followed.
4. Do not approach emergency scene too closely.

Establish Plan of Action- Before rushing into an emergency area, establish a plan of action to consider the following:

Rescue - do not take unnecessary risks to rescue people if the emergency situation is out of control.

1. Controlling the emergency.
2. Securing the emergency.
3. Back-up Plan.

The plan of action should be established by the Fire and Rescue Team Leader, the Area Superintendent, and other Deputy I/C Officers.

Secure Necessary Emergency Response Equipment - If the necessary emergency response equipment is not available at the emergency site, send personnel to obtain it. Additional equipment needed might include Cl2 kits, protective clothing, soda ash, additional fire equipment (hoses), etc. Establish decontamination area and equipment requirements.

Coordinate Response Efforts Between Various Emergency Response Groups - Radio contact should be maintained between the various emergency response groups including the Fire and Rescue Team, Medical Response Team, Emergency Vehicle Driver, Chemtrec Team, and Disaster Coordinator. All unnecessary requests for updates and information on the emergency channel should be avoided to insure that clear channel time is available for emergency personnel.

Call for Additional Assistance as Needed - If emergency response sources at the scene of the emergency are not adequate, outside assistance should be requested through the Safety Supervisor with assistance from the Responsible Care Superintendent. Assistance can be coordinated through the Emergency Management Agency, who can designate members of the LeMoyne Industrial Park to assist or other agencies (Mobile Fire Dept., Mobile HAZMAT, etc.) as needed to assist with the emergency.

Isolate the Emergency Source - The emergency source should be isolated in as safe a manner as possible according to the coordinated plan of action. The buddy system should be used by personnel isolating the emergency source with back-up personnel ready to respond if necessary as well.

Monitor Emergency Area to Ensure Safe to Re-enter - Monitoring equipment should be used after the source is isolated to ensure that the emergency area is safe to re-enter.

The area downstream of the emergency, particularly beyond our property lines should be safely monitored during the emergency for information and documentation purposes.

> **Note**: Superintendents not directly involved with the area response shall be available and aid with Industrial Hygiene and perimeter monitoring.

Establish Environmental Control - Environmental control of any runoff should be established as part of the emergency response effort. The containment or damming of any contaminants, should be part of the response plan, should be completed without risk to personnel.

Establish Security Road Control – Establish security control by assuring the main road entrances are secured. This can be accomplished by confirming individuals are available at the main entrance road and contractor road entrance. Barricades or tape can also be utilized to establish control. For large scale emergencies, security personnel arrangements to be made with the security contract provider.

Announce "All Clear" - After it has been determined that it is safe to re-enter the emergency area, an "All Clear" announcement should be made by the Incident Commander (Operations/Maintenance Manager) or his designate according to the EAP.

Emergency Critique - After any emergency a critique of the response, an investigation of the incident, and review with personnel should be completed. A report of the incident by the Department Superintendent should be issued to the Plant Manager, Safety Department, and Manager as soon as details of the incident have been investigated.

8.0 REPORTING, NOTIFICATIONS, AND COMMUNICATIONS

The geographic proximity of several chemical plants operating in the area, and the properties of some of the chemicals handled, present a potential for an accident to reach beyond the fence line and cause a hazard or inconvenience to neighboring plants. During such an occurrence it would be desirable to warn or advise neighboring plants and community that an unusual situation existed so that they could take proper actions. However, to prevent either inadequate action or over reaction, it is necessary to develop certain standards to be used for such communications. These standards should be simple and understood by everyone who would have a need to use them. Also, the responsibility for communication as well as the method of communication must be preplanned to be effective and avoid confusion.

In this section are the procedures and information for assigning the responsibility for communication, the method of communication (determination of the categories of releases), activation of the LeMoyne Community Siren System, and Testing of the System.

8.1 Emergency Notifications Area Plants

The following steps are to be used in notifying area plants of local emergencies which will or possibly will affect them:

8.1.1 Normal Business Hours

1. When the major gas release alarm is first sounded, the process engineer who is responsible for the main gate should immediately and safely proceed to the main security gate.

2. If the main gate process engineer cannot safely reach the main gate due to the wind direction and gas release source, the process engineer should make contact with Incident Command (Incident Commander) advising that he/she has been unable to make contact with the area plants. The Incident Command should then make contact with the guard providing the necessary information for area plant's notification.

3. The main gate process engineer, using the guard's plant radio, should first find out the nature of the emergency and determine if the gas release is a category 1, 2, or 3 according to the guidelines listed in the attached "Emergency Notifications Procedure" in **section 8.4**.

4. The main gate process engineer should notify the affected area plants individually through the guardhouse radio designated for this purpose. In addition, each contact made to the surrounding plants should be documented on the appropriate Notification checklist (contained here-in).

5. The Engineer (or designate of the Incident Commander) should provide the following information:

    a. Category of release

    b. Name of chemical, if category 2 or 3 release

    c. Wind direction

6. If unable to contact an individual plant by radio, a phone call should be placed to the designated contact at the desired plant (see designated contacts from the attached Emergency Notifications Procedure).

    NOTE: A phone call must be made to **EcoSouth** and **Mobile County** notifying them of the status. See **Appendix VII** for contact information.

7. When the emergency has been resolved, the process engineer (or designate of the Incident Commander) should relay the all clear message to the neighboring plants and document on the notification checklist.

8.1.2 Off-Shift Hours

1. The shift supervisor should contact the guard to notify area plants using the radio in the guardhouse that is designated for this purpose.

2. The shift supervisor should provide the security guard with the following information:

   a. Category of release (see attached LeMoyne Industrial Park Emergency Notifications Procedure)

   b. Name of chemical, if category 2 or 3

   c. Wind direction

3. The security guard should relay this information to the neighboring plants using the emergency notification radio.

   NOTE: A phone call must be made to **EcoSouth** and **Mobile County** notifying them of the status. See **Appendix VII** for contact information.

4. If the guard is unable to contact an individual plant by radio, a phone call should be placed to the designated contact at the desired plant (see designated contacts from the attached L.I.P. Emergency Notifications Procedure).

8.2 LeMoyne Community Siren Alarm Activation

To assure all individuals activating the siren system are completing the activation per the LeMoyne Industrial Park protocols and that evaluation of the situation has been completed.

Emergency Activation of the LeMoyne Community Siren System is to be done by the Incident Commander or his designate. Evaluation of the situation is of primary importance, activation of the siren requires that a category 3 situation exists (Note: Category 3 involves a release which could affect the surrounding community). The in-house EAP alarms and notifications should also be completed.

8.2.1 Community Siren Activation Protocols

Evaluate the situation and determine the type of category and the message which will need to be broadcast for the situation. Use the descriptions of each category noted in the previous pages to determine the type of emergency. For category 3 conditions follow the given steps here-in. Determine the type of message you will request before activating the siren system.

Select the appropriate message from the following:

i. SHELTER-IN-PLACE
ii. EVACUATION
iii. FALSE ALARM
iv. ALL CLEAR
v. TORNADO

8.2.2 Activate the LeMoyne Community Siren System

Obtain a radio with a phone touch tone pad and ensure that it is on the LeMoyne Industrial Park frequency. Normally this will be **channel 10** on those radio's which are dedicated for activation of the LIP siren system (verify by checking the radio notation).

How:

1. Use a radio with a phone keypad (see the attached drawing).
2. Check/verify you are on the LeMoyne Industrial Park frequency.
3. Depress the Activation Button on the side and hold down.
4. Press the proper activation code sequence by depressing the numbers on the phone keypad.
5. Allow 2 - 4 seconds and then repeat steps 1 through 4.

Note: The alarm will begin to sound and will time out after 3 minutes.

8.2.3 Contact MCEMA

Immediately contact the **Mobile County Emergency Management Agency** (MCEMA – see **Appendix VII**) and advise of the status and have them make the appropriate broadcast, (Have the proper message selected prior to calling). Note: For most situations, Message #1 will apply.

The initial contact to provide information regarding activation of the system should include the items below:

i. Name of Caller
ii. Message and Message type you are requesting to be Broadcast
iii. Nature and Location of Incident

How:

1. Get to a safe telephone location and contact MCEMA per the Instruction card provided to each of the designated individuals.
2. After dialing the number, provide information noted above in items 1 - 3.
3. Indicate that additional information will be provided as needed.

8.2.4 Broadcast Clear Message

When contacting the Mobile County Emergency Management Agency (MCEMA – see **Appendix VII**) and advising of the status, make them aware of the proper message you want broadcast.

The initial contact to provide information regarding activation of the system should include the items below.

i. Name of Caller
ii. Call Back Number
iii. Message and Message # you requested to broadcast.
iv. Nature and Location of Incident
v. Chemical Name
vi. Local Conditions
vii. Assistance as Needed (If known)
viii. Proper Precautions to Take

How:

1. Get to a safe telephone location and contact the Mobile County Emergency Management Agency (MCEMA – see **Appendix VII**).
2. After dialing the number, provide information noted above in items 1-8.

3. Indicate that additional information will be provided as needed.

EXAMPLE MESSAGE TO BE MADE: The call to the Mobile County Emergency Management Agency can be made as shown below:

> "This is **'YOUR NAME'** at LEMOYNE in the LeMoyne Industrial Park. We have activated the LeMoyne Community Sirens in the AXIS and BUCKS AREA, we request to make an Emergency Broadcast. We request the following message '**TYPE (Repeat the Type of Message Selected - I. E. Evacuation)'** to be broadcast. Our call back number is **'PROVIDE TELEPHONE #'**.
> We have an emergency situation at our facility involving **'CHEMICAL NAME AND ESTIMATED QUANTITY'** (if known). Local conditions are **'EXPLAIN BRIEF CONDITIONS'**. We would also like to request the following assistance **'EXPLAIN NEEDED ASSISTANCE'** (if known/needed). We will provide updated information as needed."
>
> **Note**: For Calls during off-hours and weekends, the Mobile County Emergency Management Agency (MCEMA) forwards all calls over to the Mobile Communications Center 911 Systems Operator. Please request that the Mobile County Emergency Management Agency Call duty officer be contacted. We must provide the information as needed, the 911 Operators should be requested to have the MCEMA call duty officer make a call back. Because of this, you must provide a call back number. The 911 Operator will contact the MCEMA duty officer who will call back to verify the emergency and provide any additional assistance if needed (After verification is provided).

8.2.5 Radio LeMoyne Industrial Park Companies

Make a radio announcement to the other LeMoyne Industrial Park Companies. (Note: A call to EcoSouth will be by telephone using contact information in **Appendix VII**).

How:

1. Use a radio with a phone keypad (See attached drawing).
2. Check/verify you are on the LeMoyne Industrial Park frequency.
3. Depress the activation button on the side and hold down.
4. Make the appropriate announcement.

This is LeMoyne, we have activated the LeMoyne Community Siren System. Please be aware of the following conditions...(provide information regarding the status of the emergency), including

i. Name of Caller
ii. Call Back Number
iii. Nature and Location of incident
iv. Chemical Name
v. Local conditions
vi. Assistance as Needed
vii. Proper Precautions to Take

Note: You do not have to provide a long detailed message. If the person begins to ask a lot of questions, indicate that additional updates will be provided as needed.

8.2.6 Update MCEMA

Contact the Mobile County Emergency Management Agency and update/advise of the status. The update contact should provide information as needed, including the items below:

i. Name of Caller
ii. Call Back Number
iii. Nature and Location of Incident
iv. Status of the Incident or All Clear
v. Chemical Name and (if known) Estimated Quantity (Note: This information can be provided during a follow-up call when the specifics are better known)
vi. Local conditions
vii. Assistance as needed
viii. Proper Precautions to Take

How:

1. Get to a safe telephone location and contact the Mobile County Emergency Management Agency (MCEMA – see **Appendix VII**).
2. After dialing the number, provide information noted above in items 1 - 8.
3. Indicate that additional information (if needed) will be provided as needed.

8.3 Emergency Broadcast Message

The following Industries comprise the LeMoyne Industrial park:

i. NOURYON - LEMOYNE
ii. ALABAMA POWER COMPANY
iii. ARKEMA
iv. AMVAC
v. FMC
vi. EcoSouth
vii. LENZING
viii. SSAB
ix. U.S. AMINES

In the event there is a chemical release, tornado or other emergency in the Industrial Park that has potential to affect the health or safety of residential neighbors, the community warning sirens will be activated to alert potentially affected residents. Immediately after activation of the sirens, a phone call will be made to **the Mobile County Emergency Management Agency (MCEMA)**, who will broadcast specific information/instructions.

To contact the Mobile County Emergency Management Agency (MCEMA – see **Appendix VII**).

The call to MCEMA will be made as shown below:

> "This is **'YOUR NAME'** at Nouryon in the LeMoyne Industrial park. We have activated the LeMoyne Community Sirens in the AXIS and BUCKS AREA, please broadcast **'TYPE OF EMERGENCY' (Repeat the Type of Message - I.E. Evacuation)**. We will call back with additional information as needed."

Message texts are attached:

Realizing that it may take people who are outside a little while to get inside, the radio message will be repeated 2-3 times over a 5-7 minute period. The EAS message should be broadcast simultaneously over local radio and television stations.

Note: Unlike the previous protocols, the MCEMA will determine how messages are to be broadcast. Additional information as requested by the Mobile County Emergency Management Agency (MCEMA) may be provided during a later follow-up call. Typical statement of broadcast messages are noted on the next page.

In addition, the MCEMA has been issued procedures for also activating sirens and issuing a request for broadcasting tornado warnings.

8.3.1 EMERGENCY MESSAGE #1 (Shelter-in-Place)

"This is an emergency message to residents in the LeMoyne Industrial Park area in north Mobile County only. The emergency sirens in your area have been activated **THIS IS NOT A TEST**.

There has been a chemical release in the park that could affect persons living within a 2 mile radius of the park. Residents in that area are advised to:

i. Immediately gather family members inside your home.

ii. Close all doors and windows.

iii. Turn off or close all equipment that could draw air into the dwelling such as air conditioning, heat pumps, bathroom or kitchen vent fans, fire place damper, etc.

iv. Do not go outside for any reason until advised that the danger is over.

v. To protect breathing cover nose and mouth with wet towels or cloth.

vi. Stay tuned to local radio or TV for further information.

All traffic traveling on Highway 43 should avoid the Industrial Park Area between Axis and Mount Vernon."

(REPEAT MESSAGE)

8.3.2 EMERGENCY MESSAGE #2 (Evacuation)

"This is an emergency message to residents in the LeMoyne Industrial Park area in north Mobile County only. The emergency sirens in your area have been activated **THIS IS NOT A TEST**.

There has been a chemical release in the park that could affect persons living within a 2 mile radius of the park. Residents in that area are advised:

i. In a safe and orderly fashion all family members should immediately evacuate your dwelling according to your evacuation plan and stay tuned for information updates regarding shelters.

ii. Keep all vehicle windows closed-- do not operate the air conditioning and heater blowers.

iii. Do not delay leaving to care for pets or to gather personal belongings.

iv. To protect breathing cover nose and mouth with wet towels or cloth.

v. Keep your car radio tuned for further information.

All traffic traveling on Highway 43 should avoid the Industrial Park Area between Axis and Mount Vernon."

(REPEAT MESSAGE)

8.3.3 EMERGENCY MESSAGE #3 (False Alarm)

"This is an important message to residents of the LeMoyne Industrial Park area of north Mobile County. The sirens in your area have been Unintentionally activated and you are getting a false alarm. There is **NO EMERGENCY** in the Industrial park."

(REPEAT MESSAGE)

8.3.4 EMERGENCY MESSAGE #4 (All Clear)

"This is an important message to residents of the LeMoyne Industrial Park area of North Mobile County. An **'ALL CLEAR'** indicating the emergency in the LeMoyne Industrial Park area has been secured and you may resume normal activities."

(REPEAT MESSAGE)

8.3.5 EMERGENCY MESSAGE #5 (Tornado)

"This is an emergency message to residents in the LeMoyne Industrial Park area in north Mobile County only. The emergency sirens in your area have been activated **THIS IS NOT A TEST**.

Local weather radar indicates a tornado, (or, A tornado has been spotted) in the park that could affect persons living within the area. Residents in the area are advised to:

i. Go to a windowless interior room, basement, or lowest level of your home or building.

ii. If outdoors, go to a low lying area or ditch.

iii. Do not delay to care for pets or to gather personal belongings.

iv. Keep your radio or TV tuned for further information.

All traffic traveling on Highway 43 should avoid the Industrial Park Area in Axis and Bucks."

(REPEAT MESSAGE)

8.4 Emergency Release Response

In The type of hazard which could affect another site or the community is one which requires immediate notification to the surrounding community. Our first requirement is to determine the category of the release. The LeMoyne Industrial Park emergency siren system will be activated only under a category 3 release. Below is a brief description of each category.

8.4.1 CATEGORY 1

An incident (at the LeMoyne plant) that could cause an unusual smell with possible minor skin or eye irritation.

MOST PROBABLE ACTION:

1. Be aware of the problem and to be able to advise employees that the incident is minor without any expected effect from possible exposure.
2. Notify the neighboring plants.

8.4.2 CATEGORY 2

An incident involving a release which, because of the amount or properties of the material, could be expected to cause injury or significant discomfort to persons who were exposed. All category 2 warnings will include the name of the chemical released.

MOST PROBABLE ACTION:

1. Alert all personnel (including neighboring plants and appropriate community representatives) of the release and possible exposure.
2. Advise on evacuation or necessary protective action.
3. Monitor plant area to determine the actual level of the chemical released.
4. Refer to data on hand for specific information to treat actual or suspected exposures.

Note: Any release other than from LeMoyne will require that the plant involved be contacted and additional information requested.

8.4.3 CATEGORY 3

An incident (at LeMoyne) involving a massive release of a very toxic or corrosive vapor which could be expected to cause immediate and extensive injury to all persons exposed.

MOST PROBABLE ACTION:

1. Immediate evacuation of all employees who had any potential for exposure.
2. Refer to data an hand for specific information on the chemical involved and take appropriate follow-up action.

8.5 Community Siren Testing

To assure community sirens are in working order and all individuals activating the siren system are completing the activation per LeMoyne Industrial Park protocols.

Sirens will be tested every Wednesday at 9:00 A.M. by the superintendent on radio call duty or shift supervisor on duty (or his designate). The sirens will be tested on an alternating basis to ensure every member of the LeMoyne Industrial Park has a radio which is in working condition.

8.5.1 Test Protocols

1. Obtain a radio with the touch tone pad and ensure it is on the LeMoyne Industrial Park frequency. Normally this will be **channel 10** on those radio's which are dedicated for activation of the LIP siren system.

2. 1 - 2 minutes before activation of the system, announce LeMoyne will be completing testing of the LeMoyne Industrial Park Community Siren System. Note: Activate the system on Wednesdays at 9:00 AM per the LIP schedule: The Siren test should occur between 9:00 AM and 9:05 AM only!

   How:
   a) Use a radio with a phone keypad (see the attached drawing).
   b) Check/verify the radio channel select is on the LeMoyne Industrial Park frequency.
   c) Depress the Activation Button on the side and hold down.
   d) Make the following announcement:

   "This is LeMoyne, we will be activating the LeMoyne Community Siren System."

3. After the announcement, (9:00 AM) Enter the proper activation code two times, allow 2-4 seconds before activating the second time.

   How:
   a) Use a radio with the phone keypad.
   b) Check/verify the radio is on the LeMoyne Industrial Park frequency.
   c) Depress the Activation Button on the side and hold down.
   d) Press the proper activation code sequence by depressing the numbers on the phone keypad.
   e) Allow 2 - 4 seconds and then repeat steps 1 through 4.

4. The alarm will begin to sound and will time out after 3 minutes, however after 20 seconds, de-activate the system, by entering the interruption signal.

   How:
   a) Use a radio with the phone keypad.
   b) Check/verify the radio is on the LeMoyne Industrial Park frequency.
   c) Depress the Activation Button on the side and hold down.

d) Press the proper interruption code sequence by depressing the numbers on the phone keypad.
e) Allow 2 - 4 seconds and then repeat steps 1 through 4.

5. After the alarm has stopped sounding, announce that testing of the LeMoyne Community Siren System is complete.

How:
a) Use a radio with a phone keypad (see attached drawing).
b) Check/verify radio is on the LeMoyne Industrial Park frequency.
c) Depress the Activation Button on the side and hold down.
d) Make the following announcement:

"This is LeMoyne, this completes testing of the LeMoyne Community Siren System."

8.5.2 Community Alarm Scheduling

As a final step contact the Mobile County Emergency Management Agency (MCEMA – see **Appendix VII**) and notify them that LeMoyne has completed the LeMoyne Industrial Park Community Siren System Test.SCHEDULE, BACK-UP PROVISIONS:

In December of each year, the LeMoyne Industrial Park (LIP) Emergency Response Sub-Committee shall issue a siren activation schedule for the following year to each of the members. This list will be in calendar form with each company listed on a rotating basis to activate the siren each week of the year.

In the event the company responsible for activating the siren during their assigned date fails to initiate siren activation for any reason (i.e. – equipment failure, dead battery or radio failure, failure to remember, etc.), the company should contact Arkema security to activate the sirens.

NOTE: Siren test should occur between 9:00 AM and 9:05 AM only!

Arkema must also contact the responsible company and determine why the given company failed to complete their assigned activation. The Arkema representative will then report to the LeMoyne Industrial Park Emergency Response Sub-Committee. The Sub-Committee will then complete any follow-up needed.

8.6 Community Emergency

During start-ups, upsets or in-plant incidents that may cause emissions, spills, or other releases of chemicals, the plant is to patrol and inspect residential or business areas likely to be affected. If emissions, odors or pollution can be detected in such areas or appear to exceed permissible environmental levels, the plant representative shall report such facts to an individual at the plant who has been designated as the Disaster Emergency Coordinator. Immediate action must be taken by the plant to eliminate any such problem and to minimize its continuing effects.

Plants must notify the Environmental Control Department according to the "Environmental Upset Reporting and Response" procedures presented in the "Reporting" **section 8.1** and "Environmental Guidance" **in Section 21.0**. They must also, of course, notify the proper environmental regulatory agencies as required by their operating permits.

When such occurrences are significant enough to involve or affect the health or welfare of people in the surrounding community, you must immediately alert LeMoyne's ISOS by calling (440) 2076571999. Under these circumstances the plant must also immediately notify the MCEMA which can notify hospitals which are likely to receive affected people and/or community emergency agencies such as the following which are responsible for implementing evacuation procedures.

i. Emergency Units
ii. Fire Department
iii. Police Department
iv. Emergency Management Agency
v. Hospitals
vi. Health Department

The hospitals and emergency agencies should be given:

1. The name of the chemical and the physical form (gas, liquid) to which people might have had exposure.

2. Product safety information from the appropriate Safety Data Sheet including but not limited to physical description, health hazards and first aid.

3. The telephone number at the plant.

4. If the release involves a highly toxic material (such as H2S, chlorine or a highly toxic material), you should be prepared to advise the appropriate agency whether, in your opinion, an area should be evacuated, or other emergency precautions taken.

5. Give all the information necessary to respond to the emergency. Show the company's real concern for the people who might be affected. **DO NOT** volunteer information regarding the reasons for the occurrence.

Establish a good working relationship with these agencies by meeting with them and discussing your interest in protecting the public if such an event should occur. Review with them the products you produce and solicit their suggestions for improvement of your Disaster Plan.

Apprehension and misunderstanding caused by publicity about the alleged toxicity of chemicals or an incident caused by a plant may result in calls from the general public or from emergency organizations to the numbers of any of our plants, laboratories, or offices listed in the telephone directory. It is essential that a response is obtained at any time of day or night. If a 24-hour emergency number is not manned 24 hours a day, the location is to provide an answering service. The answering service is to contact a responsible person who will get back to the caller.

Additional site-specific community emergency response procedures are available via the site Crisis Communications Plan. Also attached herein are the "LeMoyne Industrial Park Emergency Siren System Emergency Release Response" and a letter from the Mobile County Emergency Management Agency describing the procedures that the neighboring community should follow in case of an emergency resulting from a chemical release in the LeMoyne Industrial Park area.

8.7 MIR3 Urgent Notifications System

The purpose of the MIR3 Urgent notification system is to ensure that defined groups of persons within Nouryon are notified within one hour about (potential) serious incidents, unannounced visits of agencies, and/or media attention in order to take appropriate measures.

For the following (potential) events notifications are predefined in the MIR3 system:

- 12.5 Incident Level 3
- 12.5 Incident Level 2 or 1
- Unannounced Regulatory or Agency visit
- Media attention only
- Distribution incident only

Other incidents such as 12.5 Level 0, or LSR incidents not being 12.5 Level 1 – 3 shall be reported according to the appropriate procedures involved.

The following site personnel should be trained on the MIR3 Urgent Notification System:

- Site Director
- HSE&S BP
- HSE Advisor
- PQC Manager
- Operations Manager(s)

9.0 FIRE EMERGENCY

This section explains the existence of multi-level fire brigades and that it is presently part of our Plant's Emergency Action Plan to assure that this plant has an organized and properly trained group of employees ready to handle fire and rescue emergencies. The rescue emergencies may involve all types of assistance during process releases, spills, emissions, etc.

9.1 Organization

The Fire Brigade is organized into three distinct groups, each with a particular function:

i. Days F&R Team - There are up to ten (10) members. This team is day shift employees only.

ii. Shift F&R Team - There are up to seven (7) members. This team is on a rotating shift schedule.

9.2 Fire Protection Training

This section outlines the training required under the fire prevention plan to assure that all personnel are properly trained in necessary fire prevention and protection techniques.

9.2.1 General Employee Training

Fire Hazards Training

i. Each employee will be apprised of the fire hazards of the materials to which they are exposed through training in their respective departments. Responsibility - department Superintendents

Emergency Action Training

i. Each employee will be trained in those parts of the fire prevention plan which the employee must know to protect the employee in the event of an emergency, during the Orientation Program. Responsibility - Safety Supervisor.

9.2.2 LeMoyne Emergency Fire & Rescue Team - (EFRT)

Each EFRT member (after initial basic Fire Fighting Course) will participate in at least one (1) annual emergency Drill.

i. Drill Content - A mock emergency will be planned and distributed by the Fire Marshall. This can and will include tabletop drills and preplans.
ii. Drill Schedule – Will be conducted as part of the annual required "Live Fire" and the Confined Space Rescue training as scheduled by the Fire Marshall.
iii. All shift team members are trained together and shall participate in emergency drills and training.
iv. Drill Critique - The Fire and Rescue Team shall critique Fire and Rescue Team response for all drills. Critique will be conducted by the acting Fire Marshall.

9.2.3 Initial Training

i. The Emergency Fire and Rescue Team trains together in the plant as a team. All members of this team attend the Texas A&M Fire School and receive multi-media first aid, CPR and 40 hour HAZWOPER and 40 hours Industrial Rescue training.

9.2.4 Ongoing Training

Each team will participate in a training drill, preplanned by the team leaders and observed and critique by one member of supervision.

9.3 Functions of LeMoyne Response Teams

i. Fire hoses will be used to supply water to the fire area to cool equipment and adjacent structures.

ii. The Emergency Fire & Rescue Team will function as a team to enter fire areas for equipment isolation, etc. and to perform necessary rescues in emergency situations such as gas releases.

iii. Confined Space Rescues guidelines for the LeMoyne site are found in procedure **WP080** in the site's document control system.

9.4 Fire Protection

This Fire protection embraces all measures relating to safeguarding life and preservation of property in the prevention, detection and extinguishment of fire. The following steps are to be followed when a fire occurs.

9.4.1 Small Fires

i. When a fire is small, a portable fire extinguisher or water hose should be used to extinguish and control the fire as quickly as possible.

ii. All employees are to be trained in the use of fire extinguishers, so they can effectively combat fires at their inception.

iii. If the fire is not extinguished immediately or cannot be controlled with the portable extinguisher or water hose, sound the fire alarm immediately.

9.4.2 Fire Alarm

i. Any employee can sound the alarm.

ii. The fire alarm is a cycling siren.

iii. Procedures for turning in the alarm is spelled out in the Action Plan Section of the EAP (**Section 8.0**).

9.4.3 Fire Brigade

i. When the alarm is sounded, the Emergency Fire and Rescue team, and the shift teams (when other teams aren't available) will respond immediately.

ii. The Incident Commander will coordinate the activities of the Fire Brigade's when the fire effects more than one location or plant.

iii. The area supervisor of the plant in which the fire is located will act as an Operations Section Officer and work in coordination with the Fire Marshall.

iv. The Fire Marshall is in charge of the Emergency Fire and Rescue Team.

v. The Senior Deputy Fire Marshall is 2nd in command of the Emergency Fire and Rescue Team.

vi. The Shift Supervisor is in charge of the shift team (Incident Commander), during hours when other personnel are not available.

vii. During times when the shift supervisor would be in charge, the 1st class operator of the area affected would take the lead of Operations Section Officer until relieved by outside response or the duties are passed onto a senior 1st class operator in an un-affected plant and it is clearly communicated.

viii. See **Appendix III**

9.4.4 Fire Fighting

i. When the alarm is sounded the hose teams will go to the main guard house to await instructions from the IC., the golf carts can be taken as they can be used to assist with movement of other equipment as deemed necessary.

ii. The Mobile & Electrical Team (Un-assigned) will also report to the main guard house to await instructions (if conditions allow during initial fire alarm activation) as directed by Incident Command.

iii. When an employee assigned to a team is missing the Deputy Fire Marshall is responsible for replacing him.

iv. The Emergency Fire and Rescue Team will function as a team to enter the fire area for equipment isolation and to perform necessary rescue in emergency situations.

v. The Fire Marshall will direct the activities of the Brigade under directions of the Fire Chief.

9.4.5 Locations of Major Fire Fighting Equipment

Drawings showing location of fire houses, fire hydrants and fire water lines can be found in the site's document control system as P&ID **GEN011**.

9.4.6 Additional Comments

The success of handling a fire depends largely upon the promptness with which the Fire Brigade is activated and upon the efficiency of the Brigade in handling the fire fighting equipment.

9.5 Maintenance for Fire Protection

This section assigns specific responsibilities for the maintenance of all plant Fire Protection Equipment and Heat Producing equipment for the following reasons:

1. To assure that all Fire Protection Equipment will be functional when needed.

2. To assure that all equipment and systems installed on heat producing equipment to prevent accidental ignition of combustible materials are functioning properly.

9.5.1 Fire Extinguisher (Portable)

i. Monthly Inspection - Outside contracted services
ii. Annual Inspection - Outside contracted services

9.5.2 Fire Hose Houses

i. Quarterly - Outside contracted services

9.5.3 Fire Pumps

i. Twice per month start-up and maintenance by Crystex® Operations and Maintenance.
ii. Annual - Flow test by Crystex® Plant Superintendent/Outside contracted services

9.5.4 Sprinkler Systems

i. Monthly Inspection - Outside contracted services
ii. Annual Inspection - Inspection and maintenance by outside contracted service.

9.5.5 Hydrants and Monitor Nozzles

i. Weekly P.I.V. Inspection - Area Plant Inspector.
ii. Quarterly test - Area Plant Supervisor

9.5.6 Responsibilities

All heat producing equipment is checked for fire eye failures and proper shutdown of all burners, fuel sources, etc., on established schedules.

9.6 Maintenance for Fire Protection

This section provides a written policy identifying the major fire hazards, their proper handling and storage procedures, potential ignition sources (such as welding, smoking, and others) and their control procedures, and the type of fire protection equipment or systems which can control a fire involving them and a policy for the control of accumulations of flammable and combustible waste materials and residues.

The goal of this section is that all employees are aware of the major workplace fire hazards and necessary prevention and control techniques, as well as to prevent unnecessary accumulations of flammable and combustible waste materials and residues to minimize contribution to a fire emergency. To note that various fire risk assessments have been completed including LOPA studies, HAZOPs, and asset integrity reports to aid in identifying main events that could cause a fire or explosion along with likely consequences and the fire safety management systems in place.

9.6.1 Major Workplace Fire Hazards & Wastes

The following is a list of each plant with their list of fire hazards:

Carbon Disulfide Plant

1. Carbon Disulfide
2. Hydrogen Sulfide
3. Methane (Natural Gas)
4. Oil
5. Sulfur

Crystex® Plant

1. Carbon Disulfide
2. Hydrogen Sulfide
3. Methane (Natural Gas)
4. Sulfur
5. Oil
6. Waste Crystex® Absorption Oil

Sulfuric Acid Plant

1. Methane (Natural Gas)
2. Hydrogen
3. Sulfur
4. Hydrogen Peroxide
5. Carbon Disulfide

Sodium Hydrosulfide (NaSH) Plant

1. Hydrogen Sulfide

Sulfur Chlorides Plant

1. Sulfur
2. Chlorine

MCA Plant

No flammables

Other Areas

I. Paint Shop
   1. Paint thinner
   2. Paint
   3. Waste Paint Thinner (55 gal)

II. Hazardous Waste Pad
   1. CS2 Still Bottoms – Process Oil
   2. Waste Crystex® Abs. Oil
   3. Waste Paint Thinner

We have removed all sources of ignition of these workplace fire hazards. We have sprinkler systems in all plant areas of concentrated volumes and these sprinkler systems are activated by heat activating devices or burn out elements.

10.0 RELEASE OF TOXIC OR HAZARDOUS CHEMICALS EMERGENCY

A major or serious gas release is one incident, which would initiate the Emergency Action Plan. The following steps are to be followed in case of a serious gas release which outline the responsibilities of all employees and the proper response which should be completed in the event of a serious gas release, including the steps to follow in activating the site emergency alarm system.

In case of a major emergency as defined in the introduction, the EAP will be put into effect. The main consideration is that each EAP officer reacts as quickly as possible to cope with the emergency.

10.1 Alarm System

If a potentially serious gas leak is determined to exist because of a gas release from one of our plants or an adjacent plant, the Major Gas Alarm will be sounded for approximately 30 seconds and it will be announced on the public address (P.A.) system.

The **MAJOR GAS RELEASE ALARM** is a continuous siren sound.

The major gas alarm normally will be sounded by a supervisor who is familiar with the situation, however, any employee who believes a dangerous situation exists may sound the alarm.

The alarm system should be sounded in case of an emergency or disaster. When in doubt about gravity of a situation, sound the alarm.

The alarm system may be activated by the use of any telephone within the LeMoyne Plant. If an employee has a radio and a phone is not readily available, they may request that the alarm system be activated after providing emergency information as necessary.

10.2 Operating The Alarm System

10.2.1 Gas Release Only

If the disaster or emergency is of a gas release nature, the following steps are to be followed (**Note**: Gas Siren is a continuous alarm)

1. **Dial Extension 757** - you will hear the normal "rings" which you would hear when calling any other number.
2. Allow the phone to ring (siren will be operating) for thirty (30) seconds.
3. Hang up the phone.
4. **Dial Extension 600** (Public Address System) - Page
5. Announce the emergency in detail on the public address system. Be sure to talk calmly for clarity and state the nature and location of the emergency, repeat the message.

   A sample message would be:

   *"We have a **(name the chemical/material if known)** gas release in the **(name the plant or area of the facility)**, I repeat we have a **(name the chemical/material if known** gas release in the **(name the plant or area of the facility)** plant."*

   (Repeat a third time as needed)

6. Hang up the phone and seek help.

   Note: All emergencies reported by visitors, contractors, or drivers will be reported by them calling ext. 230, which is the Crystex® control room. The Crystex® operator is responsible for taking the information and activating the proper alarm and/or response as necessary. The operator when receiving this type of call should verify that they properly understand the emergency information.

7. Active **Swift911** system

8. All visitors/contract personnel/delivery personnel should exit the plant and assemble in safe assembly areas. They should ensure they are accounted for and remain in the area as requested.

10.2.2 Both Fire and Gas Incident

If the disaster is both fire and gas or any other grave emergency, **dial extension 757** (gas release) and follow the steps in above for gas release.

10.2.3 Shelter-in Place

If protection of individuals due to gas release conditions from a neighboring plant or a situation at the site are better served by sheltering, Incident Command will make a determination and make both radio and P.A. Announcements as needed to notify all individuals on site. I\C will also make a decision regarding headcount.

10.2.4 Nearby Releases (Off-Site)

Emergencies or disasters located at the river dock should be handled as follows:

1. Immediately notify the plant facility via radio or telephone based on availability.

Once the plant emergency has been recognized, the alarm system activated and emergency measures underway, the LeMoyne Industrial Park Plants should be notified as to the category of the release. Note: If the emergency is of the type, which would pose a threat to the neighboring plants and Community, the facility will proceed with a Phase II evacuation and activate the LIP Emergency Sirens as outlined in section 6, LeMoyne Industrial Park Response.

When the disaster or emergency is over, the public address system should be used to give an all-clear response. The Incident Commander will give the all-clear via the public address system. In addition, an all-clear should be announced via radio communications on the LeMoyne repeater frequency (channel 1 on most radios), but only after the initial P.A. all-clear has been provided. The Incident Commander can designate any individual to provide the radio all-clear.

Note: After an all-clear has been provided, all confined space and hot work permits must be re-issued before any work is restarted. Each department is responsible for re-issuance of these work permits. An additional safety reminder should be provided at the muster (assembly) areas to all employees and contractors.

10.3 Major Gas Release Action Plan - Phase 1

When operating the gas release alarm, it is first sounded (30 seconds) as noted on the previous page in 10.2.1. All personnel should be alert to the possibility of a dangerous gas release.

10.3.1 Non-operating Personnel (Phase 1)

1. All running equipment should be shut down when the alarm is sounded.

2. Immediately move down from structures, out of tanks, etc. and move into a plant area and position where you can observe and be alert to any developing situation. Be aware of wind direction.

3. All Visitors, Contract Personnel, and Delivery Personnel should exit the plant and assemble in safe assembly areas. They should ensure that they are accounted for and remain in the area as requested. **This applies to both Major Gas and Major Fire Emergencies**.

4. For shelter-in-place decisions, made by incident command, individuals must follow the instructions of LeMoyne.

5. Customer Service (Loading) personnel should shut off all valves and stop loading operations.

6. Make every effort to be seen by your supervisor so all personnel can be accounted for.

10.3.2 Operating Personnel (Phase 1)

1. Upon hearing the first alarm, operating personnel are to make readily available a self-contained 30-minute air pack (SCBA). Make sure the air pack has a sufficient supply of air.

2. Radio's in each of the control rooms should be switched to the LeMoyne frequency, channel #1 if not already on this channel.

   Note: If the LeMoyne Radio repeater is out of service, switch to **channel #7 (Talk Around channel)**.

3. All unnecessary equipment should be shut down.

4. Be prepared to shut down the plant if necessary. If Incident Command does not provide instruction, operations personnel have the authority to shut down the unit as needed.

10.3.3 Supervisory Personnel (Phase 1)

1. Supervisory personnel should account for all their personnel as soon as possible after the first alarm is sounded.

2. General instructions should be given to employees by their supervisors concerning accessibility, safe routes to, and the safety of designated Phase 2 assembly areas.

3. Supervisors who have normal access to radios should secure these radios and be ready to take them to a designated assembly area, if these radios are not already being used as part of the emergency response. These supervisors who have their radios in their possession, should report to the Plant Assembly Area Coordinator, by radio, where they are located for possible Local Assembly Coordinator assignments in the event of a Phase 2 evacuation.

10.3.4 Plant Assembly Area Coordinator (Phase 1)

1. The Plant Assembly Area Coordinator should determine the safety status of each designated assembly areas. If Shelter-in-Place is called for by incident command, the PAAC should assure all visitors, contractors, and drivers are accounted for as needed.

2. The Plant Assembly Area Coordinator should also designate Local Assembly Area Coordinators for each of the designated assembly areas.

10.3.5 Local Assembly Area Coordinators (Phase 1)

Designated Local Assembly Coordinators should be prepared to go to their designated assembly areas upon sounding of the Phase 2 alarm.

10.3.6 Main Gate/Environmental and/or Process Engineer Supv. (Phase 1)

The environmental engineer, laboratory technician, process engineer, or designated individual who is responsible for the main gate should notify the surrounding plants via the emergency radio located in the guard house. The Emergency Notification Procedure should be followed, with the status of the gas release obtained from the Incident Commander or as directed by the superintendent/fire marshall of the affected area. The notification should include the category and chemical involved.

10.3.7 All Clear Notice (Phase 1)

As the gas release is controlled and emergency conditions subside, an all-clear bulletin will be put out by the Incident Commander or designate, via the P. A. and radio.

10.4 Major Gas Release Action Plan - Phase 2

If it is determined that a major gas release has or is occurring which requires evacuation of the plant, the major gas release alarm will be sounded a second time for a longer period of time, approximately 2 minutes. Note: Any time an alarm is sounded a second time, regardless of the type (i.e. Major Fire or Major Gas Alarm), the second activation results in evacuation of site personnel, even for mixed alarms (i.e. 1st Fire, then Gas alarm activation).

10.4.1 Non-Operating Personnel (Phase 2)

1. Upon Phase 2 Alarm, all non-operating personnel not involved in handling the emergency, should evacuate to a safe assembly area as described in the Assembly Area (**Section 10.4.7**) section of this Phase 2 procedure.

2. When proceeding to an assembly area, employees should pay close attention to the wind direction and walk across wind from the gas release source.

3. Upon arrival at an assembly area, employees should look for the departmental signs (which classify each group, only during normal work hours) and make contact with their supervisors for personnel accounting. If the employee's supervisor is not available, contact should be made with the Local Assembly Area Coordinator. Individuals should remain with their department and not visit or walk around until an all-clear has been provided.

10.4.2 Operating Personnel (Phase 2)

1. Insure that radio's are on the LeMoyne repeater frequency (normally channel #1) and wait for instructions of supervisor (Note: Instructions may come via phone, verbal, or radio), however if none has been given, check the status via radio, and then put on an air pack and proceed to shutdown the plant as per the shutdown plan.

2. After the plant has been shut down and is secure, evacuate the plant to a safe assembly area as described in the Assembly Area (**Section 10.4.7**) section of this Phase 2 procedure.

3. After evacuation to assembly area, make every effort to contact your supervisor. If your supervisor is not at the assembly area, contact the Local Assembly Area Coordinator at this assembly area.

4. If the instructions given by supervision (Incident Command) are to continue running, make sure to evaluate the conditions in the plant, which could present a problem. If supervision (Incident Command) is unaware of any conditions, advise as necessary.

10.4.3 Supervisory Personnel (Phase 2)

1. Make sure that your employees evacuate to a safe assembly area as described in the Assembly Area (**Section 10.4.7**) section of this Phase 2 procedure.

2. Be on the look out for any personnel not proceeding to an assembly area in a safe route or acting in an unsafe manner.

3. At the assembly area, account for all your employees and report personnel accounting results to the Local Assembly Area Coordinator of your assembly area. If any of your employees are not at your assembly area, the Local Assembly Area Coordinator will check by radio with the other Assembly Area Coordinators for these employees.

4. If the release will affect the neighboring community, notification should be made via the LeMoyne Industrial Park Siren System. The incident must be a category 3 release.

10.4.4 Plant Assembly Area Coordinator (Phase 2)

1. The Safety Supervisor will serve as the Main Plant Assembly Area coordinator (PAAC). Upon the absence of the Safety Supervisor, Human Resource and designated office representatives will serve as Plant Assembly Area Coordinators.

2. The Plant Assembly Area Coordinator is responsible for accounting for all LeMoyne and non-LeMoyne personnel on site at the time of the emergency.

3. The Plant Assembly Area Coordinator is responsible for designating Local Assembly Area Coordinators (LAAC) for the secondary assembly areas from anyone who has access to a radio and can safely get to the designated assembly area. The PAAC should appoint LAAC's during Phase 1 of the gas release if possible.

4. The Plant Assembly Area Coordinator will normally be located at the primary assembly area. If the PAAC is unable to safely get to the primary assembly area, he should designate a Local Assembly Area Coordinator from anyone who has access to a radio and can safely get to the primary assembly area.

10.4.5 Local Assembly area Coordinators (Phase 2)

1. The Local Assembly Area Coordinators can be anyone who has access to a radio and can safely get to a designated assembly area, or as predetermined by each area department.

2. Local Assembly Area Coordinators will be appointed by the PAAC.

3. Local Assembly Area Coordinators are responsible for personnel accounting at their designated assembly area. LAAC's should communicate personnel accounting results to the Plant Assembly Area Coordinator.

10.4.6 Communications (Phase 2)

1. Hand held portable radios will be the primary means of communication during a major gas release.

2. The Security Building radio will be used by the environmental or process engineer responsible for the main gate. The security guard will evacuate the building as soon as the engineer responds and will assist with visitor/contractor/driver headcount. The radio will be left with the engineer.

3. Personnel normally possessing radio's can be designated as Local Assembly Area Coordinators, if they can safely get to the designated assembly area with their radio.

4. The environmental or process engineer who is responsible for the main gate should notify the surrounding plants via the emergency radio (LeMoyne Industrial Park frequency - normally **channel 10**) per the emergency notification procedure and provide the status of the gas release.

10.4.7 Assembly Areas (Phase 2)

1. Designated assembly areas have been set up so that personnel can assemble at as few safe locations as possible in a plant evacuation situation in order that personnel accounting can be done as efficiently as possible.

2. Designated assembly areas have been chosen with regard to prevailing wind directions and hazardous gas release sources.

3. Depending upon the wind direction and /or the gas release source, one designated assembly area will not always be accessible to all employees.

4. Evacuating employees should walk across wind from the gas release source to a safe assembly area and (during normal work hours) look for the departmental signs for ease in identifying each group.

5. The primary assembly area has been designated to be west of the front office on the west side of the railroad tracks (see attached Evecuation Map in **Section 16.5**). Evacuating employees should proceed to the primary assembly area if they can get to it safely and the wind is not blowing in this direction from the gas release source, making it an unsafe assembly area.

6. If the primary assembly area cannot be safely reached or the primary assembly area is an unsafe location, evacuating personnel should evacuate to one of the secondary assembly areas to the east of the Plant or south of the Plant on the south river road (see attached Evecuation Map in **Section 16.5**).

7. If the primary and secondary assembly areas are inaccessible or are unsafe areas, evacuating personnel should evacuate to a safe assembly area and try to make contact with their supervisor for personnel accounting.

10.4.8 Personnel Accounting (Phase 2)

1. Plant Assembly Area Coordinator

   i. Upon the Phase 1 announcement, the Plant Assembly Area Coordinator (PAAC) should determine the safety status of each designated assembly area and designate Local Assembly Area Coordinators for each of the safe assembly areas.

   ii. Upon Phase 2 announcement, the PAAC or his designate should make a radio announcement of any unsafe assembly areas (as needed).

   iii. The PAAC will compile the emergency head count check list from the personnel accounting results he gets through the Local Assembly Area Coordinators.

iv. An updated master LeMoyne personnel list will consist of all LeMoyne personnel by their respective department and supervisor. This list will be periodically updated to insure that it is revised as necessary. This list will be used for personnel accounting.

v. The security guard will maintain a current list of all visitors, contractors and delivery personnel on site.

vi. The PAAC should report personnel accounting status to the EAP Director (Incident Command).

vii. For Shelter-in-Place, individuals must be accounted for at the request of I\C and done similar to an actual evacuation.

2. Local Assembly Area Coordinators

Local Assembly Area Coordinators are responsible for communicating personnel accounting status in their designated assembly area to the PAAC.

3. Main Gate

The environmental and/or process engineer supervisor who is responsible for the main gate should bring the "Employee Log" from the guardhouse to a safe assembly area upon Phase 2 announcement if this has not already been completed by the security guard or retrieved as directed by the PAAC. The "Employee Logs" are maintained by the guard and is a list of all contractors, visitors, and local truck drivers at the site.

4. Supervisors

At each assembly area, supervisors should account for their personnel and report results to the PAAC or through the Local Assembly Area Coordinator. Exceptions or special points are as follows:

i. The Fire Marshall or his designated back-up will account for members of the Fire & Rescue Team.

ii.

iii. The on-site supervisor of each contractor will be responsible for accounting for all contractor personnel.

iv.

v. The LeMoyne liaison who authorizes plant admittance to a visitor is responsible for accounting on off-hour shifts.

5. Missing Persons

Searches for persons unaccounted for will be authorized by the Plant Assembly Area coordinator only through the Incident Commander.

6. Off-Hour Shifts

i. The Shift Supervisor or his designate will be responsible for accounting on off-hour shifts.

ii. Upon sounding of the emergency gas release alarm, the security guard should notify the shift supervisor of all non-operating personnel in the plant, including LeMoyne maintenance and supervisory personnel, contractors, and truck drivers.

iii. Each plant should account for their own personnel and report results to the shift supervisor or his designate at the designated assembly area.

10.4.9 General Warnings (Phase 2)

1. When the second alarm is sounded and you are instructed to evacuate, do not attempt to go to locker rooms or other places for personal belongings.

2. Do not attempt to return to the plant to remove breathing equipment until proper tests have been made and you are instructed that it is all clear.

3. When the second major gas alarm is sounded the Emergency Action Plan is in effect and should be followed.

10.4.10 Emergency Conditions (Phase 2)

1. If an emergency exists such as a major gas release or bomb threat which would immediately endanger personnel, the major gas release alarm will be sounded for 10 seconds, shut off, a P.A. announcement made and sounded again for an indefinite period of time (2 minutes or longer). This is to alert personnel to evacuate immediately.

   Note: The individual who activates this alarm, as they must also immediately evacuate, should respond to a safe assembly area and immediately identify where (phone location) they have activated the siren from.

2. All employees will react per Phase 2 of the Action Plan.

3. The Emergency Action Plan will be in effect.

10.4.11 All clear Signal (Phase 2)

1. After the emergency has passed and the proper tests have been made and it is determined that the plant is safe, an all-clear bulletin will be issued.

2. The All Clear will be a verbal announcement originating with the Incident Commander or designate.

3. All personnel after receiving the message will return to their departments unless otherwise instructed by their supervisor. Note: All outside personnel should receive a verbal release from the LeMoyne Employee responsible for their admittance into the plant.

   Note: After an all-clear, all confined space work permits and hot work must be re-issued before any work is restarted. Each department is responsible for re-issuance of permits.

11.0 MEDICAL EMERGENCY

In order to ensure that all personnel know how to call in a medical emergency, which results in injury to an employee, the following should be completed.This section will guide the proper response in the event that any individual who suffers from an injury, fall, heart attack, or any medical problem is quickly responded to. This will guarantee that we can provide the best and quickest response to any condition. Note: This applies to injuries/illness, which are not associated with a Fire/Gas and/or Alarms.

> **Note**: We can make sure that a quicker response is made if a P.A. Announcement is made rather than activating the Gas/Fire alarms when an injury occurs. What happens when the Alarms sound, is that the emergency personnel will lose time in getting to their emergency equipment which may not be needed for medical emergencies (This results in loss of precious time).

11.1 Notification of Medical Assistance Needs

1. To call in a medical emergency, the caller should pick up any telephone, **DIAL 600**, and make an announcement.
2. The caller should state:
   *"Will the Medical Response and Fire/Rescue Teams respond to the **'LOCATION OF PERSON'**, we have a man down (or we have a medical emergency)".*

3. The caller should speak calmly and with clarity. The caller should repeat the message to ensure that it is understood.

   Note: As a reminder to save time, if a hand-held radio is available, a call can be made via a radio. The request can be made for both direct medical assistance and to ask someone to make a P.A. Announcement. Note: If the caller is aware the injury or problem is major, they can also initiate a 911 call.

11.2 Emergency Vehicle

The site is no longer equipped with an emergency vehicle in the event that injuries require transportation to medical facilities. The site must utilize the 911 Emergency Center services for all transportation. The old emergency vehicle now serves a sole function of providing medical equipment to meet first aid team needs as well as communication equipment to function as a potential control center. Medical equipment stored in the emergency vehicle includes the following:

i. Oxygen supply units
ii. Splints (Air, Thomas Leg, and Hare type)
iii. Stretchers
iv. Suction Apparatus
v. Backboards
vi. Burn Kits

The vehicle is not equipped to transport injured personnel to local medical centers. For transportation needs, the site will need to utilize the 911 emergency center to contact and request ambulance services.

11.2.1 Operating Responsibility

Personnel assigned to operate the vehicle are as follows:

i. Salaried Working Hours – Medical Response Team

ii. Nights and Weekends – Designate of the Shift Supervisor

11.2.2 Emergency Response

Salaried Working Hours

i. Phase I Alarm – Upon hearing the Phase I Alarm, the designated operator should be prepared to enter the vehicle. The backup drivers should maintain contact with the Incident Commander for possible assignment. If the designated driver is unable to gain access to the vehicle, the driver should notify the Incident Commander.

ii. Phase II Evacuation Alarm – Operator should drive the vehicle to the appropriate muster (assembly area) area and await further instructions.

iii. Emergency Call – The vehicle should be moved from the muster area (assembly area) only at the instruction of the Incident Commander, Medical Response Team Officer or Rescue Team Officer. When driving within the plant, specific directions should be provided to the driver.

Nights and Weekends

Response should be as directed by the shift supervisor. Note: Generally it will not be used to transport any individual as the 911 system should be utilized. It would only be to transfer or make medical equipment available. The vehicle is restricted to on site use only.

11.3 Life Flite

The use of Life Flite will be to ensure that any critically injured/ill personnel receive the best medical attention as soon as possible. The emergency use of Life Flite serves a dual function of providing medical treatment beyond basic first aid and to transport as quickly as possible to a treating facility.

11.3.1 Notification Responsibility

The following personnel will be assigned as the Emergency Life Flite Contact as follows:

Salaried Working Hours
i. Medical Response Team Coordinator
ii. Designate of Medical Response Team (Back Up)
iii. Designate of the Emergency Response Team (Fire and Rescue Team)

Nights and Weekends
i. Designate of the Shift Supervisor

11.3.2 Emergency Response

Upon hearing any Alarm and P.A. Announcement with a medical emergency, the designated Life Flite Contact (Medical Team Designate) should contact **Life Flite at 1-800-874-1555** if the individual is critically injured or ill.

1. Contact Life Flite at 1-800-874-1555 Identify yourself

*"This is **(Your Name)**, I'm the medical Representative at Nouryon in Axis, Alabama. We have a critically injured person, can you please dispatch the Life Flite Helicopter to the Nouryon Helipad in-plant in Axis, Alabama. **(If known)** give information regarding the extent or type of injury or medical condition (information from medical response). Can you give me an estimated time of arrival. Our phone number is **251-675-1310** or other specific phone number (preferred) should you need to make a call back. Our specific location coordinates for our Landing Zone are:*

30º 58' 12.09" North 88º 01' 12.35" West

2. The emergency contact should have available a radio which will allow contact with the Fire Marshall and Medical Response Team Coordinator (**Use Radio Channel #6**). The Emergency Life Flite Contact will standby to make an additional contact with Life Flite to confirm their departure.

    i) In the event Life Flite is not needed call back at 1-800-874-1555 and cancel the call-in. Make sure a call is made either to confirm or negate the initial call. The emergency contact should also keep notes of who they spoke with, when, and what type of response was made (See the attached report sheet).

3. Landing Zone – The landing zone for the site is located north of the CS2 Portable Tank Filling Building in the roadway. A marking will be maintained **("X"_yellow in color and outlined in blue**). For any landing at the site, personnel should maintain a safe distance of 200' from the helicopter. Approach should only be as directed by the LifeFlight Helicopter Crew. The use of any hand or sign signals are to be avoided. The only signal to be recognized is the waving of arms which means do not land (all others signals are not permited.). At no time shall any flashlight or other lighting ever be directed towards the helicopter. The Emergency Response teams will have a landing zone officer established for each call. The primary staging area will be the main roadway east of the Engineering Building. Back-up locations can also be established on the main entrance road at the security building or on the roadway south of the CS2 Portable Tank Filling Building.

4. Use **Appendix XIII**

11.3.3 Emergency Call

The follow-up notification should only be made through the direction of the Medical Response Coordinator, the Fire Marshall, Incident Commander, and/or the shift supervisor.

11.3.4 Nights and Weekends

Response should be as directed by the shift supervisor.

Notes: To the Emergency Life Flite Contact

1. Upon hearing the Emergency Alarm, immediately respond to an area where you should be able to hear the P.A. announcement and get an idea about the emergency, then proceed to make your notifications as required. In addition, the contact can determine whether the primary and/or any of the backups are available.

2. The contact should then proceed to any office to make the calls necessary.

3. When making a contact to Life Flite fill in the Attached Sheet, "Life Flite Emergency Call Report".

4. Contact the Medical Response Team on Channel 6 to verify notification of Life Flight.

12.0 NATURAL DISASTER EMERGENCY

12.1 Natural Disturbance - Hurricanes

Advance preparations in detail are required to protect employees and the site during a major hurricane. This plan is designed to provide a systematic procedure for safely securing the plant in the event of a Hurricane. Thorough knowledge of the plan by its members is essential. The objective are to:

i. To minimize damage to the plant and equipment resulting from a Hurricane.
ii. To minimize personnel exposure to hazards during the disaster period.
iii. To quickly and efficiently resume operations after the storm has passed.

12.1.1 Categories of Hurricanes

A hurricane is a large powerful storm originating over tropical water with winds of 75 mph or more blowing counter clockwise around a center or eye. The high velocity winds (75 mph or more) may extend out as far as 100 miles away from the eye. Gale force winds (30 to 75 mph) may extend out as far as 200 miles from the eye. The site will use the Saffir-Simpson scale to determine actions at different storm categories.

Saffir-Simpson scale categorizes storms on a 1- 5 scale as defined below.

Category 1	74 – 95 mph winds
Category 2	96 – 110 mph winds
Category 3	111 – 130 mph winds
Category 4	131 – 155 mph winds
Category 5	> 155 mph winds

12.1.2 Guidelines for Hurricane Phase Alerts

Whenever a storm enters the Gulf of Mexico, the course of the hurricance/storm will be followed via data from the National Weather Service and Coastal Weather at the University of South Alabama. Based on information from the Weather Services, the storm intensity (category) will determine when actions are to be implemented.

Guidelines for Category 1 and 2 Hurricanes		
Phase I Alert	Called when a **Hurricane Watch** is Posted by the Weather Bureau or as determined by Incident Command.	Site begins preparations, remove drums or other items that may be blown, prepare for heavier than normal rainfall, prepare tanks and other equipment for the hurricane.
Phase II Alert	Called when a **Hurricane Warning** is posted, or at a minimum of 24 hours (or earlier) before the storm is expected to strike the mainland.	All site pre-plans for shutdown must be completed during Phase II, and department checklists made available. Staffing needs should be completed during this stage.
Phase III Alert	**Plant Shutdown** as determined by Incident Command.	All equipment should be shutdown before winds reach 50 mph (if a Phase III is activated).
Phase IV Alert	**Damage and Equipment Assessment**, initiated immediately after completion of the hurricane.	Consists of damage assessment. Determine repairs necessary to return the plants to full operational status.

Guidelines for Category 3, 4, or 5 Hurricanes		
Phase I Alert	Called when a **Hurricane Watch** is posted by the Weather Bureau or Incident Command should make this determination several days in advance of the storm if possible.	Site begins preparations, remove drums or other items that may be blown, prepare for heavier than normal rainfall, prepare tanks and other equipment for the hurricane.
Phase II Alert	Called when a **Hurricane Warning** is posted, or at a minimum of 48 hours (or earlier as determined by I/C) before the storm is expected to strike the mainland.	All site pre-plans for shutdown must be completed during this level, and department checklists available. Additional staffing and personal time for individuals assigned should be completed during this stage.
Phase III Alert	**Plant Shutdown** as determined by I/C.	All equipment should be shutdown before winds reach 50 mph (if a Phase III is activated\determined).
Phase IV Alert	**Damage and Equipment Assessment**, initiated immediately after completion of the hurricane. Initiate any staffing, relief and recovery needs.	Complete damage and equipment assessments and determine repairs necessary to return the plants to full operational status. Staffing and other personnel needs should be assessed in addition to the immediate facility needs.

12.1.3 Responsibilities

Each department\coordinator must complete their respective hurricane checklist(s).

Incident Commander (I/C)
For Hurricanes the I/C is normally the site manager followed by the maintenance manager, then supply chainmanager.

i. This person shall have the ultimate authority and responsibility concerning the direction of the emergency control activities.

ii. The Incident Commander shall ensure that all other coordinators are in readiness for the hurricane as provided in checklists prepared by each area.

iii. The Incident Commander shall prepare and/or approve all news releases.

iv. The Incident Commander shall notify all management personnel of current plant status on a need-to-know basis. Also, this person or his designate shall notify the families of any injured personnel of their condition.

Communications Coordinator
The safety manager or designate will act as the communications coordinator.

i. This person shall be responsible for the effectiveness and maintenance of the plant communications system and will take steps listed below to ensure that each system is operational during the emergency.

ii. Establish a storm emergency center.

iii. Ensure the center is equipped with equipment as needed (per the safety department hurricane checklist).

iv. Ensure a designated Emergency Phone System Telephone Operator is available for duties as needed. In addition, a headcount system for personnel who will stay at the site will be established and maintained.

Superintendents
The plant superintendents under direction of Incident Command (site manager or designate) will act as area coordinators.

i. The superintendents will be responsible for shutting down and securing plant operations that may be affected by the hurricane.

ii. The coordinators shall ensure all workers are equipped with necessary safety and foul weather gear.

iii. A list of specialized repair crews shall be obtained by the maintenance superintendent. This list shall include personnel necessary to perform any repairs necessary.

iv. A list of critical raw materials, intermediates, and final products shall be prepared by the coordinators (each department) according to their respective hurricane checklist. The coordinators shall ensure all materials on the list are in stock at all times.

v. Immediately following the hurricane event, each area coordinator shall assure or complete equipment assessments as needed.

vi. Each department should have relief personnel plans in place.

vii. The area coordinators should initiate any recovery plans.

Medical Response Team Coordinator
A senior member of the Medical Response Team shall act as Medical Response coordinator.

i. Personnel to treat injuries during the hurricane shall be available and is the responsibility of the Medical Response Team Coordinator.

ii. Requesting of outside Medical Response assistance shall be performed by the Medical Response Team coordinator with approval from the Incident Commander.

iii. The Medical Response coordinator will supply necessary first aid supplies to the minimal compliment of personnel staying during the storm.

Environmental Coordinator
The environmental coordinator shall assure each area is prepared to control and/or minimize potential hazardous spills and contain contaminated run-offs by review of each area (hurricane checklist).

i. The environmental coordinator shall obtain (assure availability of) sufficient supplies to treat any hazard that may occur at this production facility and store this material on site. In the event of a spill, the environmental coordinator shall identify the components of any spills that may contain products of this production facility.

Supplies Coordinator (Buyer)
Shall provide necessary materials.

i. Provide adequate flashlights and batteries for Incident Command.

ii. Establish a list of all necessary foods for plant operations. A minimum amount of food for personnel on the volunteer list shall be produced by the supplies coordinator.

iii. The supplies coordinator shall provide delivering of at least 200 gallons of drinking water to the plant and storing it in a location as provided by the communication coordinator.

iv. All materials needed by maintenance and operations will be obtained by the supplies coordinator. The list of such materials from the Incident Commander will be furnished by the maintenance manager.

Equipment Coordinator (Maintenance Manager)

i. A list of staffing personnel shall be established by the equipment coordinator and provided to the Incident Commander. This list shall include a minimum of one (1) qualified person for any possible repair in any production unit. Personnel will be determined using priorities as outlined in the Memorandum of Agreement between Nouryon and the local union.

ii. Evacuation procedures for all personnel shall be outlined by the equipment coordinator.

iii. Ensure compliance with the maintenance department hurricane check-list.

12.2 Tornado Response

The site will utilize the LeMoyne Industrial Park Community Sirens in the event of a tornado. The purpose is to protect plant personnel during a tornado emergency whereby sheltering provides protection due to weather conditions. This plan designates safe-havens and provides guidelines to protect personnel, communicate tornado warnings, and a procedure for safely securing plant buildings and facility in the event of a tornado. The objectives of this section are:

i. To minimize personnel exposure to hazards during a tornado period.
ii. Assure personnel know to respond to community alarms for tornado warnings.
iii. Provide tornado communications to personnel and community.
iv. To minimize damage to the plant and equipment resulting from a tornado.
v. To quickly and efficiently resume operations after the storm has passed.

12.2.1 Definitions

Tornado - A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. Damage from a tornado is a result of high wind velocity and wind-blown debris.

Tornado season - Generally March through August, although tornadoes can occur at any time of year and tend to occur in the afternoons and evenings: over 80 percent of all tornadoes strike between noon and midnight.

Tornado watch - Issued by the National Weather Service when tornadoes are possible in our area. Remain alert for approaching storms. This is a good time to remind employees (verbally), if we receive a specific watch for our area, to be aware for further developments.

Tornado warning - Issued when a tornado has been sighted or indicated by weather radar. Community sirens are activated to issue a tornado warning for our area.

12.2.2 Responsibilities

Community Alarm Activation

i. The LeMoyne Industrial Park Community Sirens will be activated in the event a call from the Weather Center, Mobile County Emergency Management Agency, or an actual visual sighting within the LeMoyne Industrial Park community.
ii. With any visual sighting, a request to activate the sirens should be made to the LeMoyne shift supervisor (or radio call duty). They will follow the standard protocols for community siren activation.
iii. If the community siren is activated by another site or at the request of the weather center, P.A. and radio announcements shall be made by the shift supervisor (radio call duty), and individuals should shelter as noted below.

Incident Command

i. I/C shall ensure all departments are notified of tornado warnings issued by the weather center or actual visual sightings. Site notifications will be done via P.A. and radio announcements as needed.
ii. Incident Command will make notification for visual sightings to the Mobile County Emergency Management Agency (MCEMA) at 460-8000.
iii. Activation of the LeMoyne Industrial Park Siren System will be completed for visual sightings, along with notification to the MCEMA, and other LIP companies. Note: Arkema is the designated company for alarm activation in the event the MCEMA requests community sirens be activated to signal tornado warnings.
iv. Incident Command is responsible for providing an all-clear.

Department Responsibilities

i. Each department is responsible for assuring assignments are made to remind employees to stay away from windows, and to seek additional protection (i.e. under desks, tables, in corners, or other protection inside shelters).
ii. Assure all hot-work, excavations, confined space, and line-entry permits are cancelled and new permits re-issued after an all-clear is provided.
iii. Note: Any individual who sights a tornado should immediately contact the shift supervisor (radio call duty) or issue a P. A. Announcement or radio warning. Sample warning (be clear, concise, and repeat):

A tornado has been sighted and is approaching from the North, All individuals should find the nearest shelter, REPEAT the warning.

12.2.3 Designated Tornado Shelters

In order to assure adequate safe havens are predetermined and limit the number of approved areas for sheltering during a tornado event, the following areas are designated as safe havens for sheltering.

i. CS2 Control Room
ii. Crystex® Control Room
iii. Sulfuric Acid Control Room
iv. MCA Control Room
v. Engineering Building
vi. Laboratory
vii. Front Office Building
viii. Toolroom\Free-issue area

12.2.4 Tornado Warnings

Whenever a tornado enters the LeMoyne area, the course of the storm will be followed via data from the Weather Bureau as provided by the University of South Alabama Weather Center. Information will be related to Incident Command and announced in advance if time allows.

13.0 POWER FAILURE EMERGENCY

The responses of employees, contractors and visitors are critical to their safety and plant security during an emergency situation at the plant. The following are required responses by the Engineering, Responsible Care, laboratory and Environmental departments during activation of the site's Emergency Action Plan or during a power failure that includes the guardshack. The first priority during an emergency is the safety of all people on the site, and to make proper notifications for the safety of those surrounding the site. Additionally, security of the site must be considered during any non-routine event.

The purpose of this section is to ensure that contractors and visitors respond properly to activation of the site's Emergency Action Plan. Traffic into and out of the plant is to be limited so that there is adequate access for emergency vehicles, and engineering assistance is to be provided wherever it is required.

13.1 Environmental Assistance

Assist with the minimization of all effects on the environment including hazardous waste, air and water protection. Complete emergency agency notifications as needed.

1. HSE&S Manager (primary)
2. HSE Advisor (1st Backup)
3. PQC Manager (2nd Backup)

13.2 Security and Traffic Control

Keep all entrances and exits open and clear for evacuations of personnel. Insure emergency vehicles have access to the property. All unauthorized personnel are to be kept out of the emergency areas. Control vehicles and personnel on Company property. Security and Traffic Control Officers provide notification of a gas release to the surrounding plants (LIP) via the **Section 8.0** in the EAP.

1. Maintenance Planner (primary)
2. Maintenance Engineer (1st Backup)
3. Maintenance Supervisor (2nd Backup)

13.3 Engineering Assistance

Assist with any problems when called upon. Act as a consultant to other departments. Assist as necessary with the resumption of operations.

13.4 Communications During A Power Failure

The phones will operate for twenty (20) minutes after a power failure on the telephone company battery. If the battery system does not function as intended, the following will be used as the back-up system(s) to communication emergency situations and response needs:

- Site radios (**Channel 7** – Talk Around (T/A) channel)
- Personnel cell phones (contact list used in **Appendix II**)
- Swift911

13.5 Power Failure

If the power failure is associated with a site-wide power failure, the emergency will be treated as a gas release, following the Major Gas Release Procedure, **Section 10.0**. If the power failure is specific to the guard shack, visitors will continue to be permitted into the site. If the power failure impacts the security camera, then the guard or the engineer will notify Crystex and SxCl that all visitors must be physically escorted at all times when they are in security sensitive areas.

13.6 Organization

Engineers assigned to give environmental and engineering assistance are to function under the individual EAP procedures for their plants. Security and Traffic Control Officers are responsible for relaying information and reorganizing as necessary during an emergency.

13.7 Area Specific Instructions on Power Failures

Below are the referenced procedures for specific areas that will need to be followed in the event of a plant-wide power failure.

Carbon Disulfide Plant

CS2215	Power Failure Procedures (1st Class)
CS2217	Power Failure (end Class Duties)

Crystex Plant

CTX100	Emergency Procedure-Loss of Electrical Power

Sulfuric Acid Plant

ACD118	Sulfuric Acid Plant Emergency Shutdown Procedure

MCA Plant

MCA138	Emergency Procedures - Power Failure

SxCl, NaSH and LeCreek

SCL109	SxCl Power Failure Response
SCL164	LeCreek Power Failure Operating Standards
NSH111	NaSH Plant Power Failure

14.0 BOMB THREAT & SECRUITY THREAT EMERGENCY

The following procedures are to be used in the event a bomb threat is made to the LeMoyne Plant.

14.1 Receipt of Call

The incoming calls will most likely be received by the operator, security guard, or shift supervisor. The person taking the call will try to get as much information as possible from the caller. While the caller is on the line, a Bomb Threat Work Sheet will be completed by the person receiving the call. It is important to remember the longer the caller talks, the better the chance of finding the location of the bomb.

14.2 During Office Hours

1. The Bomb Threat Work Sheet will immediately be given to the Site Manager. If the Site Manager can not be immediately contacted by the person receiving the call, immediately contact one of the Department Superintendents who will make the contact.

2. If the bomb threat is not obviously a hoax, the site manager or his designate, will put into effect the plant evacuation procedure as outlined in the Gas Release Section of the EAP (Section 10.0).

3. In the meantime, at the direction of the Site Manager or his designate, the Safety Manager will inform all affected supervisors of the bomb threat. In addition, all contractors and plant personnel will be instructed to cease radio communication immediately. The use of radios can be dangerous. The radio beam could cause premature denotation of an electric initiator (blasting cap).

4. After the plant has been evacuated, the Site Manager or his designate will organize a search of the plant if he feels there is time to perform the search without endangering employees. The search team will consist of supervisory personnel who are familiar with the area of the plant where the bomb is thought to be located. If a suspicious object or bomb is found, the search team will immediately leave the area, especially within 300 feet of the object and/or upstairs and downstairs. If possible, the search team will open all windows and doors in the building as they leave. No one should touch or move the suspicious object, attempt to soak it with water, etc.

5. For assistance if a bomb was found call:

The Mobile County Sheriff's Dept.

When the above agency has been contacted, the party making the call should give the answering party time to ask any questions. It is better to let them ask questions. than to give a lot of unnecessary information and waste valuable time.

14.3 During Nights, Weekends or Holiday

1. The incoming call will be received by the security guard who will complete a Bomb Threat Work Sheet as he/she talks to the caller. The security guard will try to keep the person talking as much as possible in order to get as much information about the bomb as possible. Once the call is completed, the guard will immediately contact (via telephone) the shift supervisor to report the call. As soon as possible, the guard will give the Bomb threat Work Sheet (**Appendix IX**) to the shift supervisor.

2. If the bomb threat is not obviously a hoax, the shift supervisor will put into effect the plant evacuation procedure, as outlined in the Gas Release Section 10.0.

3. The shift supervisor will contact one of the following people and inform them of the bomb threat:

i. Site Director
ii. Maintenance Manager
iii. Area Superintendents

4. The shift supervisor will notify personnel on duty that the plant is to be evacuated. After the plant is evacuated, the supervisor will organize a search of the plant if he feels there is time to perform the search without endangering employees. The search team will consist of personnel who are familiar with the area of the plant where the bomb is thought to be located. If a suspicious object or suspected bomb is found, the search team will immediately evacuate the area, especially within 300 feet of the object and/or upstairs and down stairs of the bombs location. If possible the search team should open all windows and doors in the building as they are leaving. No one should touch or move the suspicious object, attempt to soak it with water, etc.

5. For assistance if a bomb is found call:

The Mobile County Sheriff's Dept

When the above agency has been contacted, the party making the call should give the answering party time to ask any questions than to give a lot of unnecessary information and waste of valuable time.

15.0 PANDEMIC EMERGENCY PLAN

See procedure **SAF526** in document control system for details to Pandemic Emergency Plan.

16.0 RCRA QUICK REFERENCE GUIDE

The quick reference guide is a bried summary of the information included in the site's RCRA Contingency Plan.

16.1 Names, Maximum Inventories and Unique Treatment of Hazardous Waste On-site

Type of RCRA Waste	Location Key for Map	Location of Hazardous Waste	Name of Hazardous Waste	Hazardous Content(s)	Maximum Inventory	Unique Treatment
Solid Waste Management Unit (SWMU)	A-01	New Brine Mud Pond (inactive unit)	Old Mercury Waste Pit	Mercury (0.002 mg/L)	N/A	None
Areas of Concern (AOCs)	B-01	CS2 Transfer Tanks Area	Toxic Contaminated Soil	Carbon Disulfide (0.700 mg/L)	N/A	None
	B-02	CS2 VS4 Area	Toxic Contaminated Soil	Carbon Disulfide (0.700 mg/L)	N/A	None
90-Day Accumulation Areas	C-01	CS2 Still Bottoms Tank	Toxic Process Oil	Carbon Disulfide, Benzene	34,367 lbs.	None
	C-02	Paint Shop	Toxic Paint Waste, Toxic Process Oil, Toxic Lab Waste,	Carbon Disulfide, Benzene, Xylene, Toluene, Acetone, Methanol, Hexene, paint, paint thinner	300 gal.	None
Satellite Accumulation Areas	D-01	Laboratory	Toxic Lab Waste	Acetone, Methanol, Toluene, Hexene,	55 gal.	None
	D-02	Crystex Plant	Toxic Process Oil	Carbon Disulfide, Benzene, Xylene, Toluene	55 gal.	None
	D-03	Storeroom	Spent batteries, Aerosol Cans and Asbestos Gaskets	recycled batteries, aerosol cans, asbestos gaskets	55 gal.	None
	D-04	Maintenance Shop	Toxic Parts Cleaner	paint thinner, metal(s)	55 gal.	None

16.2 Identification of On-site Notification Systems (Emergency Alarms)

i. **Fire Siren** is a cycling alarm
ii. **Gas Siren** is a continuous alarm

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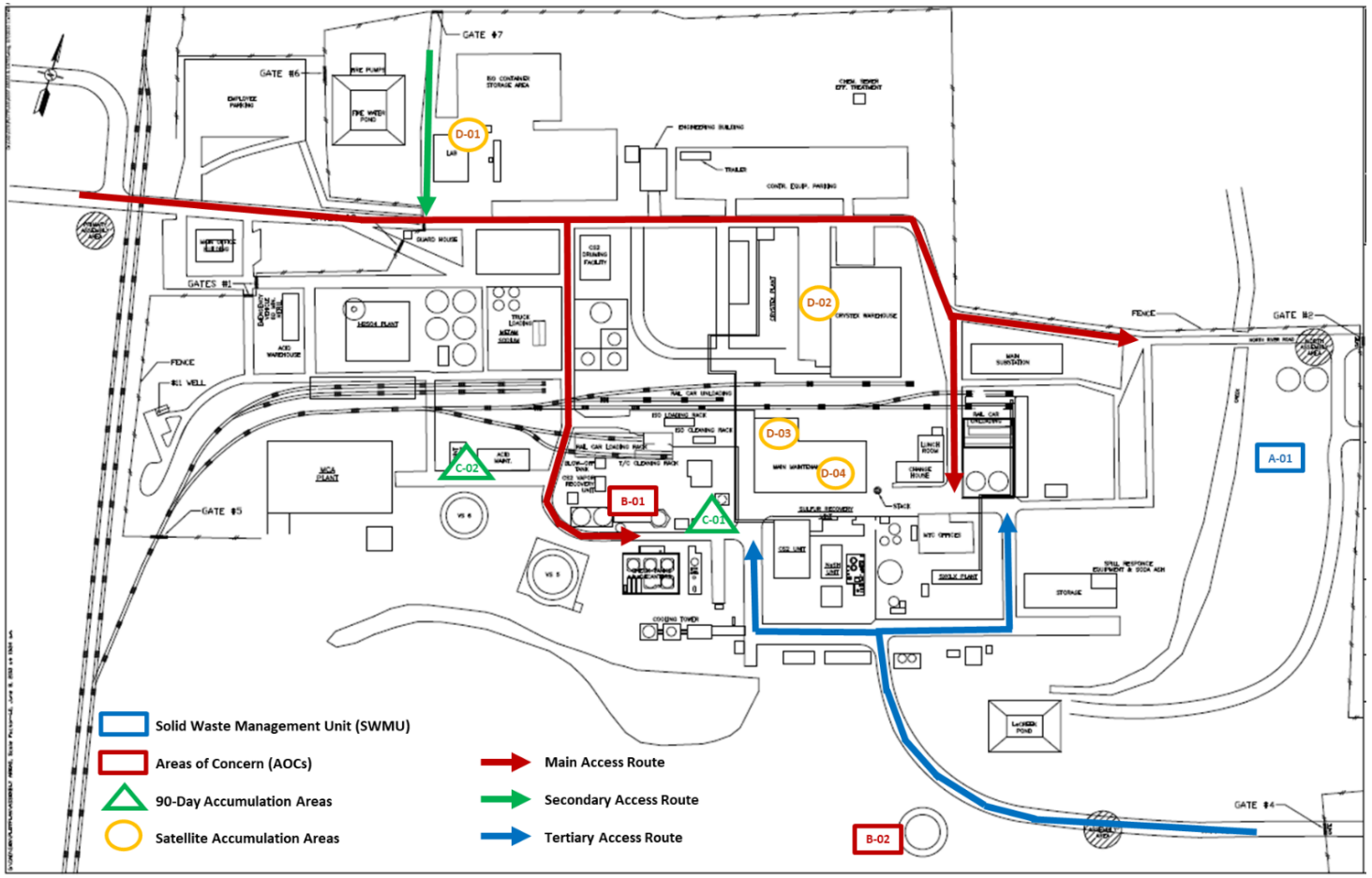
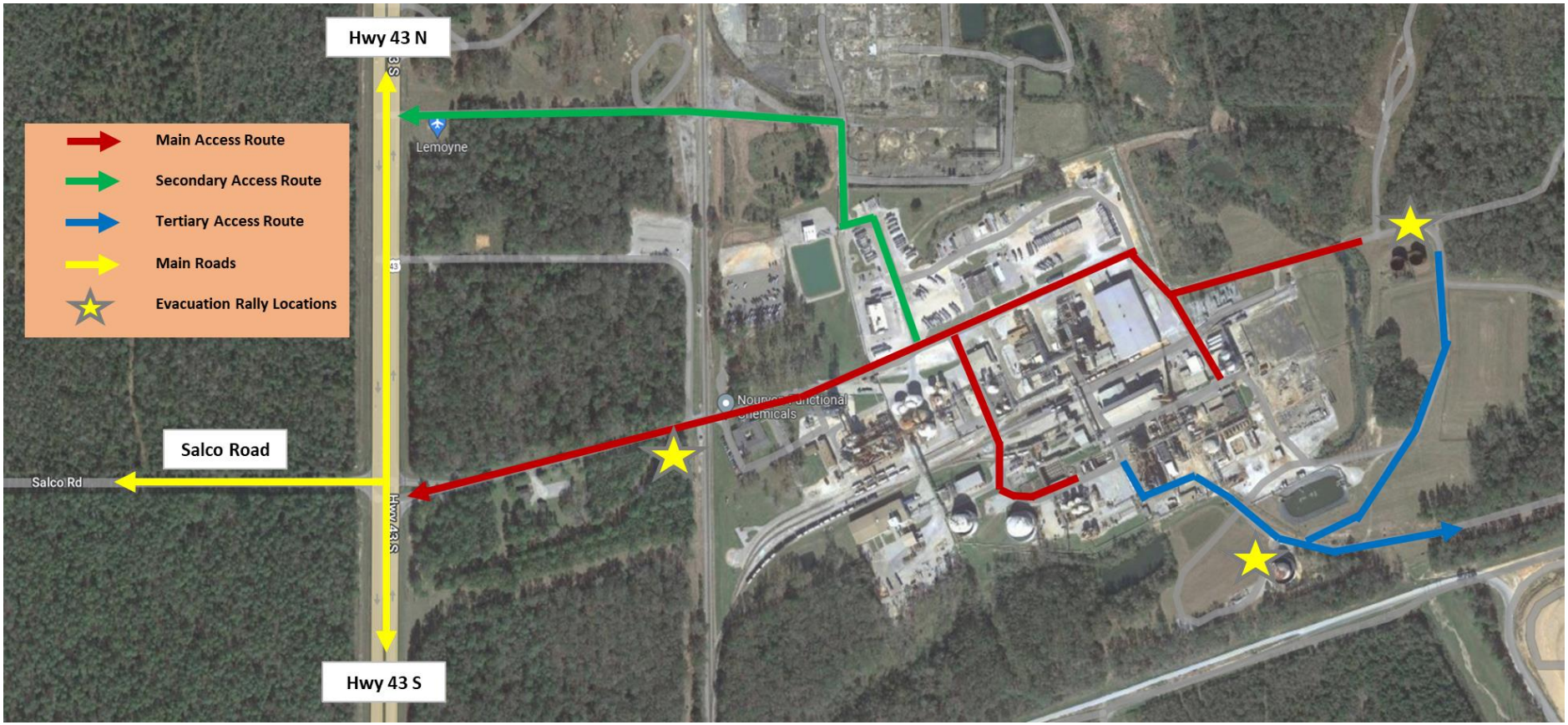
16.3 Names of the Emergency Coordinators and 24/7 Phone Numbers

i. **Shift Supervisor** (Primary) — **Contact:** 251-679-4300
ii. **Site Director** – Michael Mitchell (Alternative) — **Contact:** 406-902-9019
iii. **PQC Manager** – Bryan O'Bannon (Alternative) — **Contact:** 281-739-3846
iv. **HSE Advisor** – Brent Parker (Alternative) — **Contact:** 334-558-5056

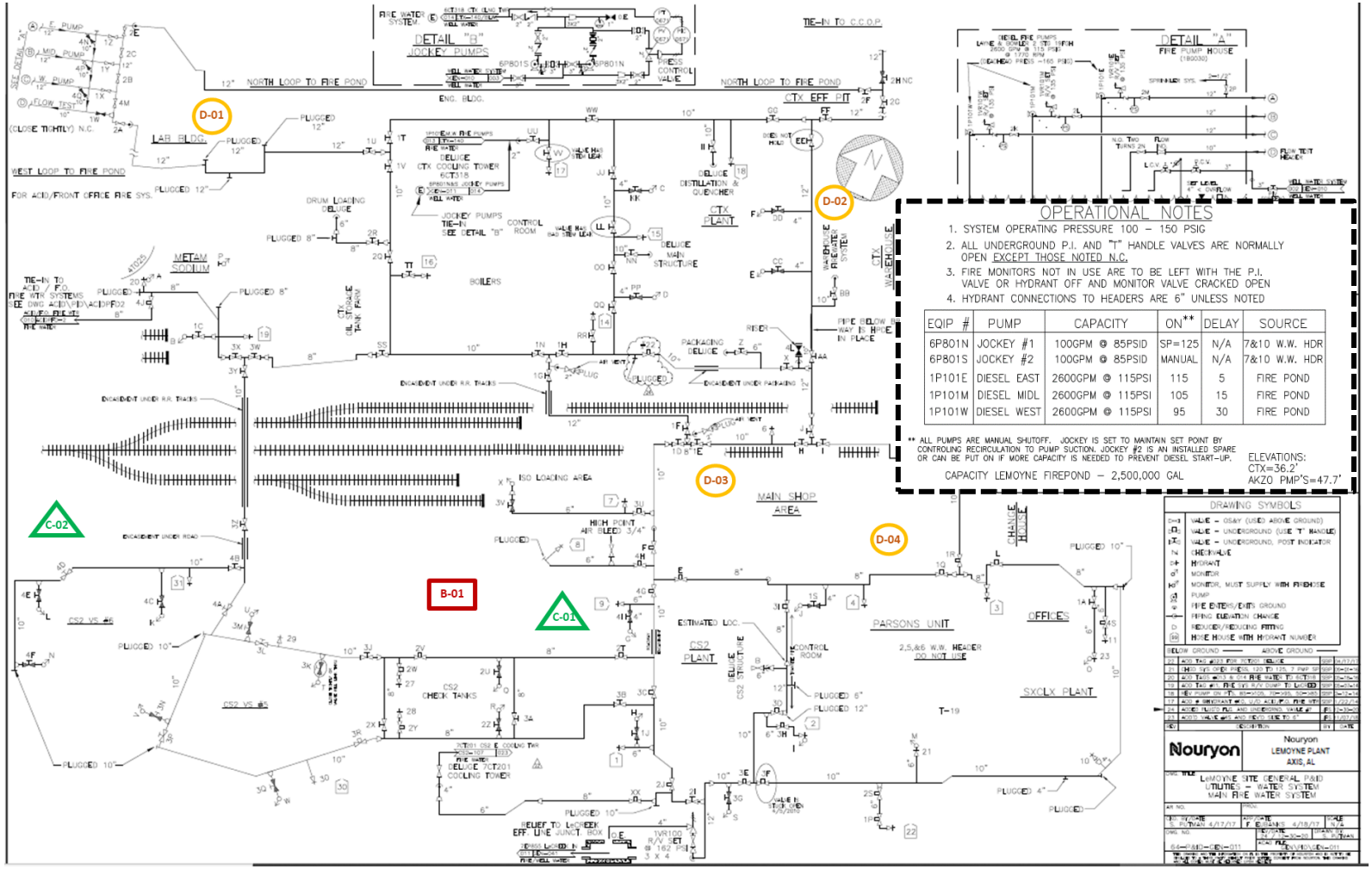
16.4 Map of Facility Hazardous Waste Locations and Routes of Access



16.5 Street Map View and Best Evacuation Routes



16.6 Street Map View and Best Evacuation Routes



17.0 RCRA CONTINGENCY PLAN

17.1 Purpose

Part 335-14-5-.04 of the ADEM Code [264(264.50 through .56) of the Federal Code] requires that each facility maintain a Contingency Plan designed to "minimize hazards to human health or the environment from fire, explosions, or any unplanned sudden or non-sudden releases of hazardous waste or hazardous waste constituents to air, soil, or surface water."

The Contingency Plan will need to be reviewed and amended in the following situations:

(a) The plan fails in an emergency.
(b) The facility changes in design, construction, operation, maintenance, or if other circumstances develop that materially increase the potential for fires, explosions, or release of hazardous waste or hazardous waste constituent, or change in the response necessary in any emergency.
(c) The list of Emergency Coordinators changes.
(d) The list of emergency equipment changes substantially.

17.2 Facility Overview

The Nouryon LeMoyne Plant is located in Axis, Alabama. One (1) Solid Waste Management Unit (SWMU), the closed New Brine Mud Pond (5EP202), and two (2) Area's of Concern (AOCs), the Carbon Disulfide Vertical Storage Tank #4 Area (AOC M) and the Carbon Disulfide Transfer Tanks Area (AOC A), are monitored under this permit.

SWMU/AOC Number	SWMU/AOC Name	Unit Comment	Potentially Affected Media	Hazardous Constituents	Concentrations (mg/L)
SWMU 9	New Brine Mud Pond	This unit managed brine muds (K071), and process filter cakes.	Groundwater, Soil	Mercury	0.002
AOC M	Carbon Disulfide Vertical Storage Tank #4 Area	This area managed carbon disulfide.	Air, Groundwater, Soil, Surface Water	Carbon Disulfide	0.700
AOC A	Carbon Disulfide Transfer Tanks Area	This area managed washwater, stormwater, and spills containing raw materials (chlorine, carbon disulfide, waste sulfur chlorides), byproducts (sulfur and sulfur chlorides) and carbon tetrachloride.	Air, Groundwater, Soil, Surface Water	Carbon Disulfide	0.700

17.3 Emergency Coordinators

It is the plant policy to maintain an Emergency Coordinator / Incident Commander on site at the Nouryon LeMoyne Plant at all times by designating a qualified emergency coordinator for each shift.

The list of Emergency Coordinators was chosen based on their thorough knowledge of all process activities at the plant and their experience with the waste operations, including a familiarity with the waste materials and the potential hazards during emergencies. All emergency coordinators can reach the plant in a short period of time. The Emergency Coordinator has full authority to direct the emergency teams, call in outside assistance, and commit all plant resources necessary to mitigate an emergency.

17.4 Implementation

In case of an imminent or actual emergency situation, the person first observing the incident will notify the on-site Emergency Coordinator by use of the public address system (Extension 600), radio, or phone. Once notified, the Emergency Coordinator will do the following:

i. Perform a preliminary assessment of the situation by determining the nature, location and extent of the incident, assessing the possible impacts to human health and the environment.
ii. If direct or indirect hazard to human health and the environment are possible, implement the Contingency Plan in the applicable sections.
iii. The Emergency Coordinator will implement section IV.H., Post EmergencyProcedures and Equipment Maintenance, and complete the necessary reporting described in section VIII when:The release is minor, controllable, and presents no potential hazard to human health or the environment.

17.5 Emergency Response Procedures

17.5.1 Notification

In the event the Emergency Coordinator determines the need for additional assistance, the Plant EAP (Emergency Action Plan) can be implemented. If outside help is needed any qualified emergency response service may be contacted.

17.5.2 Identification of Hazardous Materials

One (1) Solid Waste Management Unit (SWMU), the closed New Brine Mud Pond (5EP202), and two (2) Area's of Concern (AOCs), the Carbon Disulfide Vertical Storage Tank #4 Area (AOC M) and the Carbon Disulfide Transfer Tanks Area (AOC A) are active RCRA remediation activities at the LeMoyne Site.

The site has two (2) 90-Day Accumulation Areas, CS2 Still Bottoms Tank and Paint Shop Drum Storage, and four (4) Satellite Accumulation Areas, Laboratory, Crystex Plant, Storeroom and Maintenance Shop where hazardous waste is stored.

17.5.3 Hazard Assessment

Based on the situation and considering the hazardous material involved, the Emergency Coordinator will assess the possible hazards to human health and the environment from the incident, considering both direct and indirect effects. The type and magnitude of the response activity will depend on the results of the assessment.

Included in the hazard assessment are impacts to off-site human health and the environment. If off-site impacts are immediate or the potential exists the Emergency Coordinator will immediately notify the appropriate local, state and federal officials.

Considering the nature, properties and quantities of hazardous waste handled at the facility, no hazardous waste specific evacuation plan is deemed necessary. The proper notification of authorities is presented in Section VIII.

17.5.4 Control Procedures

The plant and its operations are designed and operated to minimize the potential hazard to facility personnel and prevent movement of released materials off of the site. The potential for release of stored materials exists at the closed New Brine Mud Pond also known on the SWMU (Solids Waste Management Unit). The New Brine Mud Pond (5EP202) is inspected weekly. In the event that damage to the cover is found, repairs will be made as soon as possible.

The Emergency Coordinator will:

- Where applicable, see that processes and/or operations are stopped, and released waste is contained and collected in order to ensure releases do not occur, recur, or spread.
- See that any material, which is potentially incompatible with the released material, is removed or protected until cleanup procedures are completed.

For a spill or release the Emergency Coordinator will:

- Assemble the required response equipment and personnel, protective clothing and gear, heavy equipment, soil, concrete, bentonite, absorbent material, empty containers, liner, and plugging and repair, materials.
- Determine the most appropriate containment or diking method: earthen dikes, excavation, pumping.
- Coordinate activities of supervisory personnel and maintain communication with the response teams if needed.

In the event of fire or potential explosion at the closed New Brine Mud Pond (5EP202) the Emergency Coordinator will act as technical and materials support for the incident commander as follows:

- Coordinate activities of supervisory personnel and maintain constant communication with them and response teams.
- Review appropriate response equipment with the incident commander.
- Assemble trucks and heavy equipment, diking and neutralization material, and empty containers for containment of cleanup residues.
- Review containment and/or diking strategy with the incident commander.
- Identify any containers that are being stored in the area and cool by flooding with water as needed.

Specific control procedures for the LeMoyne hazardous waste facilities are as follows:

Fires or Explosions:

- Response personnel will be equipped with fire and chemical-resistant clothing, and self-contained breathing apparatus.
- Several fire extinguishers are available to fight small fires.

Spills or Material Release:

- Response personnel will wear chemical-resistant clothing, face shield, goggles and respirator or self -contained breathing apparatus as necessary.

17.5.5 Prevention of Recurrence or Spread of Fires, Explosions or Releases

Plant personnel will monitor all effected areas until repairs or containment are completed. Operations will not resume until the cause of the release has been identified and properly corrected. (See D. Control Procedures)

17.5.6 Storage and Treatment of Released Materials

Any materials, which are released from the storage areas, will be cleaned up by equipment appropriate to the conditions. The emergency equipment to be used in the case of a release or spill from other areas is likely to be heavy equipment to facilitate diking and containment of contaminated soils. As soon as possible, all spill residues will be containerized and classified for offsite disposal.

17.5.7 Incompatible Wastes

Incompatible wastes in drums are temporarily stored on the Hazardous Drum Pad. These wastes are separated by a drainage sump. In addition the drums are stored on pallets, providing secondary separation. In the event of a spill, all incompatible wastes will be removed from the affected area until cleanup procedures are completed.

Incompatible wastes in rolloff boxes are spotted onsite near the area of work.

17.5.8 Post Emergency Procedures and Equipment Maintenance

Once the emergency is controlled, the Emergency Coordinator retains his authority to direct site activities until all cleanup activities are completed and normal site operations resumed.

Specific activities are listed below:

- The Emergency Coordinator will take all necessary steps to ensure that a secondary release does not occur as a result of the initial incident. Procedures that will be carried out include inspection and repair of cover and groundwater monitoring equipment.
- All operations that were initially shut down in response to the incident will not be reactivated until the area has been reviewed and approved by the Incident Commander.
- The Emergency Coordinator will see that all residue, contaminated or recovered materials are disposed of properly, including proper record keeping.
- The Emergency Coordinator will see that all emergency equipment is replaced and/or decontaminated, repaired or replenished, as necessary until fit and ready for use.
- After completion and compliance with above, the Emergency Coordinator will notify the appropriate site and corporate contacts, local authorities and EPA or state representatives as discussed in Section VIII on reporting.
- The Emergency Coordinator will participate in debriefings with site supervisory and/or operating personnel and local authorities involved to assessing preparedness and prevention activities, response activities, and casualty control and evacuation procedures. Based on this review, suggestions for revisions to the Contingency Plan will be made to site management.
- Once a sampling event has been verified to be statistically significant ADEM will be notified within 14 days.

All emergency equipment used in the response activity must be cleaned and readied for use. Contractor's equipment must be cleaned and returned to their control. The liquids and solids resulting from this cleaning will be handled in accordance with all applicable State and Federal laws.

17.5.9 Container Spills and Leakage

See Section 17.5.4. Controls Procedures

17.5.10 Tank Spills and Leakage

See Section 17.5.4. Controls Procedures

17.5.11 Waste Pile Spills and Leakage

See Section 17.5.4. Controls Procedures

17.5.12 Surface Impoundments

Nonapplicable.

17.6 Emergency Equipment

Contractors on an as-needed basis provide materials and equipment to make repairs to the cover of the New Brine Mud Pond (5EP202). Fire and Emergency Response Equipment is maintained as part of the EAP.

17.7 Coordination Agreements

Due to the LeMoyne plant's remote location, its facilities and resources have been organized to effectively handle expected emergencies. In addition, a mutual aid agreement is in place for the LeMoyne Industrial Park in which Nouryon participates. A copy of this Contingency Plan is submitted to the Mobile County Emergency Planning Committee, as appliable.

17.8 Evacuation Plan

In the event of a hazardous release at the closed impoundment (5EP202), the area is isolated and workers in the area can be evacuated by simply exiting the area proceeding upwind, with reasonable haste. In the unlikely event of a fire or explosion at the closed impoundment (5EP202), the plant's EAP (Emergency Action Plan) would be initiated and evacuation would be implemented as necessary under that plan. The Emergency Coordinator would be notified at the instant of the alarm and the Contingency Plan would be implemented if necessary.

17.9 Required Reports

The Emergency Coordinator is required to report emergency situations during and after the incident.

<u>Incident Mitigated Onsite (Contingency Plan not implemented):</u>

- Report the incident to the Emergency Coordinator and the Environmental Coordinator verbally at the time of the incident and submit a completed environmental upset form.
- Report the incident verbally to the National Response Center (800-424-8802) if an RQ is exceeded.
- File environmental upset form with the Environmental Coordinator and maintain incident reports in operations file.

Incident Requiring Outside Assistance, Potentially or Actually Endangering Human Health or the Environment (or otherwise implementing Contingency Plan):

- Report incident to local authorities and request emergency support, as needed.
- If offsite human health or the environment is threatened, report incident verbally to:
  - **National Response Center (800-424-8802)**
  - **Alabama Department of Environmental Management (334-271-7700)**
  - **Alabama Emergency Management Agency 24-hour hotline (800-843-0699)**.
- Report the incident to the Emergency Coordinator and the Environmental Coordinator verbally at the time of the incident and submit a completed environmental upset form.
- Prior to resumption of operations and after clean up, a verbal report to that effect must be made to the State.
- Within 15 days of an incident requiring implementation of the Contingency Plan, a written report must be filed with the State.

18.0 SPCC PLAN

Reference procedures **SPCC** (Spill Prevention Control and Countermeasure Plan) and **BMPPLAN** (Best Management Practices Procedure) on the site's document control system under Environmental.

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19.0 DECONTAMINATION AFTER EMERGENCY

This section is to assure the proper response for establishing decontamination of individuals in the event of a chemical release. The steps listed in this section are to ensure all personnel know the proper requirements for implementation of a plan to decontaminate any individual exposed to a chemical.

Decontamination means the removal of hazardous substances from employees\individuals and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

19.1 Initiate Decontamination Emergency Response Protocols

Ensure fire\gas release alarm has sounded. Followed by the evacuation alarm (747 or 757) as\if needed. If evacuation is not required make P.A. (public address) notifications as required to provide assistance to individuals.

Establish command post in **cold zone area** via radio **channel #1**.

Establish by radio that operations are initiating actions.

19.1.1 Role of Incident Command

1. IC should request notification of Mobile County Emergency Management Agency (MCEMA) as needed. Request additional Hazmat assistance as\if needed.
2. Channel 6 to be used by the Fire Rescue Team for team communication.
3. Complete head count of Fire rescue Team and report to I\C.
4. Radio request for assistance in obtaining spare SCBA bottles or other response equipment.
5. Select safety Officer.
6. Check with IC on site headcount..
7. Establish medical monitoring for entry teams.
8. Establish decon station (at a safety shower in a contained area if possible). Portable decon pool located in upper storeroom storage area. Announce location.

19.2 Decontamination Process

At the established decon station (at a safety shower in a contained area if possible). If specific decontamination is not included in a preplan, use\consult guidelines from SDS's to establish decontamination of individuals exposed to chemicals. For most cases, a water flushing is the standard protocol, but each material\chemical must be evaluated for any specific decontamination (i.e. for exposures to non-routinely used chemicals).

> **Note**: For all LeMoyne products and raw materials, on-site exposures will require decon with water which is appropriate, however for MCA use of bicarbonate followed by water flushing is preferred. For all site decontamination, a timed (requires a watch\clock or other timing device) decontamination is required.

19.2.1 Decon station

If Fire and Rescue Team members are returning from the hot zone in encapsulated suits, they must be decontaminated prior to entry into the cold zone or IC. A thorough washing under the safety shower is required.

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19.2.2 Packaging/Transport

If individuals are exposed to chemicals, after proper decontamination, follow standard packaging and transport for additional medical follow-up as required. Make SDS available for transport.

20.0 SAFETY DATA SHEETS

The LeMoyne intermediate product SDS's can be found at:

1. https://sdsi-prd.azurewebsites.net/
2. Then open "Performance Formulations" and seach by intermediate name.

The LeMoyne raw material SDS's can be found at:

1. https://chemmanagement.ehs.com/9/826de4d2-6181-4990-857c-b8616de0c7e0
2. Then seach by raw material name.

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21.0 ENVIRONMENTAL GUIDANCE

Reference procedures **ENV033** and **ENV034** for reportable quantity limits and reporting requirements respectfully.

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22.0 TRAINING REQUIREMENTS

Site personnel complete Hazardous Waste – RCRA Training annually. New hire, visitor and refreshing trainings conducted for emergency response and evecaution.

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24.0 REVISION LOG AND PROCEDURE REVIEW

24.1 Revision log

Any modification or changes made to this procedure since the last Approved By date should be highlighted in yellow. The highlighted sections shall be removed by the approver upon final review and approval.

Date	Revised By	Section	Version	Description of Change
09/29/2021	S. Williams	25	11	Updated personnel changes and contact information
08/09/2022	B. O'Bannon	16	12	Added RCRA Quick Reference Guide
09/19/2022	B. O'Bannon	25	12	Added MIR3 addition and updated headcount sheet
11/01/2022	B. O'Bannon	25	13	Updated headcount sheet
11/10/2022	B. O'Bannon	25	14	Updated headcount sheet

24.2 Reviewed by log

This procedure is to be reviewed at least every 3 years by the PQC Manager.

Date	Reviewed By	Title	Comments
09/19/2022	B. Parker	HSE Advisor	Approved MIR3 addition and headcount sheet

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25.0 APPENDICES

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25.1 Appendix I – Head Count List For Emergency Action Plan

ACID / MCA	Present	Off-Site	Missing
DELANEY, CLIFF (headcount)			
ADKINS, SHAWN			
BRYARS, TIM (F&R)			
CARLISLE, MARK (MCA)			
MCDANIEL, DENNIS			
SACHSE, JOSHUA (MCA)			
SMITH, WARREN (MCA)			
SUMMERS, STEVIE			
TURNER, DANE (F&R)			

CS2 / NASH / SXCL	Present	Off-Site	Missing
BRAZEL, RAYMOND (headcount)			
BEASLEY, BRANDON			
CHAMBERS, DANIEL			
FOSTER, TONY			
McPHERSON, TERRY			
MONTGOMERY, TEVIN			
MOSELY, PATRICK			
MYERS, JAYDEN			
MYERS, ROBERT			
PARKS, STEVE			
PATRICK, MARK			
PYLANT, JAYNE			
ROGERS, JARED			
WILSON, MIKE (F&R)			

CRYSTEX	Present	Off-Site	Missing
KNIGHT, THOMAS (headcount)			
BYRD, WILLIE (F&R)			
CROWDER, VINCE (F&R)			
DAVIS, GEORGE (F&R)			
DAVIS, TYLER			
GEDDES, JOSHUA			
HAYES, GREG (F&R)			
KETCHUM, KEVIN			
KNIGHT, MICHAEL			
NEWTON, TROY			
ORSO, CHASSIDY			
REID, DONALD			
TRAWICK, AUSTIN			
TURNER, DWAYNE			

ENGINEERING BLDG.	Present	Off-Site	Missing
ABBAS, RAIHA (headcount)			
CARPENTER, ADAM			
COOPER, KEVIN			
CUNNINGHAM, KENNETH			
EUBANKS, FRED			
FLORES, SHELTON			
GARRISON, JACOB (IC)			
GREENE, AUSTIN			
GORUM, DAVID (F&R)			
HACKNEY, VAUGHN (IC)			
HOWELL, CHAD			
MOORE, RON (IC)			
MURPHY, TROY			
NGUYEN, COREY			
OTTO, JOEY			
RYDZOWSKI, RONNIE			
SPORNA, JOE			
STELLY, MICHAEL			
THOMPSON, SKIP (IC)			
WARD, RODNEY (F&R)			

LOADING	Present	Off-Site	Missing
BROWN, HUGO (headcount)			
BRYARS, HUNTER (F&R)			
FRANKS, JIM (F&R)			
HERNANDEZ, RUDY			
IRBY, ALFONSO (F&R)			
JAMES, CODY (F&R)			
LEWIS, TREVOR (F&R)			
MORGAN, NEIL			
OGLESBY, LAMAR			
PERRY, KENT (F&R)			
RICHARDSON, CARL			
WICKELL, KYLE			
WILLIAMS, HERMAN			
WILSON, GLENN			
WOULARD, LEVI			

LABORATORY	Present	Off-Site	Missing
MYERS, CAROL (headcount)			
BISHOP,MILDRED (Medical)			
HARBECKE, LISA			
OWEN, TYRONE			

FRONT OFFICE	Present	Off-Site	Missing
SMITH, JORDAN (headcount)			
DOYLE, BILL			
DULABHAN, BONITA			
FUENMAYOR, NESTOR			
HAGA, SHELLEY			
MARTIN, DAVID			
MITCHELL, MIKE (IC)			
O'BANNON, BRYAN (IC)			
PARKER, BRENT (HSE)			
RICHE, DAWN			
SIMONTON, ANGELIA			
TRAWICK, LYNN			
VAUGHN, CHRIS			
VENABLE, DENNIS			
WHEAT, GREGG			

MAINTENANCE	Present	Off-Site	Missing
NORRIS, GINA (headcount)			
BROWN, JOSH			
DEAS, BO			
ELMORE, TROY			
GEORGE, TREY			
GRAHAM, ZACH			
LOFTON, CLAYTON			
MARTIN, TERRY			
MIDDLETON, JOSEPH			
NELSON, ROGER			
STRINGFELLOW, PAUL			
SULLIVAN, JEREMY (F&R)			
VICK, ALEX			
WEBB, ALAN			
WRIGHT, RODNEY			

I&E	Present	Off-Site	Missing
BROWN, JOSEPH (headcount)			
BRADFORD, ETHAN			
GLEASON, MATTHEW			
JACKSON, BRIAN			
JOHNSTON, DEVON			
MAYO, JEFF (Medical)			
O'NEAL, FREDDIE			
WILLIAMS, JOE			

LEMOYNE FIRE TEAM (ERT)	Present
RODNEY WARD (FM)	
BRYARS, HUNTER	
BRYARS, TIM	
BYRD, WILLIE	
CROWDER, VINCE	
DAVIS, GEORGE	
FRANKS, JAMES	
GORUM, DAVID	
HAYES, GREG	
IRBY, AL	
JAMES, CODY	
KNIGHT, THOMAS	
LEWIS, TREVOR	
PERRY, KENT	
SULLIVAN, JEREMY	
TURNER, DANE	
WILSON, MIKE	
BISHOP,MILDRED (Medical)	
MAYO, JEFF (Medical)	

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25.2 Appendix II – LeMoyne Site Emergency Contact List

EMERGENCY SUPPORT

NAME		CELL	ALT
Michael Mitchell		406-902-9019	
Bryan O'Bannon		281-739-3846	832-588-7739
Rodney Ward		463-2580	751-9888
Brent Parker		334-558-5056	
David Martin		206-9312	263-3911
Gregg Wheat		377-5071	776-6208
Lynn Trawick		895-3179	
Nestor Fuenmayor		509-5642	
David Gorum		656-7459	
Kenneth Cunningham		689-3642	689-7512
Fred Eubanks		601-770-0148	601-947-1942
Daniel Brown		455-1884	
Hugo Brown		201-0264	960-1402
Jacob Garrison		850-324-8782	
Ron Moore		979-4485	
Skip Thompson		656-6712	
Vaughn Hackney		978-3786	947-6169

PRODUCTION			
CRYSTEX®		**CELL**	**ALT**
Gregg Wheat		377-5071	776-6208
Thomas Knight		490-5387	656-3887
Ronny Rydzowski		604-0058	334-707-0021
Michael Stelly		589-9699	
CS2/SxCl2		**CELL**	**ALT**
Raymond Brazel		591-1023	459-0759
Chris Vaughn		288-7493	
Kevin Cooper		656-2138	
ACID/MCA		**CELL**	**ALT**
Cliff Delaney		327-5042	679-4863
Chris Vaughn		288-7493	
Corey Nguyen		228-209-0920	

EMERGENCY RESPONSE TEAMS

MEDICAL RESPONSE TEAM			
NAME		**CELL**	**ALT**
Mildred Bishop		605-7461	432-7295
Jeff Mayo		802-1518	689-4783

FIRE and RESCUE TEAM			
NAME		**CELL**	**ALT**
Rodney Ward		463-2580	751-9888
Hunter Bryers		242-9536	
Tim Bryers		242-1939	
Willie Byrd		458-0474	
Vince Crowder		597-5604	
George Davis		209-8180	
James Franks		404-4906	
David Gorum		656-7459	
Greg Hayes		753-4214	
Alfonso Irby		463-0620	
Cody James		599-7419	
Thomas Knight		490-5387	
Trevor Lewis		423-2927	
Kent Perry		581-5371	
Jeremy Sullivan		459-3448	
Dane Turner		285-8423	
Mike Wilson		680-2685	

Team Sections - Each person then calls the person below their name. If the person called does not answer, call the next name, and so on. Then call the person back that originally did not answer; from home and/or when you arrive at the Plant. For names listed under **PRODUCTION**, contact the Plant with primary responsibility for the emergency. The first person called after the block of production personnel will then contact production personnel in the areas not directly affected by the emergency.

See procedure **SIT128 in the site's document control system for the **LeMoyne Site's Organizational Appointments**

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25.3 Appendix III – LeMoyne Fire Brigade

Fire Marshall: Rodney Ward

Assistant Fire Marshall: David Gorum

Deputy Marshall(s):
Thomas Knight
Hunter Bryars
Cody James

Team Members:
Tim Byars
Willie Byrd
Vince Crowder
George Davis
James Franks
Greg Hayes
Al Irby
Trevor Lewis
Kent Perry
Jeremy Sullivan
Dane Turner
Mike Wilson

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25.4 Appendix IV – LeMoyne EAP Call-In Form

	EMPLOYEE	TIME CALLED	EST. TIME of ARRIVAL	ACTUAL TIME ON-SITE
FIRE BRIGADE	WARD, RODNEY			
	BRYARS, HUNTER			
	BRYARS, TIM			
	BYRD, WILLIE			
	CROWDER, VINCE			
	DAVIS, GEORGE			
	FRANKS, JAMES			
	GORUM, DAVID			
	HAYES, GREG			
	JAMES, CODY			
	PERRY, KENT			
	SULLIVAN, JEREMY			
	TURNER, DANE			
	WILSON, MIKE			
MEDICAL TEAM	BISHOP, MILDRED			
	MAYO, JEFF			
PRODUCTION	BRAZEL, RAYMOND (CS2)			
	BROWN, HUGO (Loading)			
	DELANEY, CLIFF (Acid / MCA)			
	KNIGHT, THOMAS (CTX)			
	RYDZOWSKI, RONNY (CTX)			
	NGUYEN, COREY (Acid / MCA)			
	COOPER, KEVIN (CS2 / NASH)			
	OTTO, RAIHA (SXCL)			
	ABBAS, RAIHA (Loading)			
MAINTENANCE	CARPENTER, ADAM			
	CUNNINGHAM, KENNETH			
	EUBANKS, FRED			
SITE LEADERSHIP	MITCHELL, MICHAEL			
	VAUGHN, CHRIS			
	WHEAT, GREGG			
	MARTIN, DAVID			
	O'BANNON, BRYAN			
	PARKER, BRENT			
	FUENMAYOR, NESTOR			

TYPE OF EMERGENCY (circle one): FIRE GAS RELEASE DRILL OTHER

SPECIAL INSTRUCTIONS FROM SHIFT SUPERVISOR:_____

FORM COMPLETED BY: _____**DATE:** ____/_____/_____

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25.5 Appendix V – Site Contacts for Outside Entities

For all non-routine contacts from outside the site, calls should be forwarded as listed below.

ENTITY CALLING	EVENT	1st	2nd	3rd	4th
Environmental Protection Agency	Inspection/Audit Information	HSE&S Manager HSE&S Manager	HSE Advisor HSE Advisor	Site Director Site Director	
ADEM	Inspection/Audit Information	HSE&S Manager HSE&S Manager	HSE Advisor HSE Advisor	Site Director Site Director	
OSHA	Complaint Inspection/Audit PSM Audit	HSE Advisor HSE&S Manager PQC Manager	HSE&S Manager HSE Advisor HSE Advisor	Site Director Site Director HSE&S Manager	
Employees	Environmental Complaints Benefits Emergencies Retirees Product Information	HSE&S Manager HRBP Supt. w/ Radio HRBP Ops Manager	HSE Advisor HRBP Site Director Site Director	Site Director HSE&S Manager Site Manager	HSE&S Manager HSE Advisor
Mobile County Emergency Management Agency	Emergencies Request for Information	Supt. w/Radio Site Director	Site Director Ops Manager	HSE&S Manager HSE&S Manager	HSE Advisor
LeMoyne Industrial Park	Environmental Complaints Emergencies Request for Information	HSE&S Manager Supt. w/ Radio Ops Manager	HSE Advisor HSE Advisor Site Director	Site Director HSE&S Manager HSE&S Manager	HSE&S Manager Shift Foreman
Media (4)	Request for Information Superfund	Site Director HSE&S Manager	Ops Manager HSE Advisor	Maint. Manager Site Director	
Coast Guard	Access to Properties Emergencies Request for Information	Supt. w/ Radio Supt. w/ Radio Ops Manager	Site Director Site Director Site Director	Ops Manager HSE&S Manager HSE&S Manager	HSE&S Manager Ops Manager
General Public	Bomb Threats(1) Emergencies Jobs/Hiring Fund Raisers/Contributions Product/Company Information Environmental Complaints	Receptionist(1) Supt. w/Radio Site Director Ops Manager Ops Manager Ops Manager	HSE&S Manager Site Director Site Director Site Director Site Director	Site Director HSE&S Manager HSE&S Manager	Ops Manager Ops Manager HSE&S Manager
LeMoyne/Axis Community	Product/Company Information Community Activities Advisory Panel (CAP) Activities Superfund(CERCLA) Environmental Complaints General Complaints Emergencies Fund Raisers/Contributions	Ops Manager Ops Manager Ops Manager HSE&S Manager Ops Manager Ops Manager Supt. w/ Radio Ops Manager	Site Director Site Director Site Director Site Director Site Director Site Director Site Director Site Director	 HSE&S Manager Ops Manager HSE&S Manager HSE&S Manager	 HSE&S Manager Ops Manager
Lawyers	All Contacts	Site Director			
Customers/Product Transportation Companies	Shipping Information Orders	Ops Manager Ops Manager	Logistics Logistics		
Internal Revenue Service	All Contacts	Site Controller			
Tax Assessors	All Contacts	Site Controller			
Weather Service	Weather Conditions Forecasts	HSE&S Manager HSE&S Manager	Supt. w/ Radio Supt. w/ Radio	Site Director Site Director	Ops Manager Ops Manager
Laboratories	Laboratory Analysis	PQC Manager	Site Director		
Vendors	Purchasing Information	Site Procurement	Site Controller		
LeMoyne Management	All Contacts	Site Director	Ops Manager	Site Controller	

Notes:
1. Record bomb threat information on the form provided and immediately activate the Emergency Action Plan.
2. All contacts between 4pm and 7am weekdays and on weekends should be forwarded to the shift supervisor.
3. If none of the designated contacts can be reached, request information and have someone call them back if it is satisfactory to the caller.
4. For all Media contacts the company spokespersons should be:
(1) Site Director (2) Ops Manager (3) Site Controller

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25.6 Appendix VI – Area Plant Emergency Notification Checklist

AREA PLANT'S EMERGENCY NOTIFICATION CHECKLIST

Category of Release		**Date**	
Name of Chemical		**Individual**	
Wind Direction		**Wind Speed**	

NOTE: Radio communications should be completed via the LIP Radio frequency (radio calls go to each sites security contact) to expedite notifications.

AREA PLANT	Phone Number	Time First Notified	Additional Notification	Time of All Clear Notification
Alabama Power – Barry Emergency Contact	331-8103			
Arkema Shift Superintendent	829-9421			
AMVAC Emergency Contact	662-8856			
FMC Incident Commander	679-5130			
EcoSouth Services Operations Manager	675-9800			
SSAB Security	662-4600			
Lenzing Shift Manager	679-2666 or 679-2667			
U.S. Amines Shift Commander	829-3710			

MAKING A CALL

When making a call, the designated contact will transmit, "This is LeMoyne to (**company name**)", and wait for a reply. "This is (**persons name**)" we have a **category (1, 2, or 3)** incident in progress involving (**appropriate chemical**). The wind direction at our location is _____."

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25.7 Appendix VII – Outside Agencies Emergencies Call List

AMBULANCES

For Ambulance service call:	**911**
Newman's Ambulance (Saraland)	Dial 911 (602-6100)
Mt.Vernon Rescue Squad (Voluntary)	Dial 911 (829-6631)
LifeFlite (Helicopter)	Dial 911 (800-874-1555)

COMPANY DOCTORS

Dr. Taylor Occupational Health Center 2050 Michigan Mobile, Alabama	434-6770

HOSPITALS

Springhill Memorial	344-9630
Mobile Infirmary	435-2400
Providence Hospital	633-1000
Providence Hospital Emergency Room	633-1900
Providence Hospital Patient Information	633-1000
Poison Control Center	1-800-462-0800/1-800-292-6678
Thomas Hospital	928-2375
University Of South Alabama Med. Center	471-7000

FIRE

Mobile Fire Dept	Dial 911 (208-7311)
Al. Forestry Commission (In case of forest fire adjacent to Plant)	Dial 911 1-800-672-6912
Creola Volunteer Fire Dept.	Dial 911 (675-8145)
Mt. Vernon Fire Dept.	Dial 911 (829-6631)
Saraland Fire Dept.	Dial 911 (633-2414)

POLICE

Alabama Highway Patrol (State Troopers)	Dial 911 (660-2300)
Creola Police	Dial 911 (675-8145)
Sherriff's Dept.	Dial 911 (574-8633)
Mobile Police	Dial 911 (208-7211)
Mt. Vernon Police Dept.	Dial 911 (829-6631)
Saraland Police Dept.	Dial 911 (675-5331)
Satsuma Police Dept.	Dial 911 (675-0151)
Sheriff's Dept.	Dial 911 (574-8633)

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ELECTRICAL

Alabama Power Company

Power Failure, etc.	438-0281
Main Office	438-6071
Barry Steam Plant	829-2093

NEIGHBORING PLANTS

Alabama Power (Barry Steam Plant)	331-8103
Arkema	829-9421
FMC	679-5130
EcoSouth	675-9800
AMVAC	662-8856
U.S. Amines	829-3710
Lenzing	679-2666
SSAB	662-4600

WEATHER

Weather Forecast Mobile	478-6666

RIVER EMERGENCY

U.S. Coast Guard	441-6211
Environmental Protection Agency Region IV Emergency Response	1-404-347-4062
National Response Center (24 hrs.)	1-800-424-8802
Alabama Marine Police	1-888-903-2583 or 660-2300

RAILROAD

Norfolk Southern Railway - Day & Nights (Emergencies)	1-800-453-2530

SECURITY EMERGENCY

Sheriff's Department	(dial 911) 574-8633
Mobile County Emergency Management Agency	460-8000
Game Warden	331-3896

GOVERNMENT AGENCIES

Alabama Department of Environmental Management (ADEM)	1-334-271-7726
ADEM 24 Hour Hotline	1-800-843-0699
	460-8436
Federal Bureau of Investigation	438-3674
Mobile County Emergency Management Agency (Civil Defense)	460-8000
Occupational Safety and Health Administration (Hotline)	1-800-321-6742

25.8 Appendix VIII – Life Flite Emergency Call Report

LIFE FLITE EMERGENCY CALL REPORT				
Name of Person Making Call				
Date				
Type of Emergency				
Type of Alarm (Mark One)	**(Gas)**		**(Fire)**	

LIFE FLITE TELEPHONE: 1-800-874-1555

INITIAL CALL: Contact LIFE FLITE and Determine TIME of ARRIVAL

This is (your name), I'm the medical representative at LeMoyne in Axis, Alabama, we have a critically injured/ill person, can you please dispatch the Life Flite helicopter to the LeMoyne Industrial Park helipad located on Highway 43 in Axis, Alabama. Our landing zone coordinates are:

30º 58' 12.09" North 88º 01' 12.35" West

(If known) give information regarding the extent or type of injury or medical condition (information from medical response). Can you give me an estimated time of arrival. Our phone number is 251-675-1310 should you need to make a call back.

Time of Initial Call	
Person Contacted	
Information Exchanged	

Medical Response Team notification: Notify the medical response team of the Life Flite status. Get additional information via Incident Command on the emergency frequency, normally radio channel 6.

FOLLOW-UP CALL: Ask for LIFE FLITE Status/Response or for Cancellation

This is (your name), I'm the medical representative at LeMoyne in Axis, Alabama. Provide any additional information as necessary regarding the extent or type of injury or medical condition (information from medical response) or response, or cancellation. Our phone number is 251-675-1310 should you need to make a call back.

Time of Follow-up Call	
Person Contacted	
Information Exchanged	

Medical Response Team Notification: Notify the Medical Response Team of the Life Flite status. Get additional information via Incident Command on the emergency frequency, normally radio channel 6.

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25.9 Appendix IX – Bomb Threat Worksheet

BOMB THREAT WORKSHEET													
Instructions: be calm, be courteous, listen, do not interrupt the caller													
Name of Person receiving call			Time			Phone Number of caller if available		Caller					
			Date					Receiver/ext.					
Caller's Identity	**Male**		**Female**		Adult		Juvenile		Approx. Age Yrs.				
Origin of Call	**Local**		**Booth**		**Long Distance**				**Internal from within Plant**				
Voice Characteristics (Speech)	Loud		Soft		Intoxicated		Pleasant		Calm		Slurred		
	Deep		Fast		Disquised		Distorted		Stutter		Lisp		
	Raspy		Slow		High Pitch		Distinct		Nasal		Other		
Voice (Accent)	Local		Foreign				Regional			Race			
Background Noises	Voices		Trains		Factory Machines				Street Traffic				
	Music		Mixed		Party Atmosphere				Animals				
	Quiet		Bedlam		Office Machines				Airplanes				
Manner	Angry		Rational		Deliberate				Coherent				
	Calm		Irrational		Righteous				Incoherent				
	Crying		Laughing		Emotional				Out of Breath				
	Message read by threat maker				Well spoken/educated								

BOMB FACTS			
Pretend to be difficult with hearing. Keep caller talking. If caller seems agreeable to further conversation, ask questions like:			
When will it go off?		Certain Hour?	
Time Remaining?		Where is it located?	
What Building, etc?			
What Area?			
What does it look like?			
What kind of bomb is it?		What will cause it to explode?	
Where are you now?		How do you know about the bomb?	
Did you place the bomb?		Why?	
What is your name and address?			
If the building is occupied, inform the caller that detonation could cause injury or death.			
Did the caller appear familiar with the plant by his description of the bomb location?			
Exact wording of the threat:			
Write additional notes on back or on separate paper as needed – capture as much info. as possible.			

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25.10 Appendix X – EAP Distribution List

Area	Location of Document	Area Responsible Position
Front Office (Admin)	Large Conference Room	HSE&S Manager
Guard Shack (Security)	Guard Shack	HSE&S Manager
Acid Control Room	Near East Door Entrance	Acid Supervisor
Carbon Disulfide Control Room	Near Printer	CS2 Supervisor
Crystex Control Room	File Cabinet in Middle of Control Room	Crystex Supervisor
Engineering Building	Shift Supervisor's Office	Shift Supervisor
Lab Building	Near Printer	Assistant Chemist

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Appendix A-3

New Brine Mud Pond Monitoring Inspection Forms and Schedules

Inspection Schedule and Form
New Brine Mud Pond 5EP202 (HWMU)
(CLOSED IMPOUNDMENT)
Nouryon Functional Chemical, LLC
Axis, Alabama

Inspector's Signature:		Date: Time:
Semi-Annually		
Criteria	Y/N	Date and Description of Corrective Action
Well Monitoring Inspection 335-14-5-.02(6)(b)1-3 Casing Cover @ arrival locked Casing Cover @ departure locked Casing Cracked: Yes/No Other:_____ Concrete Apron : Cracks Yes/No Other:_____ Benchmark top of casing: Yes/No Other:_____		
Every Five Years		
Survey of Benchmark for Wells: Yes/No Last year of survey:_____		

Inspection Schedule and Form
New Brine Mud Pond 5EP202 (HWMU)
(CLOSED IMPOUNDMENT)
AkzoNobel Functional Chemicals LLC
Axis, Alabama

Inspector's Signature: _____ Date: _____ Time: _____

CRITERIA	Yes/No	Description of Corrective Action
WEEKLY 335-14-5-.14(11)d7		
Security 335-14-5-.02(5). Are signs present and legible? Is the fence in good condition? Are gates kept locked/shut? Is the well monitor casing cover locked?		
Erosion Damage 335-14-5-.14(11)(d)1., 335-14-5-.14(11)d5 Is there evidence of subsidence or erosion? Is slope maintained?		
Vegetative Cover 335-14-5-.11(9)(b)1. Are there discolored areas or bare spots? Does cover need mowing?		
Final Cover Structure 335-14-5-.11(9)(b)1., 335-14-5-.14(11)d1 Is structure intact? Are burrow holes present?		
Leachate Collection Detection 335-14-5-.11(7)(d)2. 335-14-5-.14(11)d2-3 Leachate detected? Repair and replace?		
Survey Benchmark 335-14-5-.07(7)a, 335-14-5-.14(11)d6 Is the survey benchmark visible and maintained?		

Appendix A-4

RCRA Training Plan

Post-Closure Training Plan

New Brine Mud Pond 5EPP202 (HWMU)
LeMoyne Site
13440 Highway 43 North
Axis, Alabama 36505
USEPA ID #ALD008161176

February 29, 2024

Post-Closure Training Plan

New Brine Mud Pond 5EPP202 (HWMU)

LeMoyne Site

Axis, Mobile County, Alabama

USEPA ID #ALD008161176.

February 29, 2024

Prepared By:
Arcadis U.S., Inc.
1143 1st Avenue South, Suite 109
Birmingham
Alabama 35233
Phone: 205 930 5700
Fax: 205 930 5707

Prepared For:
Nouryon Chemical, LLC.
LeMoyne Plant
13440 Highway 43 North
Axis, Alabama 36505
United States

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1 Outline Of Training Program

This training program has been designed and implemented to inform training for management of post-closure care of the New Brine Mud Pond (NBMP) 5EP202. Management of the closed unit consists of inspection and maintenance of the liner cover and associated leachate monitoring equipment, and groundwater monitoring.

Since the NBMP was closed in place, each employee involved in post-closure activities must be able to perform their duties in a safe manner while protecting human health and the environment. No employee is permitted to work unsupervised until a supervisor has certified that the employee has successfully completed the training program. This certification of training occurs within six months of the employee's entry into a specific position. In addition, every facility employee is required to participate in continuing training in order to maintain proficiency, learn new techniques and procedures, and increase the level of safety and quality consciousness.

Specific training for the closed hazardous waste management unit (HWMU) New Brine Mud Pond (5EP202) Post-Closure Contingency Plan will be provided only for the personnel listed as Emergency Coordinators.

The minimum training level for RCRA employees at the LeMoyne Plant is General Awareness Training. General Awareness Training provides an overview of the RCRA regulation and specifically reviews toxicity, emergency response, hazardous waste generation and storage activities at the site, and the Contingency and Emergency Response Plan. General training provides the employee with the basics necessary to perform his/her role safely and effectively and is primarily acquired through lecture and on-the-job training with supervision.

Broad training uses all of the skills taught in General Training. It provides the knowledge and skills necessary to supervise normal and emergency operations. Working knowledge is acquired on the job, and the employee relates waste generation to the project or process generating the waste. The employee is capable of minimizing the impact of a spill and properly handling the waste without supervision.

Extensive training equips managers with the skills and concepts to develop and implement policy and programs, and to handle unforeseen circumstances safely and effectively. Extensive training may be acquired by advanced classroom education, remediation projects, experience with hazardous waste management practices and policies, or from other sources such as equipment manufacturers.

2 Training Content, Frequency and Techniques

This section outlines the content of the Nouryon LeMoyne training program. The program is customized to meet the specific needs of various job functions and individual employees and consists of the following sections:

The Resource Conservation and Recovery Act (RCRA): This section provides a review of the regulations with emphasis on applications to the LeMoyne facility. Compliance, particularly with respect to inspection documents is reviewed. The importance of accurate and fully documented records is stressed. Training is directed towards an understanding of the aspects, which directly pertain to the job function.

Toxicity: Training in this section enables the employee to recognize potential health hazards, to take the proper reporting and personal protection steps, and to know the potential exposures and effects of the materials handled at the facility.

In this section, the facility safety Hazards Communication Plan is reviewed. The employee is introduced to the protective clothing, and respiratory and hearing protection devices used at the facility. Training emphasizes the

selection and proper use, inspection and routine maintenance of all safety equipment. The limitations of these pieces of equipment are stressed.

Emergency Response: In this section, the response to destruction of cover or discovery of leachate in the collection sump is addressed. Proper storage of hazardous wastes can only be ensured when adequate cover is maintained. Also outlined in this portion of the document is the response procedure should a significant increase in the groundwater program's constituent be observed.

Each Emergency Coordinator is familiarized with the Post-Closure Contingency Plan. Formal training in emergency procedures is the responsibility of the Emergency Coordinator and area supervisors, and at a minimum, consists of:

- Description of the types of emergency situations which might occur.
- Duties of the Emergency Coordinator (and others)
- Implementation of the Contingency Plan Emergency communications
- Evacuation procedures
- Location of emergency equipment
- Reporting mechanisms

Following emergency response training, the individual employee is trained in his/her specific duties during an emergency. The Emergency Coordinator and immediate supervisor are responsible for the job specific training which, at a minimum, consists of:

- Procedures for using, inspecting, repairing and replacing emergency and monitoring equipment.
- Procedures for inspecting and repairing cover.
- Response to fires or explosions
- Response to groundwater contamination incidents
- Operations shutdown (non-applicable)

Plant Operation: The unit 5EP202 has been closed and is currently under post-closure care and monitoring.

Training Effectiveness Evaluation: Proficiency in meeting training goals is measured in written or oral examinations, or by performance of specific tasks. The trainer must certify on the training record that the employee has completed the training course.

Continuing Training Content: Annual refresher training is required of all employees in addition to the training described above. This training reviews the site operations and safety plan, and updates previous training.

Training Formats: Training is mainly conducted on-the-job and is supplemented by lectures and reading materials. The supervisor is responsible for assuring that the new employee learns the correct procedures can perform them accurately, reliably and efficiently, and that safety awareness is incorporated into each task. It is the supervisor's responsibility to instruct and observe the new employee in each task and to evaluate the performance. Corrective actions are taken as soon as a deficiency is observed so that the new employee does not become ingrained with bad work habits. Techniques for on-the-job training include performing tasks after an initial briefing and assigning the employee increasingly complex or responsible duties with feedback on performances.

Specific training needs for post-closure maintenance and operation of the closed New Brine Mud Pond (5EP202) are listed in **Tables 2-1 and 2-2**.

Table 2-1 Specific Training Needs

Job Title	Training Needs
Environmental Personnel	Extensive in RCRA, Toxicity, Emergency Response, Unit Maintenance and Inspection, Site Contingency Plan and Post-Closure Contingency Plan, Hazardous Waste Operations (HAZWOPER)
Supervisors/Foremen	Broad in RCRA, Toxicity, Emergency Response, Site Contingency Plan and Post-Closure Contingency Plan Contingency Plan, and Unit Inspection
Nouryon LeMoyne Response Team Response	General in RCRA, Toxicity, Emergency Contingency Plan
Grass Mowing Contractors	None
Groundwater Monitoring Contractors	General in RCRA, HAZWOPER

Table 2-2 Job Titles for Hazardous Waste Positions for The Closed Impoundment 5ep2022

Job Title	Training Needs	Qualifications	Duties
Environmental Engineer & Environmental Manager	Demonstrate supervisory skills	Knowledge of operation of chemical plant and RCRA regulations	Site environmental compliance
Shift Foreman	Demonstrate supervisory skills	Knowledge of operation of chemical plant and emergency procedures	Direct first line operation of production unit
Emergency Response Team	Ability to respond to emergencies involving the spill or release of hazardous waste and any associated fire or explosion.	Emergency Response Team	Contain and control hazardous waste incident.

Job Title	Training Needs	Qualifications	Duties
Grass Mowing	Recognize damage to groundwater monitoring wells or the liner system.	Knowledge of plant safety rules and procedures.	Mow the grass. Seed and fertilize as directed.
Groundwater Monitoring Contractors	Evacuate wells and collect water samples for analysis per sampling and analysis plan. Containerize purge water.	Knowledge of proper sample collection and preservation. HAZWOPER	Collect and preserve samples. Deliver samples to lab under chain-of-custody control for analyses. Document sampling event and file report.

3 Training Director

The Environmental Engineer is the approved RCRA training director at the LeMoyne plant. This person will have extensive experience in chemical and hazardous waste management. This experience is important in relating the specific subject area to the operations of the facility and in answering employee questions. This person should meet the functional requirements described for the Environmental Engineer for the LeMoyne Plant.

4 Implementation of Training Program

No employee at the facility may perform unsupervised work until he/she has been certified as fully trained by a supervisor. Certification is earned by successful completion of classroom training, computerized based training, job specific training and supervised work performance. Some of the training requirements may be waived if the employee can prove competence in that area. Proof may include transcripts of high school and college courses, certificates of course completion, demonstrated experience, or a written examination. In no case will the certification process exceed six months.

All training records are maintained on site. The records contain a written description of the content of each formal training session, attendees, instructor, date and signatures of instructor and attendees, certifying that the training was accomplished.

For each employee, the personnel file on site contains a job description, list of training and continuing training requirements, and certification by the supervisor that the requisite training has been satisfactorily completed. Computer-based training is documented by a summary test sheet for the entire group requiring training.

Appendix A-5

Post-Closure Notices

AKZO

Chemicals Division

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

November 16, 1992

Mr. Leigh Pegues, Director
Alabama Dept. of Environmental Management
1751 Cong. W. L. Dickinson Dr.
Montgomery, Alabama 36130

Ref: NPDES No. AL0001961

Dear Sir:

Enclosed is **CERTIFICATION OF RECORDING** which has been duly executed.

Very truly yours,

Marshall Rainwaters
Plant Manager

SP:bb

File: TSD - Mobile Co.

Akzo Chemicals Inc
P.O. Box 100
Axis, Alabama 36505
Tel. (205) 675 1510
Fax (205) 679 1505

CERTIFICATION OF RECORDING
AKZO CHEMICALS -- LEMOYNE FACILITY

Pursuant to ADEM ADMINISTRATIVE CODE 335-14-5-.07 Akzo Chemicals certifies that it has recorded in the Probate Records of Mobile County, Alabama the instrument, marked as Exhibit A and attached hereto, setting forth the information required by ADEM ADMINISTRATIVE CODE 335-14-5-.07(10)(b)(1).

DATED November 16, 1992.

Marshall Rainwaters
MARSHALL RAINWATERS
Plant Manager

STATE OF ALABAMA
COUNTY OF MOBILE

I, the undersigned Notary Public in and for said county in said state, hereby certify that MARSHALL RAINWATERS, whose name is signed to the foregoing CERTIFICATION OF RECORDING, and who is known to me, acknowledged before me on this day that, being informed of the contents of the above and foregoing CERTIFICATION OF RECORDING, he executed the same voluntarily on the day the same bears date.

GIVEN under my hand and official seal of office on this the 16th day of November, 1992.

Barbara Barnette
Notary Public
My Commission Expires: 2-13-93

RECEIVED
Water Division

EXHIBIT A

NOTICE OF EXISTENCE OF DISPOSAL FACILITY
ADEM ADMINISTRATIVE CODE RULE 335-14-5-.07

STATE OF ALABAMA

COUNTY OF MOBILE

WHEREAS, under date of May 29, 1987, Stauffer Chemical Company, a Delaware corporation, conveyed those certain parcels of real property located in Mobile County, Alabama, known as the Stauffer LeMoyne Plant to Stauffer Specialty & Food Products Company, Inc., by warranty deed of record at Real Property Book 3123, Page 879, in the office of the Judge of Probate, Mobile County, Alabama; and

WHEREAS, concurrently with the execution of the above referenced conveyance, Stauffer Chemical Company, a Delaware corporation, conveyed those certain parcels of real property located in Mobile County, Alabama, known as the Stauffer Cold Creek Plant to Stauffer Agricultural Chemicals Company, Inc., by warranty deed of record at Real Property Book 3123, Page 859, in the office of the Judge of Probate of Mobile County, Alabama; and

WHEREAS, under date of August 18, 1987, Stauffer Specialty and Food Products Company, Inc. recorded a CORRECTION WARRANTY DEED, at Real Property Book 3150, Page 124, in the office of the Judge of Probate, Mobile County, Alabama, which CORRECTION WARRANTY DEED was prepared to correct an error that had been made in the prior conveyances (referenced hereinabove) which separated the tract of real property known as the Stauffer Cold Creek Plant from the tract of real property known as the Stauffer LeMoyne Plant; and

WHEREAS, the stock in Stauffer Specialty and Food Products Company, Inc. (which owned the real property known as the Stauffer LeMoyne Plant), has been transferred to various corporate entities which at different times owned the stock of Stauffer Specialty and Food Products Company, Inc.; and

WHEREAS, on or about January 1, 1988, Stauffer Specialty and Food Products Company, Inc. was merged into Akzo Specialties, Inc., a Delaware corporation, and the surviving corporation was named Akzo Chemical, Inc.; and

WHEREAS, on February 18, 1988, the name of the corporation known as Akzo Chemical, Inc. was formally changed to Akzo Chemicals Inc.; and

WHEREAS, as a result of these transactions referenced hereinabove, Akzo Chemicals Inc. owns the real property formerly

known as the Stauffer LeMoyne Plant as of the date of the recording of this instrument (captioned "NOTICE OF EXISTENCE OF DISPOSAL FACILITY ADEM ADMINISTRATIVE CODE RULE 335-14-5-.07; and

WHEREAS, this instrument is being recorded in the office of the Judge of Probate, Mobile County, Alabama, in compliance with ADEM ADMINISTRATIVE CODE RULE 335-14-5-.07;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS: Notice is hereby given that the property described has been used to manage hazardous waste; that hazardous waste disposal facilities as defined in the ADEM ADMINISTRATIVE CODE, are located on the property hereinafter described and that the use of said property is restricted under ADEM ADMINISTRATIVE CODE RULE 335-14-5-.07.

The property containing the hazardous waste disposal facilities are more completely described upon the surveys attached hereto as Exhibit A and Exhibit B. Specifically, on Exhibit A the property containing that hazardous waste disposal facility is labeled as "5EP 202 Area"; and on Exhibit B the property containing that hazardous waste disposal facility is labeled as "5EP 200 Area."

The "5EP 202 Area" is a "brine mud pond" containing spent brine and the solid impurities removed from the brine, known as

brine muds, which are contaminated with low PPM levels of mercury. The brine purification mud is listed as a hazardous waste by U. S. EPA (K071). The pond closed is capable of containing 3,000,000 gallons of waste. The area will be closed with all of the brine mud left in place in accordance with the "Brine Mud Pond (5EP202) Closure Plan Akzo Chemicals -- LeMoyne Facility EPA ID No. ALD008 161 176.

The "5EP 200 Area" is a brine mud slurry tank with a capacity of 72,000 gallons of waste water and brine muds which are contaminated with low PPM levels of mercury. The brine muds are listed as hazardous wastes by U. S. EPA (K071). The tank will be cleaned as required by regulatory authorities, demolished and disposed of as a solid waste. This area will be cleaned up in accordance with the "Brine Mud Slurry Tank (5EP200) Closure Plan Akzo Chemicals - LeMoyne Facility EPA ID No. ALD008 161 176" and the area will be reclaimed for placement of process equipment or other use.

A plat of the location of said disposal facility is on file with the Alabama Department of Enviromental Management, Lands Division in Montgomery, Alabama and at the plant of Akzo Chemicals Inc. at LeMoyne, Alabama, and may be viewed by any person having proper reason to do so. Exhibits A and B to this

instrument are survey plats of each of the hazardous waste disposal units of the facilities described therein.

IN WITNESS OF ALL OF WHICH, Akzo Chemicals Inc. has caused this notice to be executed by Marshall Rainwaters, Plant Manager, on the 10th day of ~~October~~ November, 1992.

Marshall Rainwaters

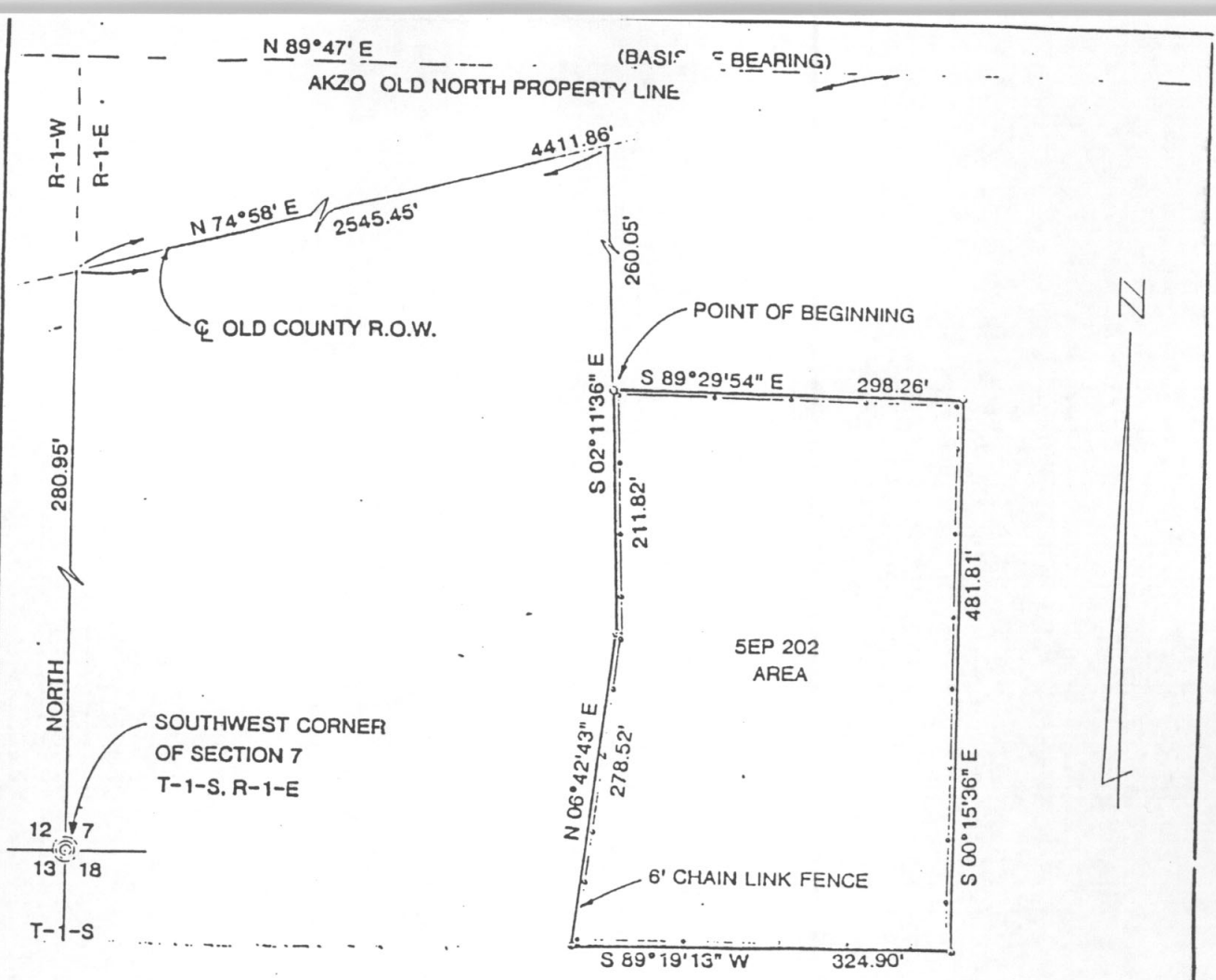
MARSHALL RAINWATERS
Plant Manager

STATE OF ALABAMA
COUNTY OF MOBILE

I, the undersigned Notary Public in and for said county in said state, hereby certify that MARSHALL RAINWATERS, whose name is signed to the foregoing NOTICE OF EXISTENCE OF DISPOSAL FACILITY ADEM ADMINISTRATIVE CODE RULE 335-14-5-.07, and who is known to me, acknowledged before me on this day that, being informed of the contents of the above and foregoing NOTICE OF EXISTENCE OF DISPOSAL FACILITY ADEM ADMINISTRATIVE CODE RULE 335-14-5-.07, he executed the same voluntarily on the day the same bears date.

GIVEN under my hand and official seal of office on this the 10th day of November, 1992.

Barbara Barnette
Notary Public
My Commission Expires: 2-16-93



STATE OF ALABAMA
COUNTY OF MOBILE

I, J. Michael Garratt, a Registered Professional Land Surveyor, in the State of Alabama, hereby certify that all parts of this survey and plat have been completed in accordance with the requirements of the Minimum Technical Standards for the Practice of Land Surveying in the State of Alabama and show the points of the compass and the dimensions of the following described property situated in the County of Mobile, State of Alabama, to wit:

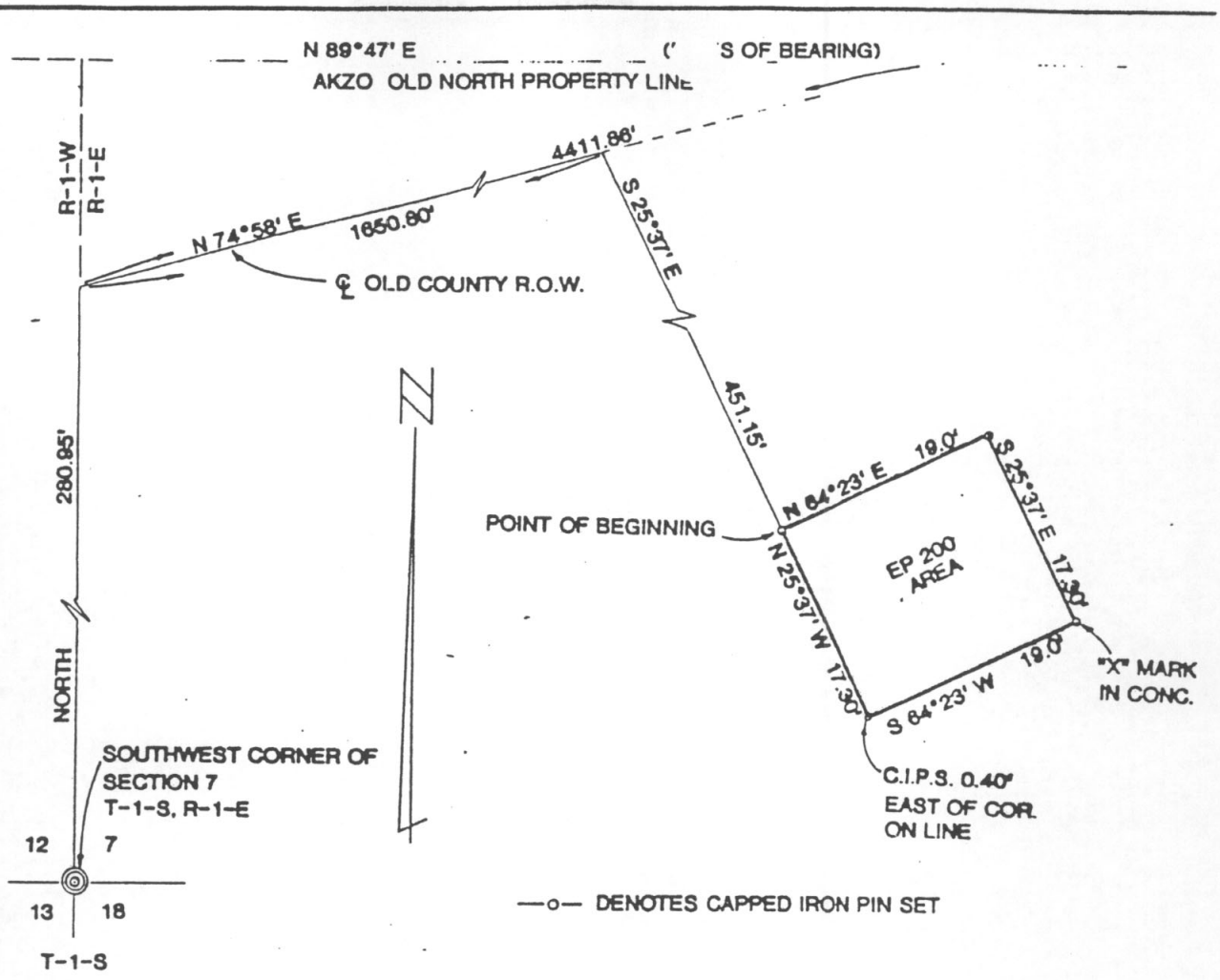
Commencing at the Southwest corner of Section 7, Township-1-South, Range-1-East; thence North along the West line of Section 7 a distance of 280.95 feet to a point in the Centerline of an old County right-of-way; thence North 74°58' East along said Centerline a distance of 2545.45 feet to a point; thence South 02°11'36" East a distance of 260.05 feet to the point of Beginning of property herein described; thence South 89°29'54" East a distance of 298.26 feet to a point; thence South 00°15'36" East a distance of 481.81 feet to a point; thence South 89°19'13" West a distance of 324.90 feet to a point; thence North 06°42'43" East a distance of 278.52 feet to a point; thence North 02°11'36" West a distance of 211.82 feet to the Point of Beginning, Containing 3.36 acres more or less.

According to my survey this 19th day of June, 1992.

J. Michael Garratt, P.L.S.
Alabama Registration No. 13187

BOUNDARY SURVEY OF 5EP 202 AREA IN AKZO CHEMICALS, INC.

Scale 1" = 100'	Harper & Garratt Engineering, Inc.	File No.	A-2-12(24)
Date JULY 30, 1992	Consulting Engineers and Land Surveyors PO Box 717 • 326 Cleveland Road • Saraland, Alabama 36571 (205) 675-7880/675-7887	J.O. No.	MBC S92-0616



STATE OF ALABAMA
COUNTY OF MOBILE

I, J. Michael Garratt, a Registered Professional Land Surveyor, in the State of Alabama, hereby certify that all parts of this survey and plat have been completed in accordance with the requirements of the Minimum Technical Standards for the Practice of Land Surveying in the State of Alabama and show the points of the compass and the dimensions of the following described property situated in the County of Mobile, State of Alabama, to wit:

Commencing at the Southwest corner of Section 7, Township-1-South, Range-1-East; thence North along the West line of Section 7, a distance of 280.95 feet to a point in the Centerline of an old County right-of-way; thence North 74°58' East along said Centerline a distance of 1650.80 feet to a point; thence South 25°37' East a distance of 451.15 feet to the Point of Beginning of property herein described; thence North 64°23' East a distance of 19.00 feet to a point; thence South 25°37' East a distance of 17.30 feet to a point: thence South 64°23' West a distance of 19.0 feet to a point; thence North 25°37' West a distance of 17.30 feet to the Point of Beginning. Containing 0.0075 acres more or less.

According to my survey this 19th day of June, 1992.

J. Michael Garratt

J. Michael Garratt, P.L.S.
Alabama Registration No. 13187

BOUNDARY SURVEY OF EP 200 AREA IN AKZO CHEMICALS, INC.

Scale 1" = 10'	Harper & Garratt Engineering, Inc.	File No.	A-2-12(23)
Date JULY 30, 1992	Consulting Engineers and Land Surveyors PO Box 717 • 326 Cleveland Road • Saraland, Alabama 36571 (205) 675-7880/675-7887	J.O. No.	MBC-S92-0616

Appendix A-6

Post Closure and Corrective Action Cost Estimates and Financial Assurance

Appendix A-6, Table 1: 30-Year Cost Estimate Summary
Nouryon Functional Chemicals, Axis, Alabama

Project Phase	Component	Description	Capital Cost ($)	Annual Cost ($)	Periodic Cost ($)	30-YearTotal Cost ($)	Reference
30-Year Cost Estimate: CMI Construction, Operation, Maintenance, Monitoring, Post Closure Care, Reporting	AOC-A & AOC-M CMI Implementation	**Construction & Installation of the full scale CMIs**. The preliminary layout is provided in the CMIPs. Quarterly reports to ADEM provide pilot testing reports and will provide final design layout.	$ 839,000	$ -	$ 76,500	**$915,600**	Table 2
	AOC-A & AOC-M CM Operation and Maintenance	**Operation and Maintenace of the CM** systems. Includes labor and materials for operation.		$ 128,500	$ -	**$642,500**	Table 3
	AOC-A & AOC-M System Utilities	**Utility costs** to operate the system including telephone, electricity and internet.	$ -	$ 23,500	$ -	**$117,500**	Table 3
	AOC-A & AOC-M CM Effectiveness Monitoring & SWMU 9 Detection Monitoring	**Monitoring** of CMI performance as outlined in the CMIPs; and SWMU 9 Detection Monitoring.	$ -	$ 41,500	$ -	**$1,245,000**	Table 3
	General Post-Closure Care and Permit Requirements / Site, CAP, and CM Maintenance	**Post Closure Care** requirements (maintenance and management).	$ -	$ 42,200	$ -	**$1,266,000**	Table 3
	RCRA AOC-A & AOC-M CM Effectiveness Reporting and SWMU 9 Reporting	**Reporting** Annual Corrective Measures and Semi-Annual Detection Reporting.	$ -	$ 30,000	$ -	**$900,000**	Table 3
					TOTAL (30 Years)	**$5,086,600**	

Appendix A-6, Table 2: Detailed Cost for AOC-A CMI Construction, Installation, and Decommissioning
Nouryon Functional Chemicals, Axis, Alabama
(R-6/17/2025)

COSTS:	RATES	CMI System Installation / Construction		CMI System Decommissioning	
		Units/Hours	Cost	Units/Hours	Cost
LABOR COSTS					
Program Manager	$ 333.54	5	$1,668	1	$200
Senior Project Manager	$ 192.96	26	$5,036	3	$579
Project Manager	$ 167.99	0	$0	0	$0
Task Manager	$ 151.52	66	$10,061	8	$1,152
Senior Expert	$ 326.64	14	$4,573	0	$0
Project Advisor	$ 238.42	0	$0	0	$0
Principal Sci/Eng/Arch/Designer	$ 194.30	0	$0	0	$0
Senior Sci/Eng/Arch/Designer	$ 151.42	39	$5,905	0	$0
Project Sci/Eng/Arch/Designer	$ 120.80	78	$9,422	2	$242
Staff Sci/Eng/Arch/Designer	$ 104.69	88	$9,213	8	$838
Sci/Eng/Arch/Designer 2	$ 93.47	612	$57,205	32	$2,991
Technician III	$ 94.15	510	$48,017	160	$15,064
Technician I	$ 56.96	584	$33,263	0	$0
Designer	$ 105.57	0	$0	0	$0
CADD/Drafter II	$ 72.58	0	$0	0	$0
CADD/Drafter I	$ 63.12	0	$0	0	$0
Project Coordinator	$ 135.36	0	$0	0	$0
Project Assistant	$ 79.65	10	$796	2	$159
Subtotals		**2032**	**$185,159**	**216**	**$21,225**

OTHER DIRECT COSTS						
Truck/car rental per day	day	$50	101	$5,050	16	$800
Lodging	day/person	$150	90	$13,500	15	$2,250
Meals (day work)	day/person	$25	101	$2,525	16	$400
Decon area setup/supplies	day	$25	0	$0	0	$0
Level D PPE	day/person	$15	101	$1,515	16	$240
Miscellaneous (photographs, gas, tolls, supplies, etc.)	day	$20	101	$2,020	16	$320
Copies	each	$0	0	$0	0	$0
Shipping (Coolers)	each	$100	50	$5,000	0	$0
Shipping (Reports)	each	$25	0	$0	0	$0
Communications	day	$2	50	$100	0	$0
200 micron Bag filter	each	$35	0	$0	0	$0
25 micron bag filter	each	$45	0	$0	0	$0
3 micron cartridge	each	$40	0	$0	0	$0
Monthly Utilities (phone, telemetry , water, sewer etc)	month	$1,100.00	0	$0	0	$0
Utilities - Electrical AS/SVE	month	$858	0	$0	0	$0
Miscellaneous Items (Fire extinguisher service, PLC software	annually	$1,915	0	$0	0	$0
Subtotals				**$29,710**		**$4,010**

SUBCONTRACTOR EXPENSES						
VOCs (8260B)	each	$ 46.00		$0		$0
BTEX/MtBE (8021)	each	$ 45.00		$0		$0
Sulfide, total	each	$ 33.00		$0		$0
Total Organic Carbon (TOC)-single analysis	each	$ 21.00		$0		$0
Full waste characterization	each	$ 613.00		$12,260		$0
EPA TO-15 Full Scan	each	$ 115.00		$1,380		$0
Light hydrocarbons (methane, ethane, ethene)	each	$ 48.00		$0		$0
Well Abandonment Mob	each	$ 2,000.00		$0		$2,000
2" Well Abandonment	lf	$ 15.00		$0		$26,340
Drum rate (soil or liquid, 55-gallon incl. drum purchase)	each	$ 195.00		$36,660		$0
Transportation (200 miles up to 14 drums) , non-haz	each load	$ 450.00		$6,300		$0
Trenching	lf	$ 50.00		$171,500		$0
Piping, 4" HDPE	lf	$ 8.50		$8,500		$0
Piping, 2" HDPE	lf	$ 7.00		$14,350		$0
Piping, 1" HDPE	lf	$ 5.25		$7,245		$0
Surveyor	day	$ 1,500.00		$1,500		$0
Utility location	day	$ 1,880.00		$3,760		$0
Misc valves and fittings	LS	$ 12,000.00		$24,000		$0
PLC Remote Connection	each	$ 15,000.00		$15,000		$0
Treatment Building	Each	$ 30,000.00		$30,000		$0
Granular Activated Carbon Changeout	lb	$ 1.50		$0		$0
Power Drop - Average Cost Assuming Some Transformer	ea	$ 7,500.01		$7,500		$0
AS Wellhead Connections/Completions	ea	$ 550.00		$37,950		$0
Claw Compressor (Zephyr C-DLR 300, 23 psi, 190 scfm,	ea	$ 20,000.00		$20,000		$0
Heat Exchanger (<200 scfm)	ea	$ 2,000.00		$2,000		$0
1-inch Motorized Valve	ea	$2,000		$2,000		$0
Air Flow Meter (0-30 scfm)	ea	$ 200.00		$22,200		$0
SVE Wellhead Connections/Completions	ea	$ 450.00		$18,900		$0
Concrete Pad, 2500 sqft	ea	$ 17,500.00		$17,500		$0
SVE knockout tank	ea	$ 1,000.00		$1,000		$0
Regenerative Blower (Rotron EN-858, 10 HP, 50 in-H2O	ea	$ 20,000.00		$20,000		$0
4,000 lb vapor phase carbon vessel	ea	$ 12,000.00		$24,000		$0
System Decommissioning Level 2 (complex systems - AS	each system	$ 15,000.00		$0		$15,000
Demolition Crew (including labor and equipment)	days	$ 8,000.00		$0		$8,000
Metals - Al, Ar, Br, Cr, Fe, Pb, Mn	each	$ 57.19		$0		$0
12 inch bore hole in residuum using HSA rig	LF	$ 55.00		$0		$0
Hollow stem auger mobilization (equipment, decon pad co	each	$ 5,000.00		$0		$0
6 inch bore hole in residuum using HSA rig	LF	$ 18.00		$62,100		$0
2" well materials PVC	foot	$ 7.70		$26,565		$0
6" well materials Stainless Steel	foot	$ 60.00		$0		$0
EHC-G	lb	$ 1.85		$0		$0
EHC-G Delivery	each	$ 2,650.00		$0		$0
Water transport	per/1000 gallons	$ 15.00		$0		$0
Motor Control Center / Main Control Panel	Lump	$ 30,000.00		$30,000		$0
Maintenance and Replacement Parts (4% EQ)	%	$ 0.04		$0		$0
Vironex Mob/Demob	each	$ 5,500.00		$0		$0
Hand auger clearing	each	$ 50.00		$0		$0
Day Rate	day	$ 6,000.00		$0		$0
Decontamination, drums, etc	lump	$ 2,500.00		$0		$0
Injection Reporting	lump	$ 2,500.00		$0		$0
Vegetation Maintenance	annually	$ 500.00		$0		$0
Subtotals				**$624,170**		**$51,340**
Task Sub-Totals				**$839,039**		**$76,575**
Total CMI Construction & Implementation				**$915,614**		

Appendix A-6, Table 3: Detailed Cost for CMI Operation and Maintenance, Groundwater Monitoring, Post Closure Care and Permit Compliance, and Reporting
Nouryon Functional Chemicals, Axis, Alabama
(R-6/17/25)

COSTS:		Rates	CMI Operation & Maintenance, CMI and Detection Monitoring, Post Closure Care & Permit Compliance, Reporting							
			Systems Operation		Detection and CMI Effectiveness Monitoring		Post Closure Care & General Permit Compliance		Reporting	
			Units/Hrs	Cost	Units/Hrs	Cost	Units/Hrs	Cost	Units/Hrs	Cost
LABOR COSTS										
Program Manager		$ 333.54	15	$4,836	1	$334	2	$667	2	$667
Senior Project Manager		$ 192.96	75	$14,472	5	$965	5	$965	5	$965
Project Manager		$ 167.99	0	$0	0	$0	0	$0	0	$0
Task Manager		$ 151.52	191	$28,940	12	$1,818	40	$6,061	11	$1,667
Senior Expert		$ 326.64	26	$8,493	0	$0	0	$0	11	$3,593
Project Advisor		$ 238.42	0	$0	0	$0	0	$0	8	$1,907
Principal Sci/Eng/Arch/Designer		$ 194.30	52	$10,104	0	$0	0	$0	20	$3,886
Senior Sci/Eng/Arch/Designer		$ 151.42	130	$19,685	12	$1,817	5	$757	20	$3,028
Project Sci/Eng/Arch/Designer		$ 120.80	390	$47,112	24	$2,899	22	$2,658	40	$4,832
Staff Sci/Eng/Arch/Designer		$ 104.69	0	$0	48	$5,025	0	$0	50	$5,235
Sci/Eng/Arch/Designer 2		$ 93.47	0	$0	0	$0	140	$13,086	0	$0
Technician III		$ 94.15	4200	$395,431	130	$12,240	0	$0	0	$0
Technician I		$ 56.96	0	$0	0	$0	240	$13,670	0	$0
Designer		$ 105.57	0	$0	0	$0	0	$0	0	$0
CADD/Drafter II		$ 72.58	0	$0	0	$0	0	$0	15	$1,089
CADD/Drafter I		$ 63.12	0	$0	0	$0	0	$0	0	$0
Project Coordinator		$ 135.36	0	$0	0	$0	0	$0	0	$0
Project Assistant		$ 79.65	26	$2,071	0	$0	3	$239	36	$2,867
Subtotals			**5105**	**$531,144**	**1546**	**$25,097**	**4692**	**$38,103**	**218**	**$29,736**
OTHER DIRECT COSTS										
Truck/car rental per day	day	$50	0	$0	20	$1,000	50	$2,500	0	$0
Lodging	day/person	$150.00	0	$0	0	$0	0	$0	0	$0
Meals (day work)	day/person	$25	0	$0	0	$0	0	$0	0	$0
Decon area setup/supplies	day	$25	0	$0	8	$200	0	$0	0	$0
Level D PPE	day/person	$15	520	$7,800	60	$900	55	$825	0	$0
Miscellaneous (photographs, gas, tolls, supplies, etc.)	day	$20	0	$0	0	$0	40	$800	0	$0
Copies	each	$200	0	$0	0	$0	0	$0	1	$200
Shipping (Coolers)	each	$100	0	$0	10	$1,000	0	$0	0	$0
Shipping (Reports)	each	$25	0	$0	0	$0	0	$0	4	$100
Communications	day	$2	0	$0	0	$0	0	$0	0	$0
200 micron Bag filter	each	$35	0	$0	0	$0	0	$0	0	$0
25 micron bag filter	each	$45	0	$0	0	$0	0	$0	0	$0
3 micron cartridge	each	$40	0	$0	0	$0	0	$0	0	$0
Monthly Utilities (phone, telemetry , water, sewer etc)	month	$1,100.00	60	$66,000	0	$0	0	$0	0	$0
Utilities - Electrical AS/SVE	month	$858	60	$51,500	0	$0	0	$0	0	$0
Miscellanous Items (Fire extinguisher service, PLC softwa	annually	$1,915	5	$9,575	0	$0	0	$0	0	$0
Subtotals				**$134,875**		**$3,100**		**$4,125**		**$300**
SUBCONTRACTOR EXPENSES										
VOCs (8260B)	each	$ 46.00		$0		$5,600		$0		$0
Full waste characterization	each	$ 613.00		$0		$0		$0		$0
EPA TO-15 Full Scan	each	$ 115.00		$20,700		$0		$0		$0
Light hydrocarbons (methane, ethane, ethene)	each	$ 48.00		$0		$1,575		$0		$0
Well Abandonment Mob	each	$ 2,000.00		$0		$0		$0		$0
2" Well Abandonment	lf	$ 15.00		$0		$0		$0		$0
6" Well Abandonment	lf	$ 25.00		$0		$0		$0		$0
Drum rate (soil or liquid, 55-gallon incl. drum purchase)	each	$ 195.00		$0		$0		$0		$0
Transportation (200 miles up to 14 drums) , non-haz	each load	$ 450.00		$0		$0		$0		$0
Trenching	lf	$ 50.00		$0		$0		$0		$0
Piping, 4" HDPE	lf	$ 8.50		$0		$0		$0		$0
Piping, 2" HDPE	lf	$ 7.00		$0		$0		$0		$0
Piping, 1" HDPE	lf	$ 5.25		$0		$0		$0		$0
Surveyor	day	$ 1,500.00		$0		$0		$0		$0
Utility location	day	$ 1,880.00		$0		$0		$0		$0
Misc valves and fittings	LS	$ 12,000.00		$0		$0		$0		$0
PLC Remote Connection	each	$ 15,000.00		$0		$0		$0		$0
Treatment Building	Each	$ 30,000.00		$0		$0		$0		$0
Granular Activated Carbon Changeout	lb	$ 1.50		$30,000		$0		$0		$0
Power Drop - Average Cost Assuming Some Transformer	ea	$ 7,500.01		$0		$0		$0		$0
AS Wellhead Connections/Completions	ea	$ 550.00		$0		$0		$0		$0
Claw Compressor (Zephyr C-DLR 300, 23 psi, 190 scfm,	ea	$ 20,000.00		$0		$0		$0		$0
Heat Exchanger (<200 scfm)	ea	$ 2,000.00		$0		$0		$0		$0
1-inch Motarized Valve	ea	100000%		$0		$0		$0		$0
Air Flow Meter (0-30 scfm)	ea	$ 200.00		$0		$0		$0		$0
SVE Wellhead Connections/Completions	ea	$ 450.00		$0		$0		$0		$0
Concrete Pad, 2500 sqft	ea	$ 17,500.00		$0		$0		$0		$0
SVE knockout tank	ea	$ 1,000.00		$0		$0		$0		$0
Regenerative Blower (Rotron EN-858, 10 HP, 50 in-H2O	ea	$ 20,000.00		$0		$0		$0		$0
4,000 lb vapor phase carbon vessel	ea	$ 12,000.00		$0		$0		$0		$0
System Decommissioning Level 2 (complex systems - AS	each system	$ 15,000.00		$0		$0		$0		$0
Demolition Crew (including labor and equipment)	days	$ 8,000.00		$0		$0		$0		$0
Metals - Al, Ar, Br, Cr, Fe, Pb, Mn, Hg	each	$ 57.19		$0		$6,100		$0		$0
12 inch bore hole in residuum using HSA rig	LF	$ 55.00		$0		$0		$0		$0
Hollow stem auger mobilization (equipment, decon pad co	each	$ 5,000.00		$0		$0		$0		$0
6 inch bore hole in residuum using HSA rig	LF	$ 18.00		$0		$0		$0		$0
2" well materials PVC	foot	$ 7.70		$0		$0		$0		$0
6" well materials Stainless Steel	foot	$ 60.00		$0		$0		$0		$0
EHC-G	lb	$ 1.85		$0		$0		$0		$0
EHC-G Delivery	each	$ 2,650.00		$0		$0		$0		$0
Water transport	per/1000 gallons	$ 15.00		$0		$0		$0		$0
Motor Control Center / Main Control Panel	Lump	$ 30,000.00		$0		$0		$0		$0
Maintenance and Replacement Parts (4% EQ)	%	$ 0.04		$41,000		$0		$0		$0
Vironex Mob/Demob	each	$ 5,500.00		$0		$0		$0		$0
Hand auger clearing	each	$ 50.00		$0		$0		$0		$0
Day Rate	day	$ 6,000.00		$0		$0		$0		$0
Decontamination, drums, etc	lump	$ 2,500.00		$0		$0		$0		$0
Injection Reporting	lump	$ 2,500.00		$0		$0		$0		$0
Vegetation Maintenance	annually	$ 500.00		$2,500		$0		$0		$0
Subtotals				**$94,200**		**$13,275**		**$0**		**$0**
Task Sub-Totals 5-year active CMI				**CMI OM&M & utilities =** **$760,219**		**Annual CMI Eff Monitoring =** **$41,472**		**Annual Permit Compliance =** **$42,228**		**Annual Reporting =** **$30,036**

Nouryon Chemicals LLC
Environmental Liability Management

Via Electronic & Certified Mail

Attn: Linda Knickerbocker
Industrial Hazardous Waste Branch
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, AL 36110

March 27, 2024

Dear Mr. Knickerbocker,

Subject: Financial Assurance – Axis, Alabama
Nouryon Functional Chemicals LLC
ALD 008 161 176

This letter confirms that irrevocable standby letter of credit No. 68175678 is in place for the Nouryon Functional Chemicals LLC (Nouryon) facility in Axis, Alabama.

The current letter of credit issued by Bank of America totals $3,310,725. A copy of the most recent letter of credit is attached. The total actual estimated corrective action and post closure costs, adjusted for 2024, total $3,152,038. Therefore, the existing letter of credit meets the amount required by regulation.

	Required Amount	Current Amount
Corrective Action Cost	1,051,669	1,104,249
Post Closure Cost	2,100,370	2,206,476
Total	$3,152,038	$3,310,725

If you should have any questions or require additional information, please do not hesitate to contact me at 419-348-0880.

Sincerely,

Colleen E. Varga
Environmental Liability Specialist

c: R. Johnston, Nouryon Functional Chemicals LLC (via email only)
M. Mitchel, Nouryon Functional Chemicals LLC (via email only)
C. Anderson, Nouryon Chemicals LLC (via email only)
P. Gomez, Nouryon Chemicals LLC (via email only)

15115 Park Row Boulevard
Suite 250
Houston, Texas 77084
United States

T +1 419 348 0880

www.nouryon.com

BANK OF AMERICA

BANK OF AMERICA - CONFIDENTIAL PAGE: 1
DATE: JUNE 29, 2023
AMENDMENT TO IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: 68175678

AMENDMENT NUMBER 2

APPLICANT
NOURYON FUNCTIONAL CHEMICALS LLC
13440 HIGHWAY 43 NORTH
AXIS, AL 36505

BENEFICIARY
DIRECTOR, ALABAMA DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
381 STATE OFFICE BUILDING
MONTGOMERY, AL 36130

ISSUING BANK
BANK OF AMERICA, N.A.
ONE FLEET WAY
PA6-580-02-30
SCRANTON, PA 18507-1999

THIS AMENDMENT IS TO BE CONSIDERED AN INTEGRAL PART OF THE ABOVE CREDIT AND MUST BE ATTACHED THERETO.

THE ABOVE MENTIONED CREDIT IS AMENDED AS FOLLOWS:

THE AMOUNT OF THIS CREDIT HAS BEEN INCREASED BY USD 100,000.00
THE AGGREGATE AMOUNT OF THE CREDIT IS NOW USD 3,310,725.00

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.

IF YOU REQUIRE ANY ASSISTANCE OR HAVE ANY QUESTIONS REGARDING THIS AMENDMENT, PLEASE CALL 800-370-7519 .

AUTHORIZED SIGNATURE
THIS DOCUMENT CONSISTS OF 1 PAGE(S).

ORIGINAL

(R-10/23/2024)

This is a stored electronic document that is neither negotiable nor a document of title and should not be altered in any manner.

BANK OF AMERICA

BANK OF AMERICA - CONFIDENTIAL PAGE: 1
DATE: MAY 31, 2022
AMENDMENT TO IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: 68175678

AMENDMENT NUMBER 1

APPLICANT
NOURYON FUNCTIONAL CHEMICALS LLC
13440 HIGHWAY 43 NORTH
AXIS, AL 36505

BENEFICIARY
DIRECTOR, ALABAMA DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
381 STATE OFFICE BUILDING
MONTGOMERY, AL 36130

ISSUING BANK
BANK OF AMERICA, N.A.
ONE FLEET WAY
PA6-580-02-30
SCRANTON, PA 18507-1999

THIS AMENDMENT IS TO BE CONSIDERED AN INTEGRAL PART OF THE ABOVE CREDIT AND MUST BE ATTACHED THERETO.

THE ABOVE MENTIONED CREDIT IS AMENDED AS FOLLOWS:

THE AMOUNT OF THIS CREDIT HAS BEEN INCREASED BY USD 241,857.00
THE AGGREGATE AMOUNT OF THE CREDIT IS NOW USD 3,210,725.00

ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED.

IF YOU REQUIRE ANY ASSISTANCE OR HAVE ANY QUESTIONS REGARDING THIS AMENDMENT, PLEASE CALL 800-370-7519 .

AUTHORIZED SIGNATURE

THIS DOCUMENT CONSISTS OF 1 PAGE(S).

ORIGINAL (R-10/23/2024)

This is a stored electronic document that is neither negotiable nor a document of title and should not be altered in any manner.

BANK OF AMERICA

DATE: APRIL 19, 2021
IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: 68175678

APPLICANT
NOURYON FUNCTIONAL CHEMICALS LLC
13440 HIGHWAY 43 NORTH
AXIS, AL 36505

BENEFICIARY
DIRECTOR, ALABAMA DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT
381 STATE OFFICE BUILDING
MONTGOMERY, AL 36130

ISSUING BANK
BANK OF AMERICA, N.A.
ONE FLEET WAY
PA6-580-02-30
SCRANTON, PA 18507-1999

AMOUNT
NOT EXCEEDING USD 2,968,868.00
NOT EXCEEDING TWO MILLION NINE HUNDRED SIXTY EIGHT THOUSAND EIGHT HUNDRED SIXTY EIGHT AND 00/100'S US DOLLARS

EXPIRATION
MARCH 31, 2022 AT OUR COUNTERS

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT 68175678 IN YOUR FAVOR, AT THE REQUEST AND FOR THE ACCOUNT OF NOURYON FUNCTIONAL CHEMICALS LLC, 13440 HIGHWAY 43 NORTH, AXIS, ALABAMA 36505 UP TO THE AGGREGATE AMOUNT OF TWO MILLION NINE HUNDRED SIXTY EIGHT THOUSAND EIGHT HUNDRED SIXTY EIGHT AND NO/100 US DOLLARS (U.S. $2,968,868.00) AVAILABLE UPON PRESENTATION OF:

1. YOUR SIGHT DRAFT, BEARING REFERENCE TO THIS IRREVOCABLE STANDBY LETTER OF CREDIT NO. 68175678 AND

2. YOUR SIGNED STATEMENT READING AS FOLLOWS: "I CERTIFY THAT THE AMOUNT OF THE DRAFT IS PAYABLE PURSUANT TO REGULATIONS ISSUED UNDER AUTHORITY OF THE ALABAMA HAZARDOUS WASTE MANAGEMENT ACT OF 1978, AS AMENDED."

THIS LETTER OF CREDIT IS EFFECTIVE AS OF APRIL 19, 2021, AND SHALL EXPIRE ON MARCH 31, 2022, BUT SUCH EXPIRATION DATE SHALL BE AUTOMATICALLY EXTENDED FOR A PERIOD OF AT LEAST ONE(1) YEAR ON MARCH 31ST AND ON EACH SUCCESSIVE EXPIRATION DATE, UNLESS AT LEAST 120 DAYS BEFORE THE CURRENT EXPIRATION DATE, WE NOTIFY BOTH YOU AND NOURYON FUNCTIONAL CHEMICALS LLC BY CERTIFIED MAIL OR OVERNIGHT COURIER SERVICE THAT WE HAVE DECIDED NOT TO EXTEND THIS LETTER OF CREDIT BEYOND THE CURRENT EXPIRATION DATE. IN THE EVENT YOU ARE SO NOTIFIED, ANY UNUSED PORTION OF THE CREDIT SHALL BE AVAILABLE UPON PRESENTATION OF YOUR SIGHT DRAFT FOR 120 DAYS AFTER THE DATE OF RECEIPT BY BOTH YOU AND NOURYON FUNCTIONAL CHEMICALS LLC, AS SHOWN ON THE SIGNED RETURN RECEIPTS.

ORIGINAL

(R-10/23/2024)

BANK OF AMERICA

THIS IS AN INTEGRAL PART OF LETTER OF CREDIT NUMBER: 68175678

WHENEVER THIS LETTER OF CREDIT IS DRAWN ON UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS CREDIT, WE SHALL DULY HONOR SUCH DRAFT UPON PRESENTATION TO US, AND WE SHALL DEPOSIT THE AMOUNT OF THE DRAFT DIRECTLY INTO THE STANDBY TRUST FUND OF NOURYON FUNCTIONAL CHEMICALS LLC IN ACCORDANCE WITH YOUR INSTRUCTIONS.

WE CERTIFY THAT THE WORDING OF THIS LETTER OF CREDIT IS IDENTICAL TO THE WORDING SPECIFIED IN ADEM ADMINISTRATIVE CODE SUBPARAGRAPH 335-14-5-.08(12)(D) AS SUCH RULES WERE CONSTITUTED ON THE DATE SHOWN IMMEDIATELY BELOW.

THIS CREDIT IS SUBJECT TO UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS (2007 REVISION), INTERNATIONAL CHAMBER OF COMMERCE PUBLICATION NO. 600.

IF YOU REQUIRE ANY ASSISTANCE OR HAVE ANY QUESTIONS REGARDING THIS TRANSACTION, PLEASE CALL 800-370-7519 .

Vincent Leonardo

AUTHORIZED SIGNATURE

THIS DOCUMENT CONSISTS OF 2 PAGE(S).

COPY

TRUST AGREEMENT

TRUST AGREEMENT, the "Agreement," entered into as of January 1, 1997, by and between Akzo Nobel Chemicals Inc., a Delaware corporation, the "Grantor," and LaSalle National Trust, N.A., a national bank, the "Trustee."

WHEREAS, the Alabama Department of Environmental Management (the "Department") an agency of the State of Alabama, has established certain regulations applicable to the Grantor, requiring that an owner or operator of a hazardous waste management facility shall provide assurance that funds will be available when needed for closure and/or post-closure care of the facility,

WHEREAS, the Grantor has elected to establish a trust to provide all or part of such financial assurance for the facilities identified herein,

WHEREAS, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this Agreement, and the Trustee is willing to act as trustee,

NOW, THEREFORE, the Grantor and the Trustee agree as follows:

Section 1. Definitions. As used in this Agreement:

(a) The term "Grantor" means the owner or operator who enters into this Agreement and any successors or assigns of the Grantor.

(b) The term "Trustee" means the Trustee who enters into this Agreement and any successor Trustee.

Section 2. Identification of Facilities and Cost Estimates. This Agreement pertains to the facilities and cost estimates identified on attached Schedule A.

Section 3. Establishment of Fund. The Grantor and the Trustee hereby establish a trust fund, "Fund" for the benefit of the Department. The Grantor and the Trustee intend that no third party have access to the Fund except as herein provided. The Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, IN TRUST, as hereinafter provided. The Trustee shall not be responsible, nor shall it undertake any responsibility for the amount or adequacy of, nor any duty to collect from the Grantor, any payments necessary to discharge any liabilities of the Grantor established by the Department.

Section 4. Payment for Closure and Post-closure. The Trustee shall make payment from the Fund as the Director of the Department (the "Director") shall direct, in writing, to provide for the payment of the costs of closure and/or post-closure care of the facilities covered by this Agreement. The Trustee shall reimburse the Grantor or other persons as specified by the Director from the Fund for closure and post-closure expenditures in such amounts as the Director shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts as the Director specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund as defined herein.

Section 5. Payments Comprising the Fund. Payments made to the Trustee for the Fund shall consist of cash or securities acceptable to the Trustee.

Section 6. Trustee Management. The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge

his duties with respect to the trust fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims; except that:

(i) Securities or other obligations of the Grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2(a) , shall not be acquired or held, unless they are securities or other obligations of the Federal or a State government;

(ii) The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the Federal or State government; and

(iii) The trustee is authorized to hold cash awaiting investment of distribution uninvested for a reasonable time and without liability for the payment of interest thereon.

Section 7. Commingling and Investment. The Trustee is expressly authorized in its discretion:

(a) To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and

(b) To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a-1 et seq., including one which may be created managed, underwritten, or to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares in its discretion.

Section 8. Express Powers of Trustee. Without in any way limiting the powers and discretions conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

(a) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see to the application of the purchase money or to inquire into the validity or expediency of any such sale or other disposition.;

(b) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

(c) To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee of such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government or any agency or instrumentality thereof, with a Federal Reserve bank, but the books and records of the Trustee shall at all times show that all such securities are part of the Fund;

(d) To deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the Federal or State government; and

(e) To compromise or otherwise adjust all claims in favor of or against the Fund.

Section 9. Taxes and Expenses. All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees or legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

Section 10. Annual Valuation. The Trustee shall annually, at least 30 days prior to the anniversary date of establishment of the Fund, furnish to the Grantor and to the Department a statement confirming the value of the Trust. Any securities in the fund shall be valued at market value as of no more than 60 days prior to the anniversary date of the establishment of the Fund. The failure of the Grantor to object in writing to the Trustee within 90 days after the statement has been furnished to the Grantor and the Department shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement.

Section 11. Advice of Counsel. The Trustee may from time to time consult with the counsel, who may be counsel to the Grantor, with respect to any question arising as to the construction of this Agreement or any action to be hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

Section 12. Trustee Compensation. The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing from time to time with the Grantor.

Section 13. Successor Trustee. The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor Trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in writing sent to the Grantor, the Department, and the present Trustee by certified mail 10 days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this Section shall be paid as provided in section 9.

Section 14. Instructions to the Trustee. All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are designated in the attached Exhibit A or such other designees as the Grantor may designate by amendment to Exhibit A. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests, and instructions. All orders, requests, and instructions by the Department to the Trustee shall be in writing, signed by the Director or his designee, and the Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the Grantor or the Department hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or the Department, except as provided for herein.

Section 15. Notice of Nonpayment. The Trustee shall notify the Grantor and the Department by certified mail within 10 days following the expiration of the 30-day period after the anniversary of the establishment of the Trust, if no payment is received from the Grantor during that period. After the pay-in period is completed, the Trustee shall not be required to send a notice of nonpayment.

Section 16. Amendment of Agreement. This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and the Director or his designee, or by the Trustee and the Director or his designee if the Grantor ceases to exist.

Section 17. Irrevocability and Termination. Subject to the right of the parties to amend this Agreement as provided in Section 16, this Trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and the Director, or by the Trustee and the Director, if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final trust administration expenses, shall be delivered to the Grantor.

Section 18. Immunity and Indemnification. The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust, or in the carrying out of any directions by the Grantor or the Director, issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the Trust Fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

Section 19. Choice of Law. This Agreement shall be administered, construed, and enforced according to the laws of the State of Alabama.

Section 20. Interpretation. As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement.

IN WITNESS WHEREOF the parties have caused this Agreement to be executed by their respective officers duly authorized and their corporate seals to be hereunto affixed and attested as of the date first above written: The parties below certify that the wording of this Agreement is identical to the wording specified in ADEM Administrative Code subparagraph 335-14-5-.08(12)(a)1. as such rules were constituted on the date first above written.

Signature of Grantor

Title

Signature of Grantor

Title

Attest:

Title SECRETARY

Seal

Signature of Trustee

ASSISTANT VICE PRESIDENT

Attest:

Title Assistant Secretary

Seal

Certification of Acknowledgment

State of Illinois

County of Cook

On this date DECEMBER 18, 1996 before me personally came Jeffrey T. Massari, to me known, who, being by me duly sworn, did depose and say that he is the Secretary of Akzo Nobel Chemicals Inc., the corporation described in and which executed the above instrument; and that he knows the seal of said corporation; that the seal affixed to such instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed his name thereto by like order.

Notary Public

OFFICIAL SEAL
STEPHANIE D. DALTON
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 6-18-2000

(ACKNOWLEDGEMENT BY TRUSTEE)

STATE OF: ILLINOIS
: SS:
COUNTY OF: COOK

On this 20th day of December, 1996, before me personally came Estelita E. Tucker to me known who, by me duly sworn, did depose and say that she resides in Chicago, IL; that she is the Assistant Vice President of LaSalle National Trust, N.A., the banking institution described in and which executed the within Trust Fund Agreement; and that she signed her name thereto by authority of such banking institution.

Verita L Anderson
Notary Public

SCHEDULE A

EPA identification number:	ALD 008161176
Facility:	Akzo Nobel Chemicals Inc., Lemoyne Facility Highway 43 North Axis, Alabama 36505
Closure Cost:	$663,888.00
Post-Closure Cost:	$1,331,795.00

SCHEDULE B

STANDBY TRUST FUND = $ 0.00

DEN DANSKE BANK

New York Branch
280 Park Avenue
4th Floor - East Building
New York, NY 10017-1216
Telephone No. (212) 984-8400

Telex 216783 DDBNY
Telefax (212) 370-9239
S.W.I.F.T. DABAUS 33

Irrevocable Standby Letter of Credit No. 5605-96NY

Director
Alabama Department of Environmental Management
381 State Office Building
Montgomery, Alabama 36130

January 1, 1997

Dear Sir:

We hereby establish our Irrevocable Standby Letter of Credit No. 5605-96NY in your favor, at the request and for the account of Akzo Nobel Chemicals Inc., Highway 43 North, Axis, Alabama 36505, up to the aggregate amount of $1,995,683.00 (One Million Nine Hundred Ninety Five Thousand Six Hundred Eighty Three and 00/100 United States Dollars), available upon presentation of:

(1) your sight draft, bearing reference to this letter of credit No. 5605-96NY, and

(2) your signed statement reading as follows:

"I certify that the amount of the draft is payable pursuant to regulations issued under authority of the Alabama Hazardous Wastes Management Act of 1978, as amended."

This letter of credit is effective as of January 1, 1997, and shall expire on December 31, 1997, but such expiration date shall be automatically extended for a period of one year on December 31, 1997, and on each successive expiration date, unless, at least 120 days before the current expiration date, we notify both you and Akzo Nobel Chemicals Inc. by certified mail that we have decided not to extend this letter of credit beyond the current expiration date. In the event you are so notified, any unused portion of the credit shall be available upon presentation of your sight draft for 120 days after the date of receipt by both you and Akzo Nobel Chemicals, Inc., as shown on the signed return receipts.

Whenever this letter of credit is drawn on under and in compliance with the terms of this credit, we shall duly honor such draft upon presentation to us, and we shall deposit the amount of the draft directly into the standby trust fund of Akzo Nobel Chemicals Inc. in accordance with your instructions.

We certify that the wording of this letter of credit is identical to the wording specified in ADEM Administrative Code subparagraph 335-14-5-.08(12)(d) as such rules were constituted on the date shown immediately below.

This credit is subject to Uniform Customs and Practice for Documentary Credits (1993 Revision), International Chamber of Commerce Publication No. 500.

Sincerely yours,

DEN DANSKE BANK

John O'Neill
Vice President

Mogens Søndergaard
Vice President

Den Danske Bank Aktieselskab
Incorporated in Denmark
Reg. No. 28.472 Copenhagen

i:\dat\us\ms\akzo14.slc

(R-10/23/2024)

Appendix A-7

Historical Groundwater Monitoring Reports NBMP, AOC A, and AOC M (Included on USB Flash Drive Accompanying the Application)

Functional Chemicals
Sulfur Derivatives

13440 Highway 43 N
Axis, Alabama 36505

Tel. (251) 675-1310
Fax (251) 679-4368

AkzoNobel
Tomorrow's Answers Today

January 28, 2015

Mr. Phillip D. Davis
Chief Land Division
Alabama Department of Environmental Management
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Mr. Davis,

Please find enclosed copies of the 2014A and 2014B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.71 to 2.51 ft/day during the 2014A event and 1.77 to 2.59 ft/day for the 2014B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315

Sincerely

Sylvia Williams

Senior Environmental Engineer

CC: Keith West, ADEM Land Division
Federal Express Tracking Number: 870680454106

AkzoNobel
Tomorrow's Answers Today

January 28, 2015

Chief, South Programs Section
RCRA Programs Branch
Waste Management Division
USEPA, Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104
Telephone: (404) 562-8174

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Chief,

Please find enclosed copies of the 2014A and 2014B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.71 to 2.51 ft/day during the 2014A event and 1.77 to 2.59 ft/day for the 2014B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315

Sincerely

Sylvia Williams

Senior Environmental Engineer

Federal Express Tracking Number: 870680454091

Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL NUMBER	GRADIENT	Well Data May 2014 1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL NUMBER	GRADIENT	Well Data May 2014 1	2	3	4	AVG.	Comparison Data AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III
GROUNDWATER LEVEL DETERMINATION
May, 2014

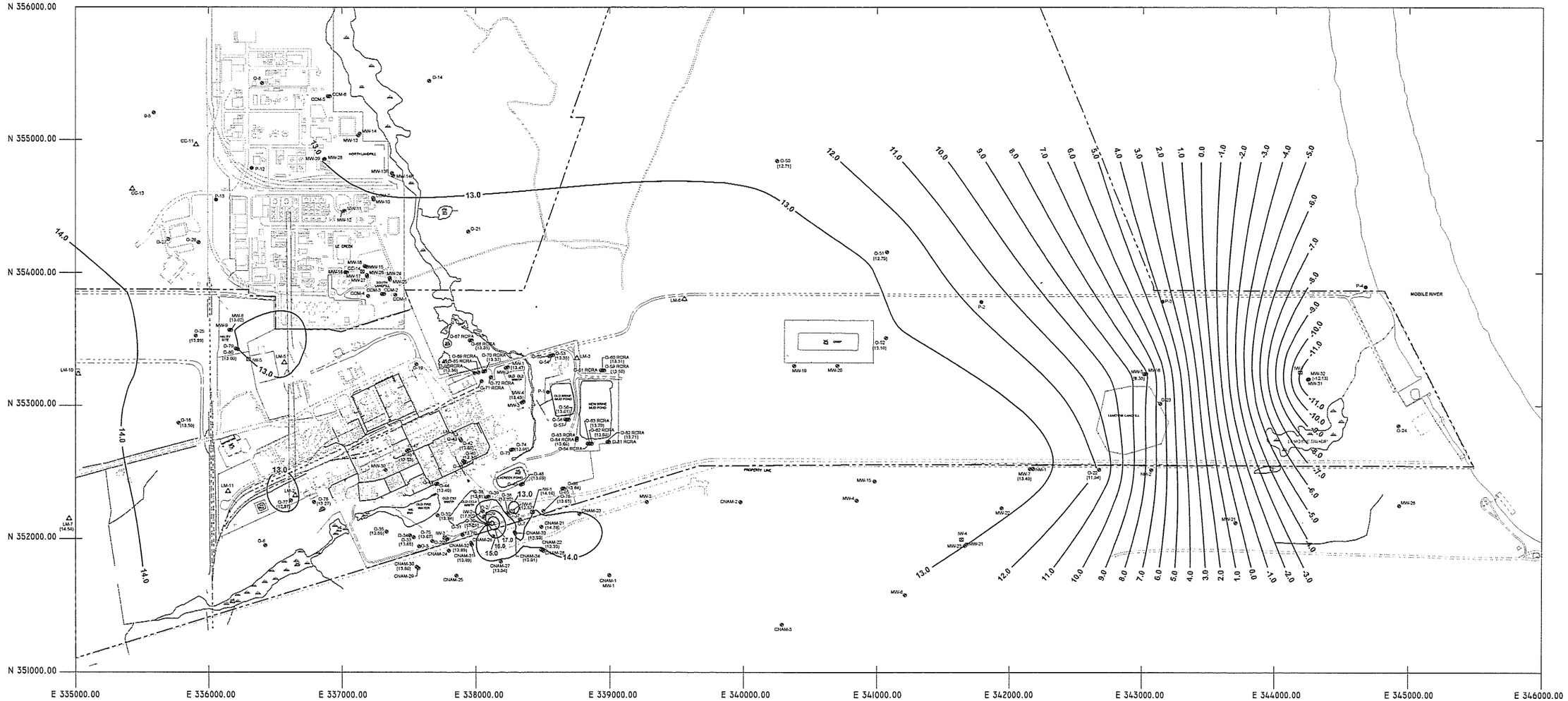
Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	24.44	13.69	119.7	
060	37.78	24.05	13.73	95.28	
061	37.79	24.05	13.74	70.06	
062	35.04	21.80	13.24	116.6	
063	35.27	21.38	13.89	92.27	
064	34.86	20.94	13.92	77.61	
067					Water Elevation Only
068					Water Elevation Only
081	35.56	21.55	14.01	68	
082	35.52	21.65	13.87	122.22	
083	36.02	21.84	14.18	67.89	
084	36.31	22.55	13.76	117.97	

TABLE IV
Groundwater Flow Velocity

2012A

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	2.64	0.509	1.81	2.49
Mid	060 to 063	519.00	2.67	0.514	1.83	2.52
Shallow	061 to 064	519.00	3.11	0.599	2.14	2.94
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.21	0.416	1.48	2.04
Deep	059 to 082	519.00	2.79	0.538	1.92	2.64
Deep	059 to 084	556.00	1.89	0.340	1.21	1.67
		AVG	**2.51**	**0.48**	**1.71**	**2.35**

Direction of groundwater flow is South
Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity
38882
Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- 10.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (12.52) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET

APPROXIMATE SCALE IN FEET

N

W E

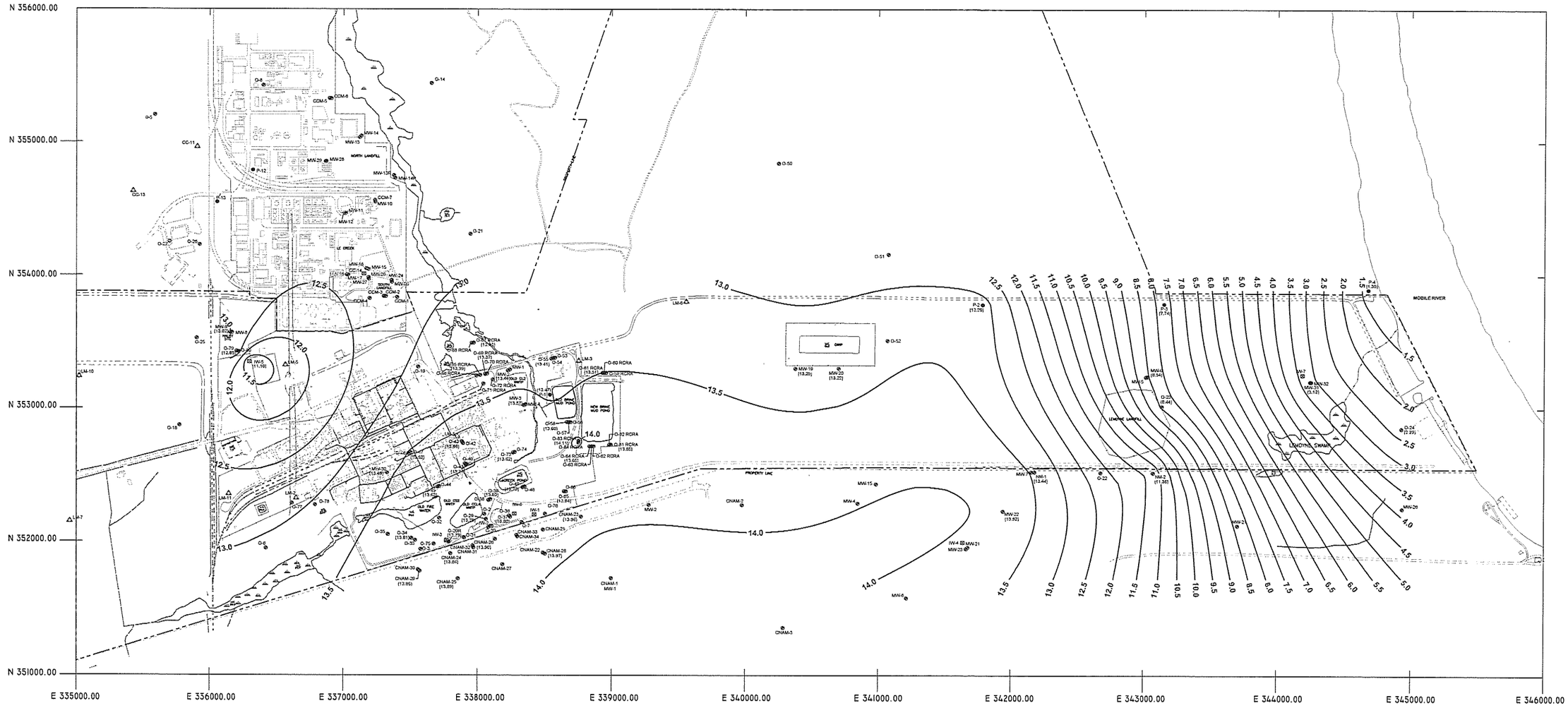
S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File:PCM-052714-DEEP.DWG Date: 06/17/2014

GROUNDWATER ELEVATION MAP
DEEP ZONE
27 MAY 2014

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (13.20) — GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET

APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: PCM-052714-SHALLOW.DWG Date:06/17/2014

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
27 MAY 2014

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL		Well Data November 2014				
NUMBER	GRADIENT	1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL		Well Data November 2014					Comparison Data		
NUMBER	GRADIENT	1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III

GROUNDWATER LEVEL DETERMINATION

Elevations taken November ,2014 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	26.94	11.19	119.87	
060	37.78	26.58	11.20	95.25	
061	37.79	26.58	11.21	70.18	
062	35.04	23.69	11.35	116.64	
063	35.27	23.92	11.35	92.22	
064	34.86	23.48	11.38	77.25	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	23.97	11.59	68.07	
082	35.52	24.11	11.41	117.59	
083	36.02	24.37	11.65	67.91	
084	36.31	25.07	11.24	118.20	

TABLE IV

Groundwater Flow Velocity

2012B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.25	0.626	2.23	3.07
Mid	060 to 063	519.00	2.66	0.513	1.83	2.51
Shallow	061 to 064	519.00	3.10	0.597	2.13	2.93
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.21	0.416	1.48	2.04
Deep	059 to 082	519.00	2.83	0.545	1.94	2.67
Deep	059 to 084	556.00	1.87	0.336	1.20	1.65
		AVG	**2.59**	**0.50**	**1.77**	**2.43**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

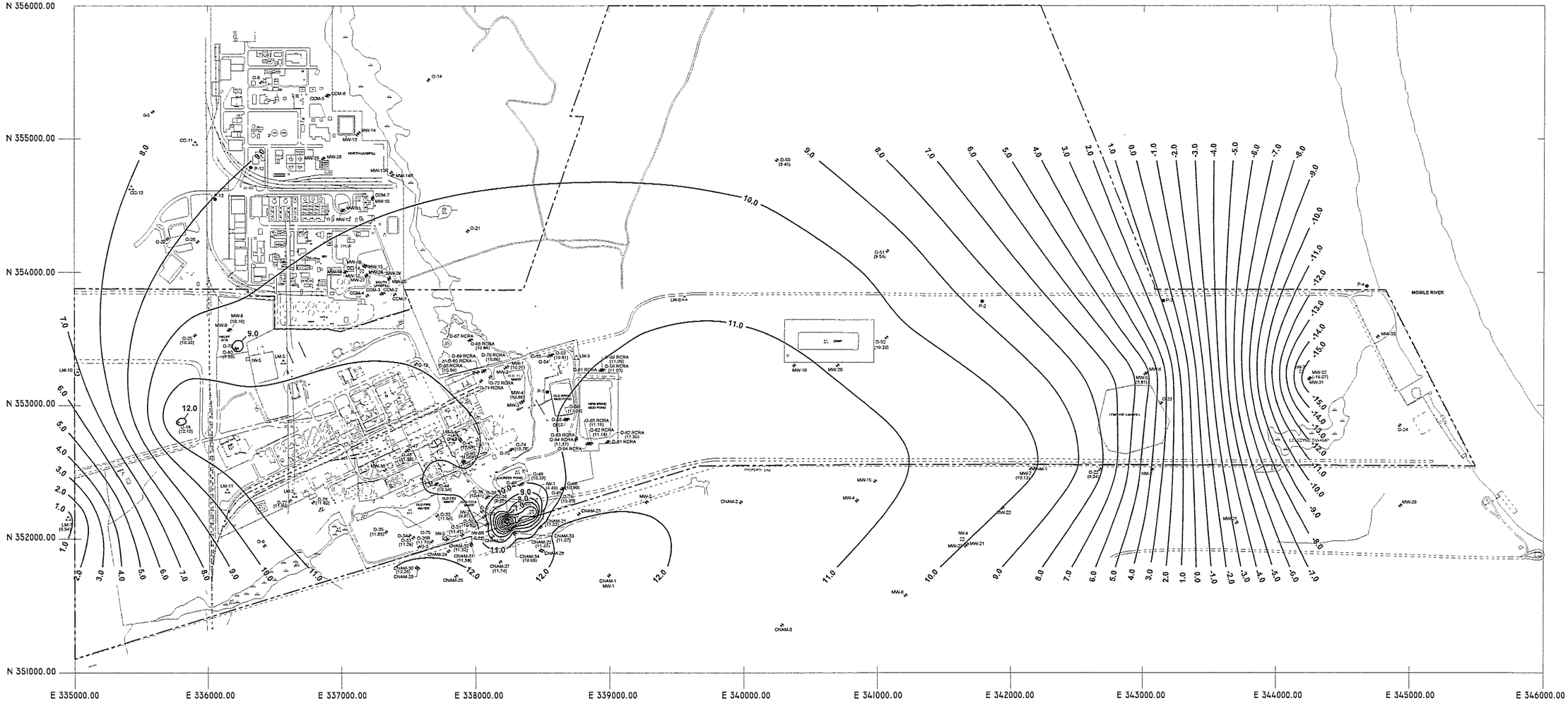
38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifier

DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.13	0.01	0.00	0.07	0.13	0.04	0.02	0.00	0.00	0.00	*	0.00
2	0.61	0.22	0.01	0.08	0.01	0.04	0.01	0.00	0.06	0.39	0.00	0.00
3	0.10	0.01	0.03	0.09	0.00	0.02	0.01	0.00	0.00	0.42	0.00	0.00
4	0.00	0.22	0.13	0.16	0.00	0.01	0.00	0.00	0.62	0.00	0.00	0.00
5	0.02	0.04	0.01	0.17	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.08
6	0.00	0.02	0.25	0.35	0.00	0.01	0.00	0.22	0.00	0.00	0.00	0.25
7	0.00	0.11	0.00	1.04	0.00	0.01	0.00	0.00	1.16	0.00	0.00	0.00
8	0.00	0.00	0.00	0.07	0.00	0.01	0.00	0.96	0.01	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	1.22	0.02	1.08	0.14	0.01	0.00	0.00	0.00
10	0.29	0.26	0.00	0.00	0.34	0.02	0.34	0.00	0.01	0.00	0.00	0.00
11	0.51	0.63	0.09	0.00	0.16	0.03	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.69	0.00	0.00	0.06	0.05	0.16	0.26	0.00	0.00	0.00	0.00
13	0.42	0.19	0.00	0.00	0.06	0.04	0.01	0.00	0.00	0.49	0.10	0.00
14	0.00	0.08	0.00	2.15	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.74	0.02	0.09	0.02	0.12	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	2.12	0.00	0.03	0.02	0.00	0.00	0.82	0.00	0.53	0.00
17	0.00	0.00	0.02	0.69	0.02	0.01	0.01	0.56	0.12	0.00	0.04	0.00
18	0.80	0.03	0.00	0.16	0.02	0.02	0.84	0.00	0.11	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.07	0.01	0.91	0.04	0.09	0.00	0.00	1.12
20	0.00	1.69	0.00	0.00	0.04	0.04	0.15	0.00	0.00	0.00	0.00	0.02
21	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.18	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.01	0.38
23	0.00	0.67	0.25	0.00	0.01	0.05	0.00	0.00	0.00	0.00	0.17	1.12
24	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	0.00
25	0.00	0.90	0.00	0.00	0.00	0.01	0.36	0.00	0.00	0.00	0.00	0.00
26	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
27	0.24	0.00	0.69	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	1.56
28	0.00	0.00	0.69	1.77	0.75	0.02	0.00	0.00	0.16	*	0.00	0.04
29	0.00		0.65	1.65	0.09	0.02	0.00	0.00	0.02	*	0.00	0.01
30	0.17		0.14	0.54	0.05	0.02	0.00	0.00	0.00	*	0.00	0.00
31	0.04		0.14		0.03		0.00	0.00		*	0.00	0.00
Total	3.33	5.97	5.96	9.01	3.31	0.78	4.05	2.18	3.19	1.30	0.85	4.58
Tot for year		44.51										

* guage did not record, but no rain. PO power outtage

^ guage was not legible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PROPERTY LINE
NORTH LANDFILL
SOUTH LANDFILL
OLD FIRE PIT
OLD PITCH MIX POND
NEW BRINE MUD POND
OLD CO2 MIXER
OLD FIRE PIT
CHAM-1
CHAM-2
CHAM-3
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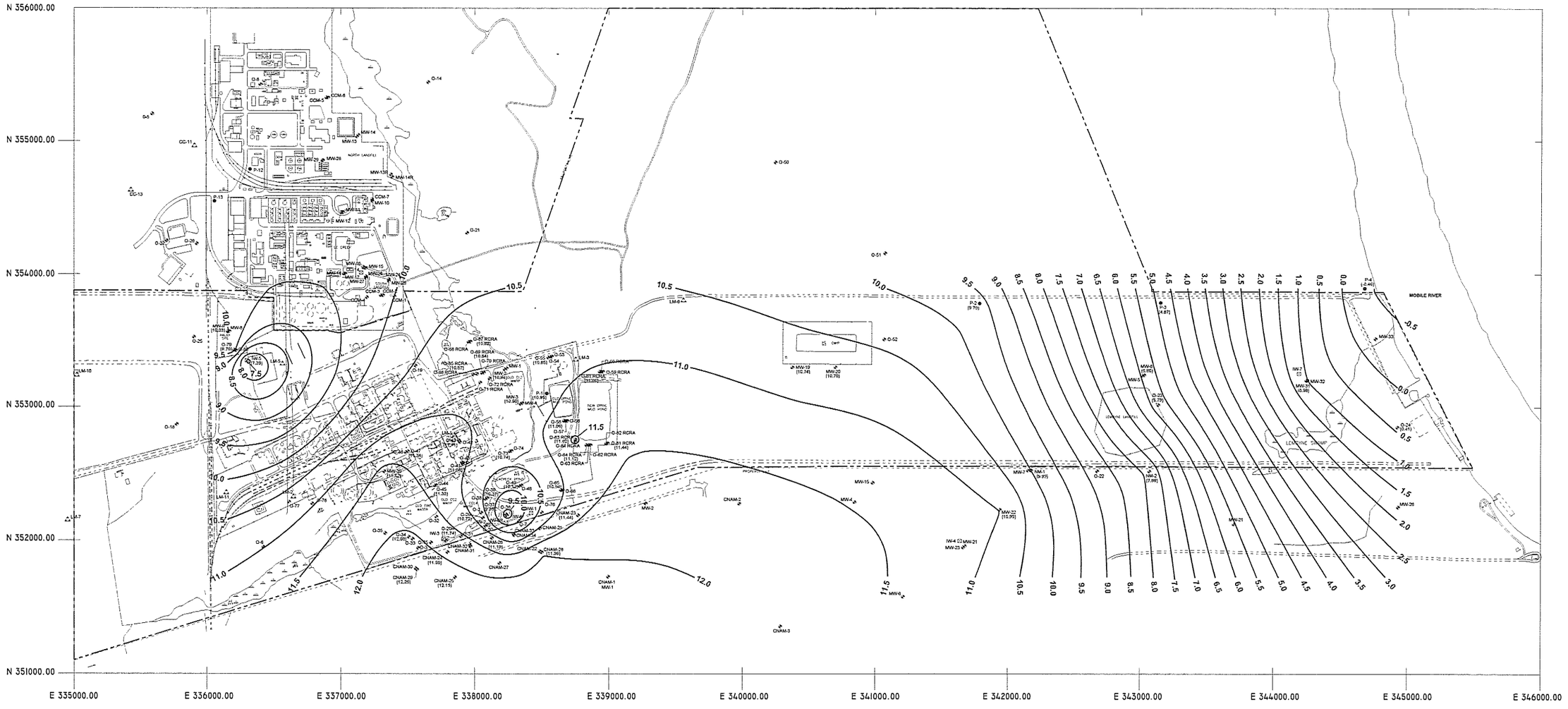

LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.44) — GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET

APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: Nov2014-GW-SHALLOW.dwg Date:11/20/2014

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
03 NOVEMBER 2014

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

Sulfur Derivatives 13440 Highway 43 N Tel: (251)675-1310
Axis, Al 36505 Fax: (251) 679-4368

AkzoNobel

January 27, 2016

Mr. Phillip D. Davis
Chief Land Division
Alabama Department of Environmental Management
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Mr. Davis,

Please find enclosed copies of the 2015A and 2015B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.58 to 2.31 ft/day during the 2015A event and 1.74 to 2.55 ft/day for the 2015B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315

Sincerely

Sylvia Williams

Senior Environmental Engineer

CC: Austin Pierce , ADEM Land Division—Via E-Mail

Federal Express Tracking Number: 870680454323

Sulfur Derivatives 13440 Highway 43 N Tel (251) 675-1310
Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

January 27,2016

Chief, South Programs Section
RCRA Programs Branch
Waste Management Division
USEPA, Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104
Telephone: (404) 562-8174

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

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Please find enclosed copies of the 2015A and 2015B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

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Sincerely

Sylvia Williams

Senior Environmental Engineer

Federal Express Tracking Number: 870680454334

Bcc: Brian Love
Terry Bassett

Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL		Well Data November 2015				
NUMBER	GRADIENT	1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL		Well Data November 2015					Comparison Data		
NUMBER	GRADIENT	1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III

GROUNDWATER LEVEL DETERMINATION

Elevations taken November ,2015 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	28.00	10.13	119.71	
060	37.78	27.64	10.14	95.3	
061	37.79	27.64	10.15	70.28	
062	35.04	24.81	10.23	116.7	
063	35.27	25.04	10.23	92.19	
064	34.86	24.59	10.27	77.19	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	25.15	10.41	68	
082	35.52	25.20	10.32	117.7	
083	36.02	25.50	10.52	67.93	
084	36.31	26.13	10.18	118.10	

TABLE IV

Groundwater Flow Velocity

2015B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.19	0.615	2.19	3.01
Mid	060 to 063	519.00	2.60	0.501	1.79	2.46
Shallow	061 to 064	519.00	3.05	0.588	2.10	2.88
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.14	0.403	1.44	1.98
Deep	059 to 082	519.00	2.80	0.539	1.92	2.64
Deep	059 to 084	556.00	1.87	0.336	1.20	1.65
		AVG	**2.55**	**0.49**	**1.74**	**2.39**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifier

Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL		Well Data May 2015				
NUMBER	GRADIENT	1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL		Well Data May 2015					Comparison Data		
NUMBER	GRADIENT	1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III
GROUNDWATER LEVEL DETERMINATION
May, 2015

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	27.05	11.08	119.7	
060	37.78	26.69	11.09	95.25	
061	37.79	26.69	11.10	70.06	
062	35.04	24.10	10.94	116.68	
063	35.27	24.65	10.62	92.07	
064	34.86	23.89	10.97	77.15	
067					Water Elevation Only
068					Water Elevation Only
081	35.56	24.40	11.16	67.94	
082	35.52	24.55	10.97	117.65	
083	36.02	24.62	11.40	67.87	
084	36.31	25.44	10.87	118.00	

TABLE IV
Groundwater Flow Velocity

2015A

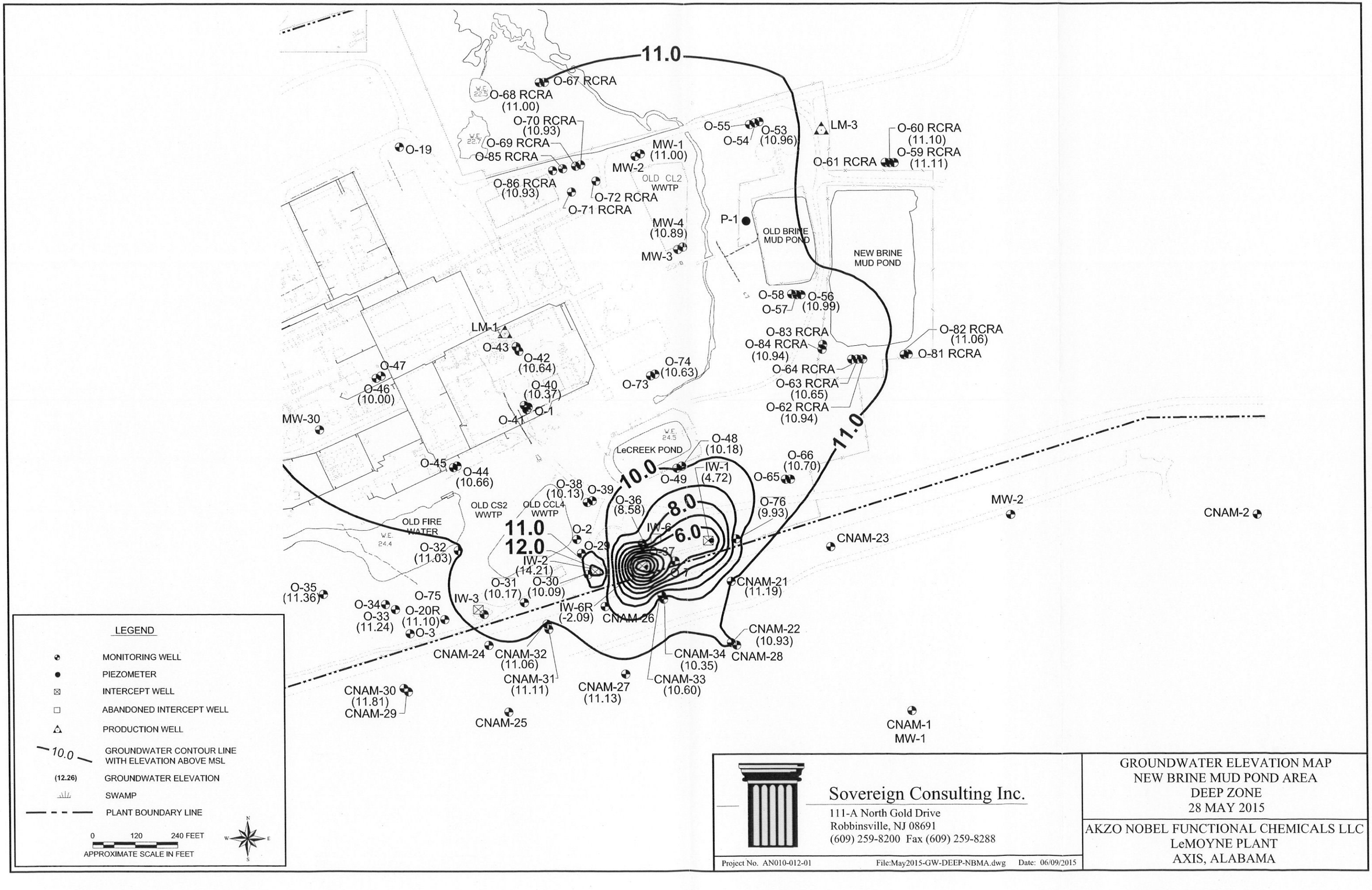
Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	2.95	0.568	2.03	2.79
Mid	060 to 063	519.00	2.04	0.393	1.40	1.93
Shallow	061 to 064	519.00	2.80	0.539	1.92	2.64
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.07	0.390	1.39	1.91
Deep	059 to 082	519.00	2.50	0.482	1.72	2.36
Deep	059 to 084	556.00	1.61	0.290	1.03	1.42
		AVG	**2.31**	**0.44**	**1.58**	**2.17**

Direction of groundwater flow is South
Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity
38882
Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifier

DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.00	0.27	0.10	0.00	0.00	0.72	0.04	0.00	0.00	0.00	1.27	0.00
2	0.01	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
3	0.96	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
4	0.01	0.40	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.01	*	0.00	0.00	0.07	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.01	*	0.00	0.01	0.00	0.06	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	*	0.00	0.00	0.00	0.00	0.00	0.97	0.00
8	0.00	0.00	0.00	0.00	*	0.24	0.00	3.85	0.18	0.00	0.27	0.00
9	0.01	0.00	0.59	0.00	0.00	0.81	0.01	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.87	4.88	0.00	0.00	0.14	0.00	0.05	0.00	0.00	0.00
11	0.00	0.00	0.00	0.04	0.00	0.05	0.13	0.00	0.35	0.00	0.00	0.00
12	0.00	0.00	0.04	1.32	0.00	0.07	0.00	0.00	0.00	0.00	0.01	0.00
13	0.00	0.00	0.43	0.36	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.65
14	0.18	0.00	0.00	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.52	0.00	0.00	0.03	4.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.33	0.00	0.10	2.30	0.00	0.37	0.81	0.00	0.00	0.00	0.97
17	0.00	0.00	0.00	0.25	0.11	0.00	0.79	0.98	0.00	0.00	0.21	0.00
18	0.00	0.00	0.01	0.08	0.01	0.00	0.00	0.15	0.00	0.00	1.79	0.00
19	0.00	0.00	0.01	0.00	0.00	0.00	0.29	1.97	0.00	0.00	0.00	0.00
20	0.00	0.01	0.00	0.00	0.13	0.00	0.31	0.06	0.00	0.00	0.00	0.00
21	0.00	0.00	0.23	0.00	0.03	0.00	0.07	0.00	1.19	0.00	0.00	1.78
22	1.96	0.21	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.10
23	0.09	0.06	0.01	0.00	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.12
24	0.00	0.02	0.00	1.09	0.31	0.31	0.23	0.00	0.00	0.00	0.00	0.08
25	0.00	0.52	0.00	0.56	3.62	0.00	0.00	0.00	0.00	2.09	0.00	0.07
26	0.00	0.00	0.01	0.00	1.05	0.12	0.00	0.00	0.00	2.97	0.00	0.06
27	0.00	0.00	0.00	0.23	0.17	0.13	0.00	0.00	1.84	0.15	0.00	0.06
28	0.00	0.00	0.00	0.22	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.04
29	0.00		0.00		0.00	0.64	0.78	0.00	0.04	0.00	0.00	0.05
30	0.00		0.00		0.00	0.51	0.17	0.00	0.00	0.00	0.00	0.03
31	0.04		0.00		0.11		0.00	0.00		0.63		0.03
Total	3.78	1.82	2.62	10.83	11.99	4.42	3.38	7.89	3.71	5.84	4.53	6.04
Tot for year		66.85										

* gauge did not record, but no rain. PO power outtage

^ gauge was not legible

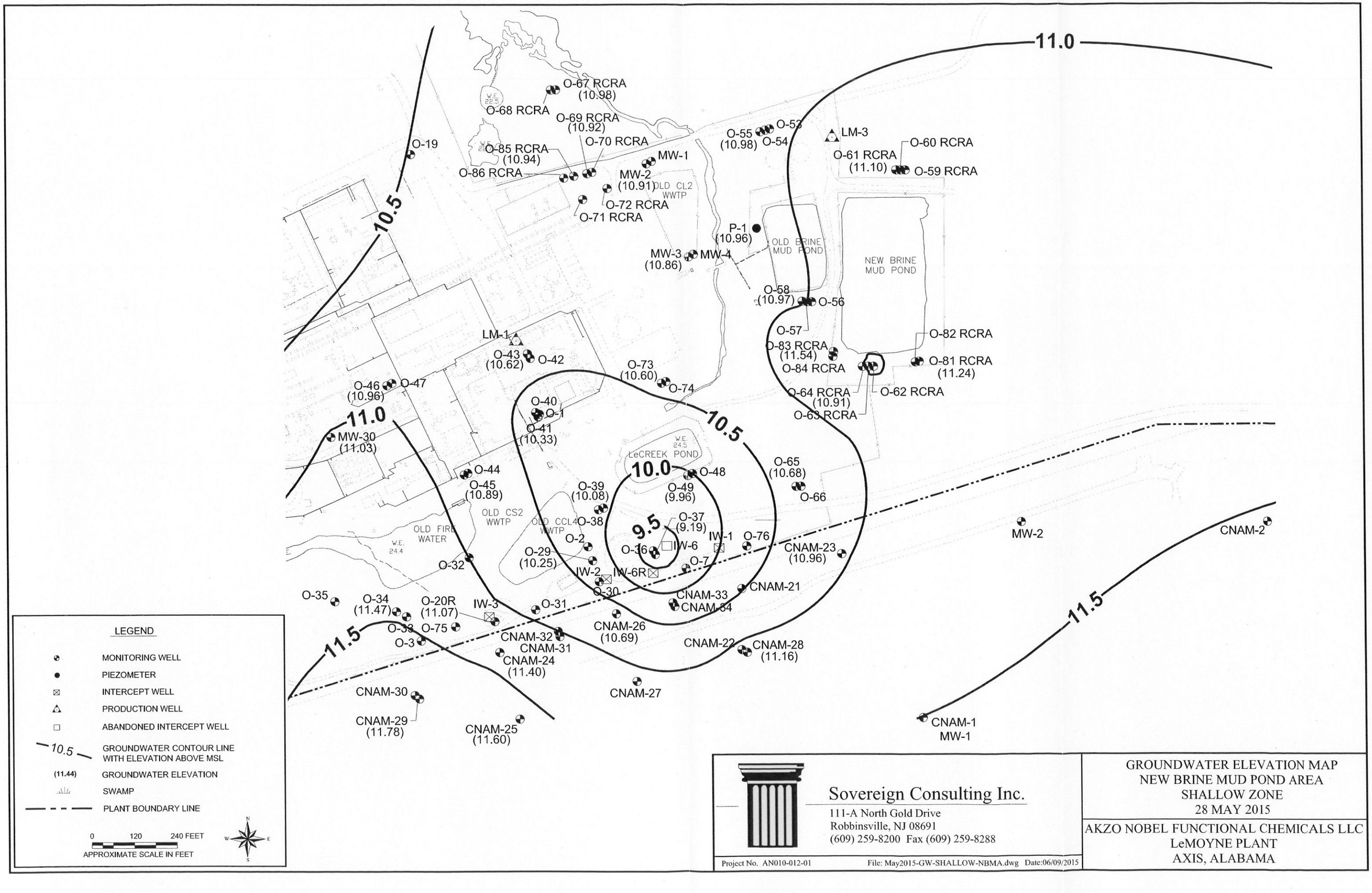


Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File:May2015-GW-DEEP-NBMA.dwg Date: 06/09/2015

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
28 MAY 2015

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



Sovereign Consulting Inc.
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(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: May2015-GW-SHALLOW-NBMA.dwg Date:06/09/2015

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
28 MAY 2015

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
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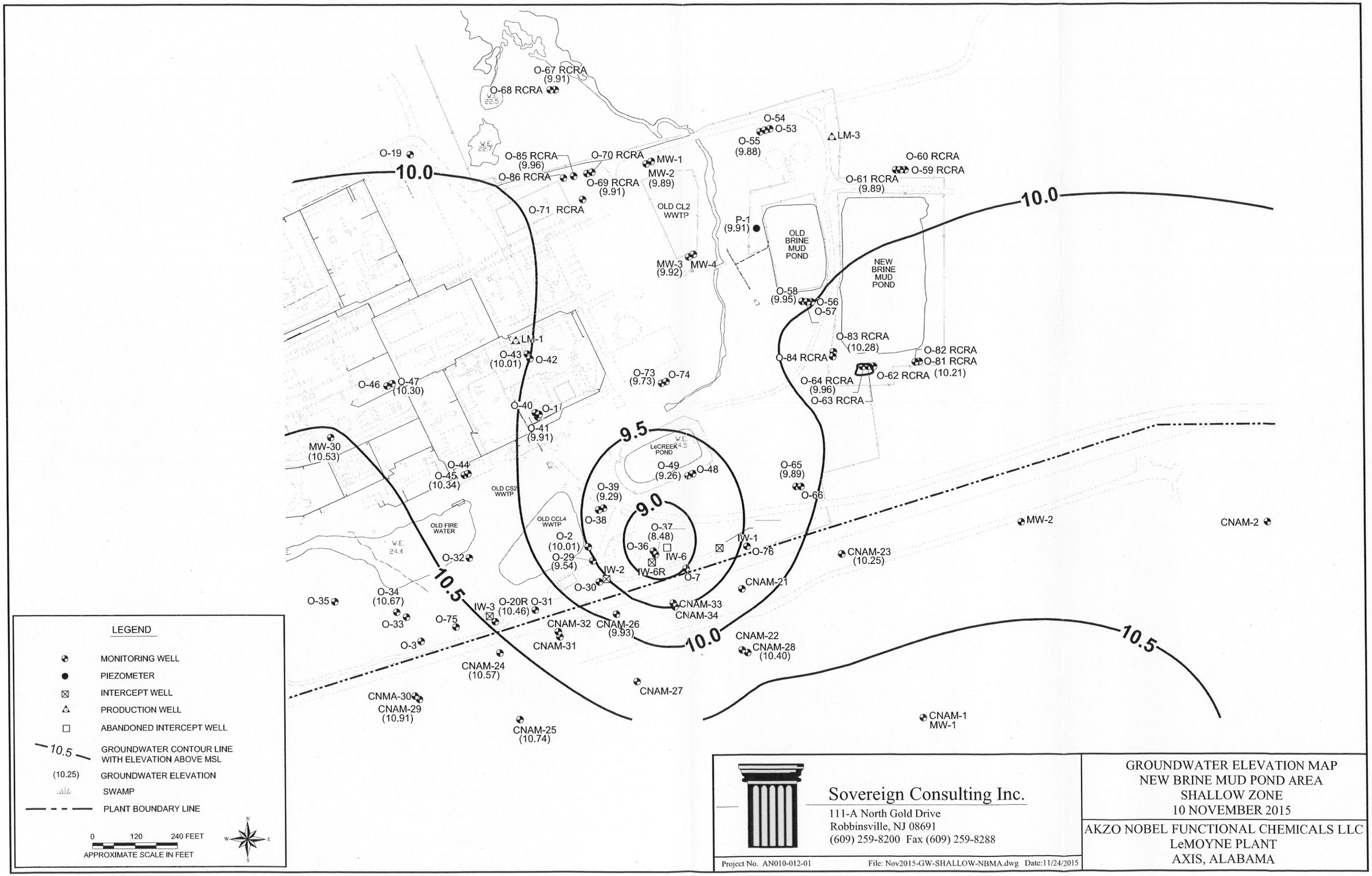
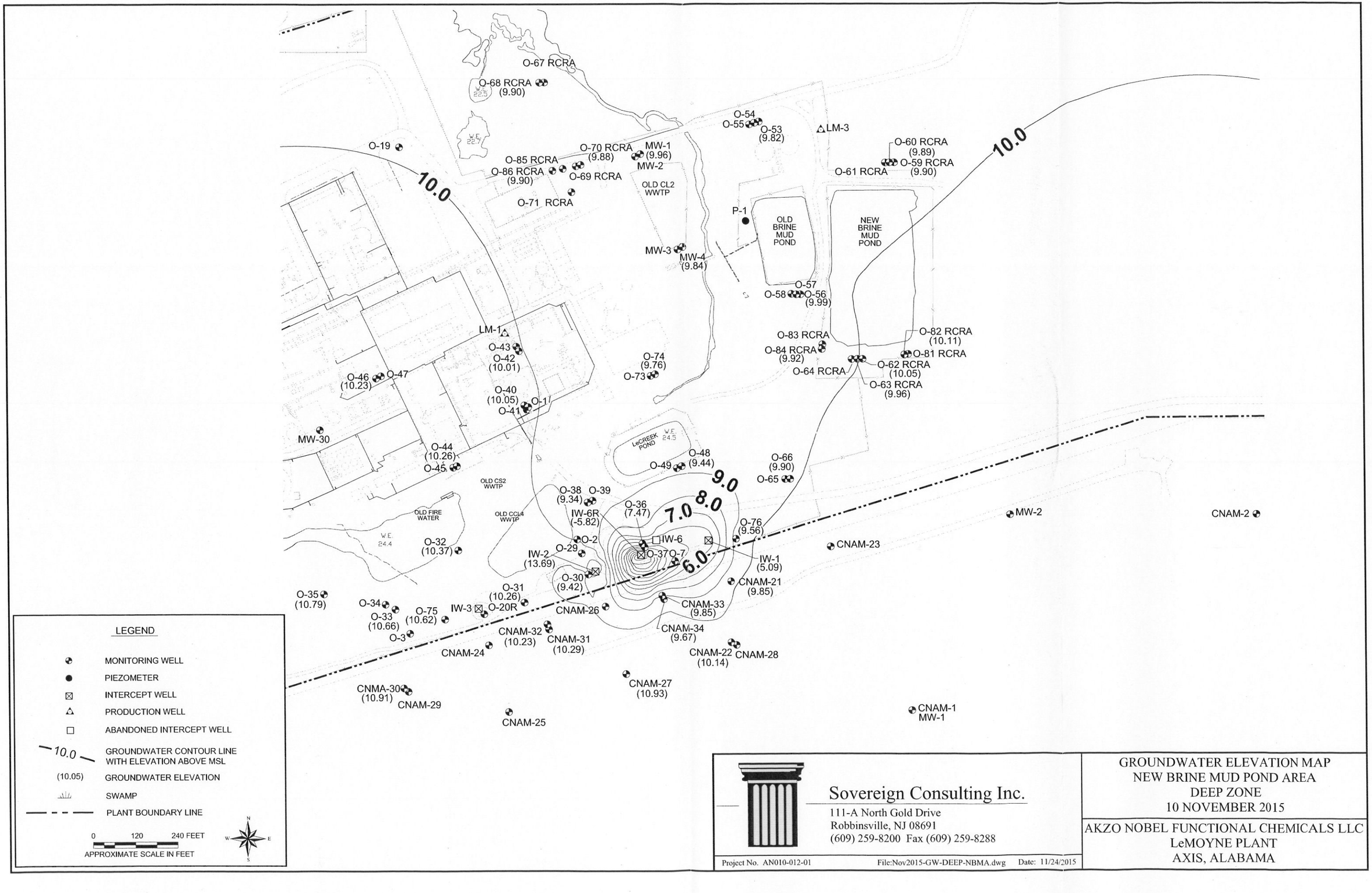


Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: Nov2015-GW-SHALLOW-NBMA.dwg Date:11/24/2015

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
10 NOVEMBER 2015

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
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- ABANDONED INTERCEPT WELL
- 10.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (10.05) — GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File:Nov2015-GW-DEEP-NBMA.dwg Date: 11/24/2015

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
10 NOVEMBER 2015

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

Sulfur Derivatives 13440 Highway 43 N Tel (251) 675-1310
Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

February 7, 2017

Mr. Phillip D. Davis
Chief Land Division
Alabama Department of Environmental Management
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

Re: Corrected ADEM Cover letter for Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Mr. Davis,

Please replace the cover letter dated December 21, 2016 with this cover letter. The information for the groundwater flow was not properly updated on the original ADEM copy. The information on the EPA version of the cover was correct and agrees with the attachments provided on December 21, 2016.

Find enclosed copies of the 2016A and 2016B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.65 to 2.27 ft/day during the 2016A event and 1.64 to 2.25 ft/day for the 2016B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315.

Sincerely

Sylvia Williams

Sulfur Derivatives 13440 Highway 43 N Tel (251) 675-1310
Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

December 21, 2016

Chief, South Programs Section
RCRA Programs Branch
Waste Management Division
USEPA, Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104
Telephone: (404) 562-8174

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Chief,

Please find enclosed copies of the 2016A and 2016B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.65 to 2.27 ft/day during the 2016A event and 1.64 to 2.25 ft/day for the 2016B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315

Sincerely

Sylvia Williams

Senior Environmental Engineer

Federal Express Tracking Number: 870680454389

Sulfur Derivatives 13440 Highway 43 N Tel (251) 675-1310
Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

B. Love Via e-mail, Lisa Krogman, J. Naron, T. Bassett

Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL		Well Data May 2016				
NUMBER	GRADIENT	1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL		Well Data May 2016					Comparison Data		
NUMBER	GRADIENT	1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III
GROUNDWATER LEVEL DETERMINATION
May, 2016

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	25.19	12.94	119.7	
060	37.78	24.83	12.95	95.25	
061	37.79	24.83	12.96	70.1	
062	35.04	22.05	12.99	116.68	
063	35.27	22.26	13.01	92.07	
064	34.86	21.82	13.04	77.15	
067					Water Elevation Only
068					Water Elevation Only
081	35.56	22.34		67.94	
082	35.52	22.49	13.03	117.65	
083	36.02	22.45	13.57	67.87	
084	36.31	24.28	12.03	118.02	

TABLE IV
Groundwater Flow Velocity

2016A

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.14	0.605	2.16	2.97
Mid	060 to 063	519.00	2.57	0.495	1.77	2.43
Shallow	061 to 064	519.00	3.01	0.580	2.07	2.84
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.38	0.448	1.60	2.20
Deep	059 to 082	519.00	2.70	0.520	1.85	2.55
Deep	059 to 084	556.00	0.91	0.164	0.58	0.80
		AVG	**2.42**	**0.46**	**1.65**	**2.27**

Direction of groundwater flow is South
Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity
38882
Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

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Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL NUMBER	GRADIENT	Well Data November 2016 1	2	3	4	AVG.	Comparison Data AVG.	VAR.	VAR./N
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* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III

GROUNDWATER LEVEL DETERMINATION

Elevations taken November ,2016 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	27.03	11.10	119.7	
060	37.78	26.68	11.10	95.25	
061	37.79	26.64	11.15	70.1	
062	35.04	24.78	10.26	116.68	
063	35.27	24.00	11.27	92.07	
064	34.86	23.54	11.32	77.15	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	24.20	11.36	67.94	
082	35.52	24.27	11.25	117.65	
083	36.02	24.64	11.38	67.87	
084	36.31	25.20	11.11	118.02	

TABLE IV

Groundwater Flow Velocity

2016B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	2.25	0.434	1.55	2.13
Mid	060 to 063	519.00	2.68	0.516	1.84	2.53
Shallow	061 to 064	519.00	3.10	0.597	2.13	2.93
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.00	0.377	1.34	1.85
Deep	059 to 082	519.00	2.76	0.532	1.90	2.61
Deep	059 to 084	556.00	1.83	0.329	1.17	1.61
		AVG	**2.41**	**0.46**	**1.64**	**2.25**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

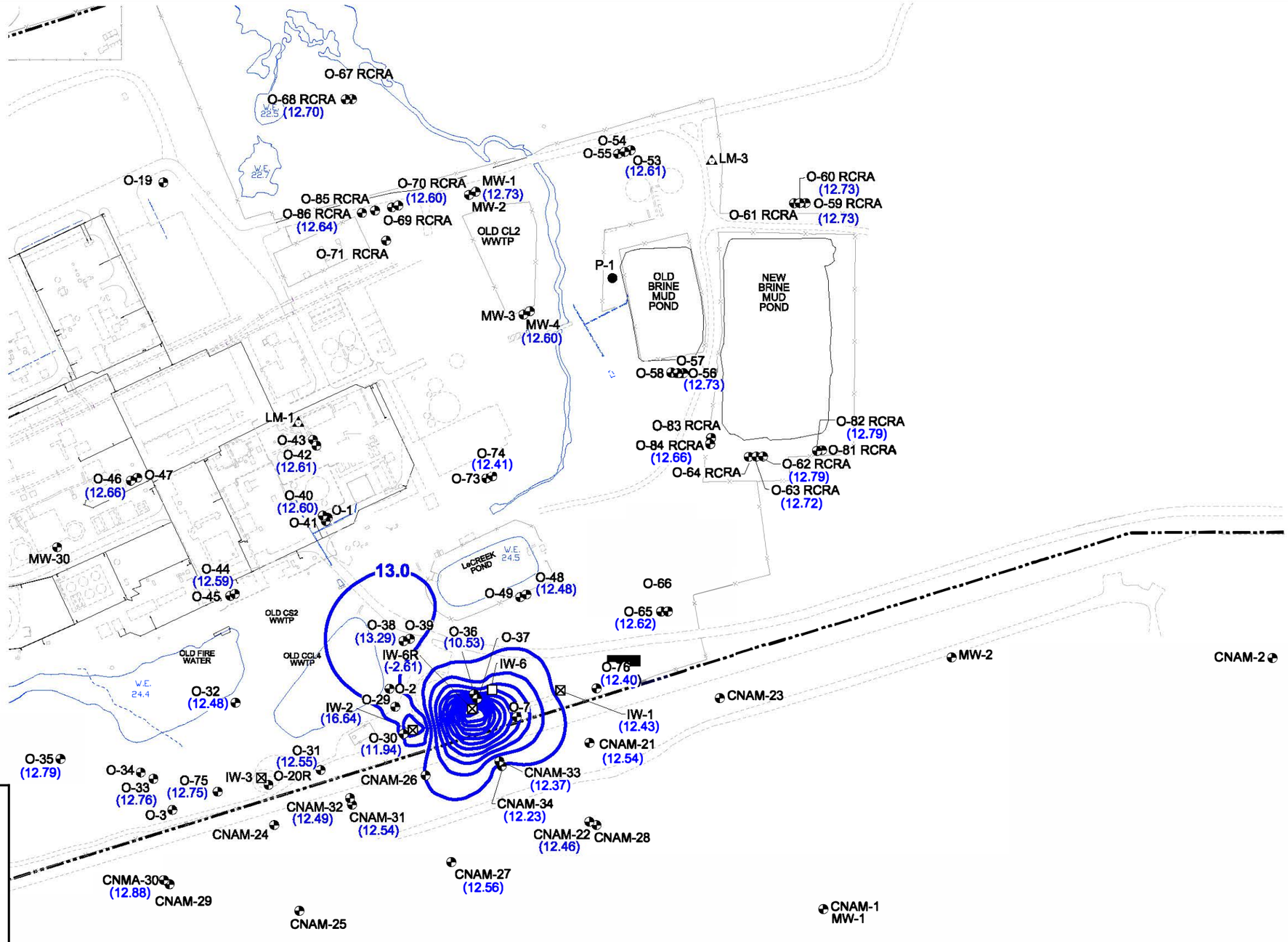
38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifier

DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.03	0.01	0.04	1.28	0.18	0.23	0.00	0.18	0.00	0.00	0.00	0.09
2	0.00	1.43	0.00	0.01	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.04
3	0 00	0.34	0.43	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.03
4	0.00	0.00	0.00	0.00	0.00	0.87	0.00	0.11	0.16	0.00	0.00	0.24
5	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.13
6	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.07
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
8	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.30	0.02
9	0.07	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.15	0.00	0.00	0.00	0.04	0.48	0.00	0.00	0.00	0.15
11	0.00	0.00	2.25	1.80	0.00	0.34	0.93	0.32	0.08	0.00	0.00	0.00
12	0.00	0.00	0.23	0.08	0.00	0.35	0.01	0.41	0.03	0.00	0.00	0.01
13	0.00	0. 00	0.00	0.79	0.00	0.04	0.44	0.37	0.00	0.00	0.00	1.26
14	1.31	0.00	0.00	0.00	0.00	1.16	0.00	0.00	0.00	0.00	0.00	0.00
15	0.52	1.32	0.00	0.00	0.00	0.00	0.53	0.86	0.00	0.00	0.00	0.01
16	0.00	0.00	0.00	0.00	0.00	0.26	0.05	0.00	0.05	0.00	0.00	0.00
17	0.00	0.00	3.00	0.00	0.63	0.33	0.48	0.00	0.06	0.00	0.00	0.01
18	0.00	0.00	0.53	0.00	0.00	0.00	0.59	0.12	1.23	0.00	0.00	1.33
19	0.00	0.00	0.00	0.00	0.92	0.15	0.00	0.00	0.00	0.00	0.00	
20	0.00	0.00	0.0	0.00	0.27	0.00	0.00	0.17	0.00	0.00	0.00	
21	1.74	0.00	0.00	0.11	0.00	0.00	0.00	0.08	0.00	0.00	0.00	
22	1.96	0.17	0.00	0.02	0.00	0.00	0.24	1.32	0.00	0.00	0.00	
23	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.00	0.00	1.87	0.00	0.00	0.00	0.46	0.15	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.47	0.00	0.00	
26	1.10	0.00	0.14	0.00	0.00	0.51	0.57	0.00	0.03	0.00	0.00	
27	0.01	0.00	0.40	0.30	0.00	0.09	0.20	0.00	0.01	0.00	0.00	
28	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.44	
29	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00	0.00	0.00	0.44	
30	0.00		0.00	0.67	0.00	0.00	1.34	0.00	0.00	0.00	0.21	
31	0.00		0.20		1.65		0.40	0.00		0.00		
Total	6.79	3.42	9.24	5.07	4.21	4.76	8.40	4.77	2.12	0.00	1.39	3.45
Tot for year		53.62										

* gauge did not record, but no rain. PO power outtage

^ gauge was not legible



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (10.05) — GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

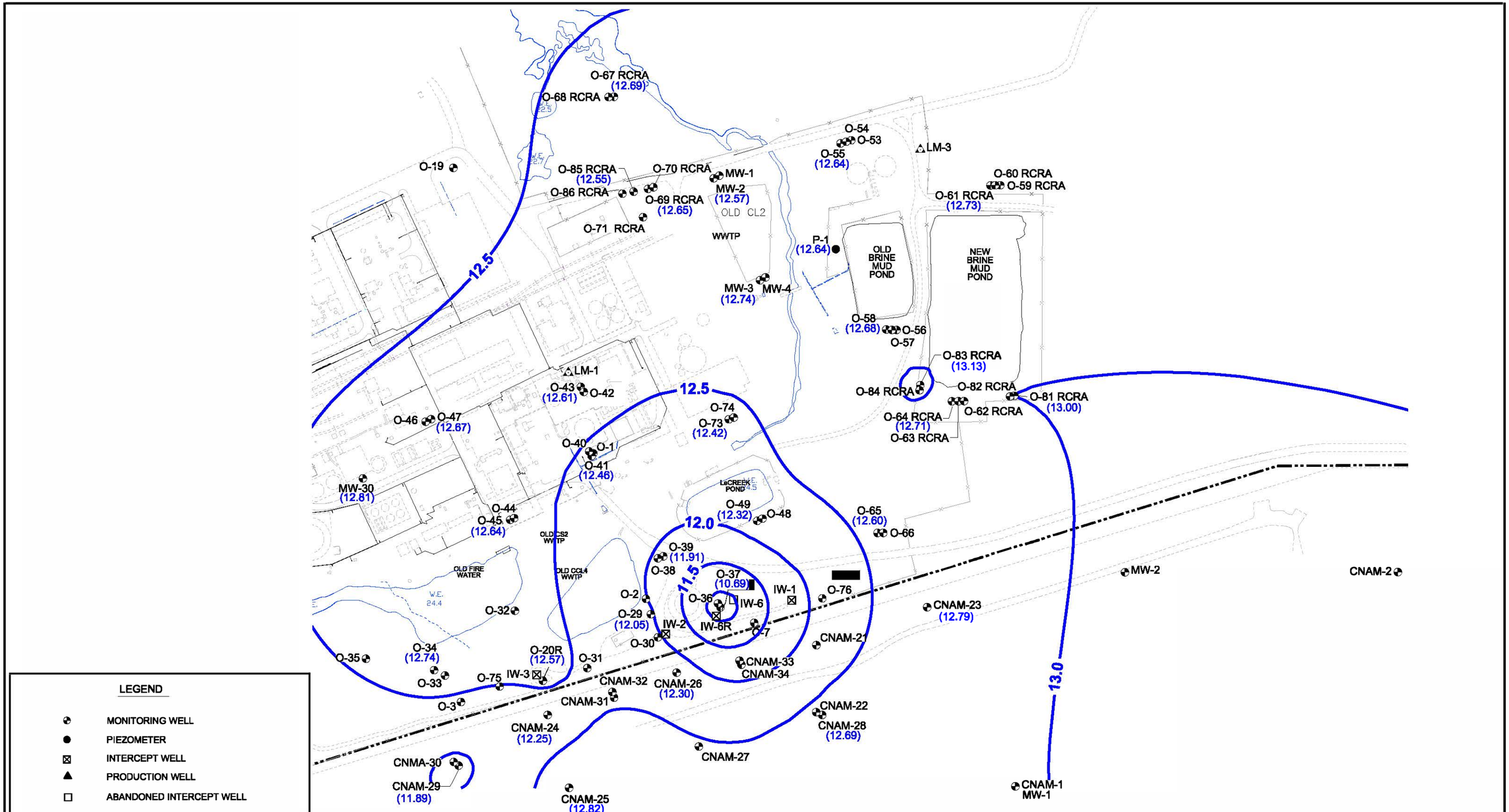
N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File:May2016-GW-DEEP-NBMA.dwg Date: 05/11/2016

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
3 MAY 2016

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (10.25) — GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

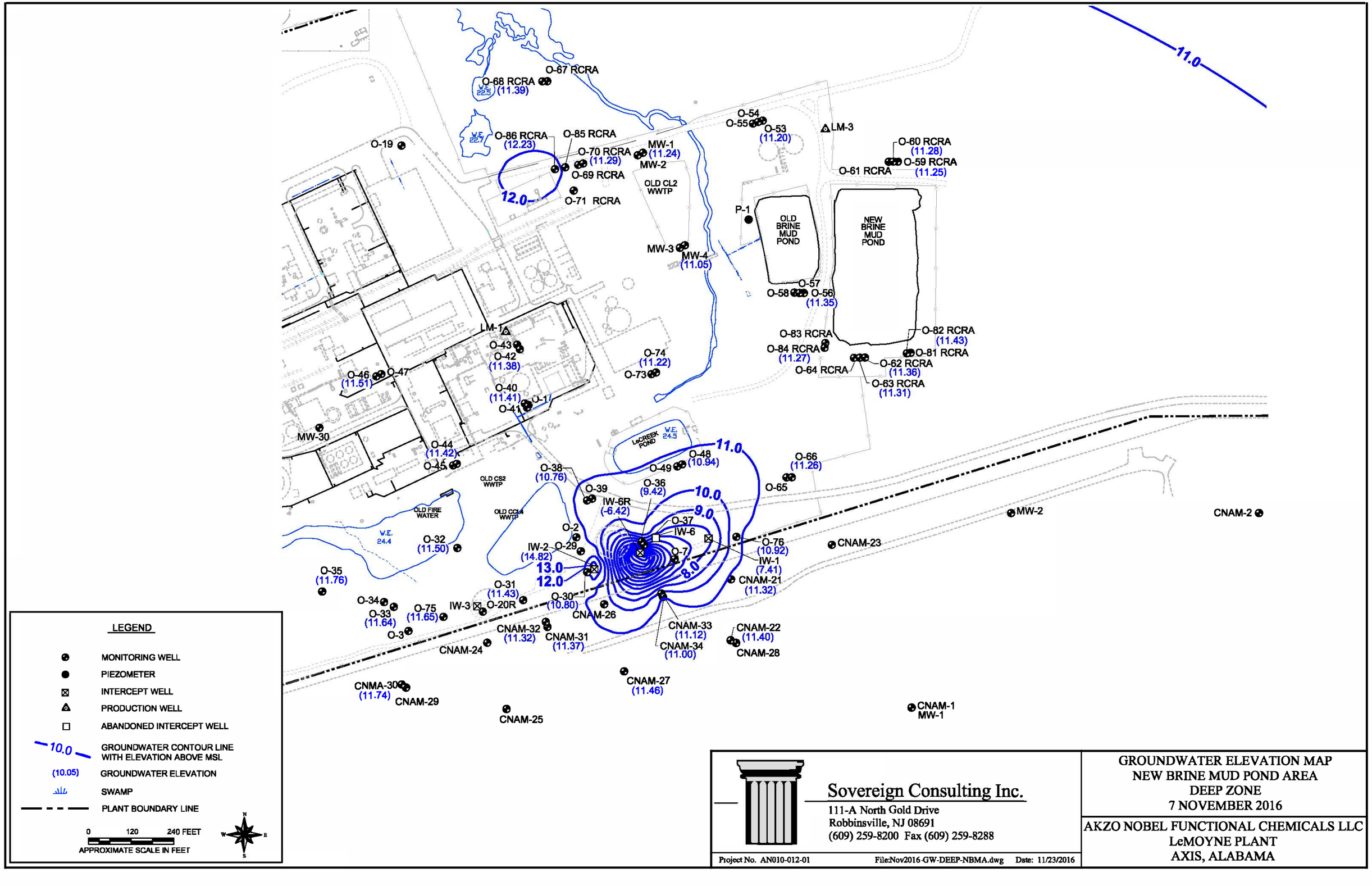
N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: May2016-GW-SHALLOW-NBMA.dwg Date:05/11/2016

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
3 MAY 2016

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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0 120 240 FEET
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N W E S

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(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File:Nov2016-GW-DEEP-NBMA.dwg Date: 11/23/2016

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
7 NOVEMBER 2016

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
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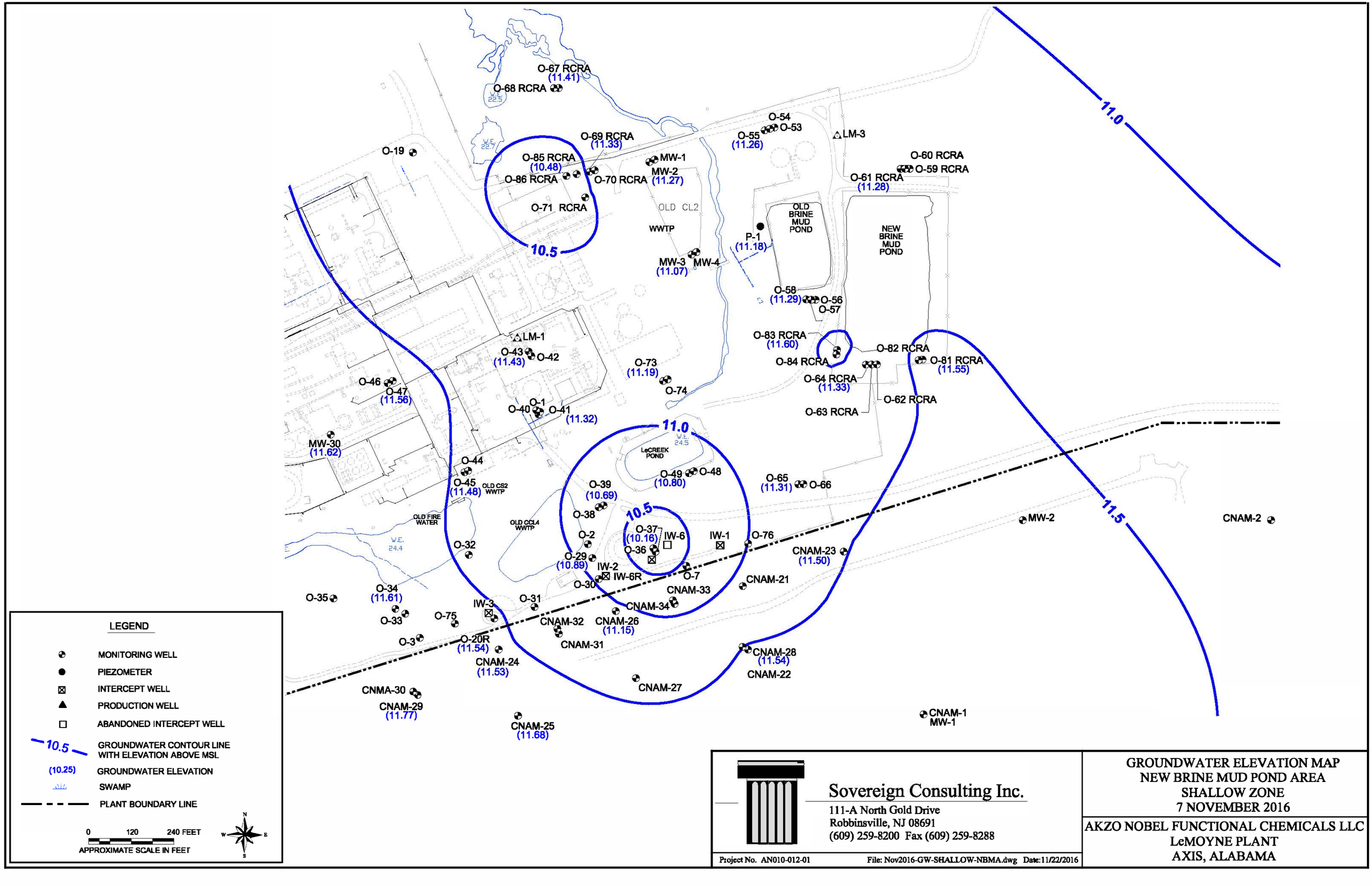

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Project No. AN010-012-01 File: Nov2016-GW-SHALLOW-NBMA.dwg Date:11/22/2016

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NEW BRINE MUD POND AREA
SHALLOW ZONE
7 NOVEMBER 2016

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Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

January 10, 2018

Chief, South Programs Section
RCRA Programs Branch
Waste Management Division
USEPA, Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104
Telephone: (404) 562-8174

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Chief,

Please find enclosed copies of the 2017A and 2017B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.65 to 2.27 ft/day during the 2017A event and 1.64 to 2.26 ft/day for the 2017B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315.

Sincerely

Sylvia Williams

Senior Environmental Engineer

Federal Express Tracking Number: 7711 8594 8952

Sulfur Derivatives 13440 Highway 43 N Tel (251) 675-1310
Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

January 10, 2018

Mr. Clay Messer
Chief Land Division
Alabama Department of Environmental Management
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

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Sincerely

Sylvia Williams

Senior Environmental Engineer

CC: Austin Pierce , ADEM Land Division

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May, 2017

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Shallow	061 to 064	519.00	2.91	0.561	2.00	2.75
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.00	0.377	1.34	1.85
Deep	059 to 082	519.00	2.63	0.507	1.81	2.48
Deep	059 to 084	556.00	1.68	0.302	1.08	1.48
		AVG	**2.42**	**0.46**	**1.65**	**2.27**

Direction of groundwater flow is South
Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity
38882
Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifier

Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL		Well Data May 2017				
NUMBER	GRADIENT	1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL		Well Data May 2017					Comparison Data		
NUMBER	GRADIENT	1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III

GROUNDWATER LEVEL DETERMINATION

Elevations taken November ,2017 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	26.08	12.05	119.69	
060	37.78	25.72	12.06	95.27	
061	37.79	25.72	12.07	72.01	
062	35.04	23.10	11.94	116.68	
063	35.27	23.30	11.97	92.07	
064	34.86	22.85	12.01	77.15	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	23.32	12.24	67.94	
082	35.52	23.52	12.00	117.65	
083	36.02	23.69	12.33	67.87	
084	36.31	24.27	12.04	119.80	

TABLE IV

Groundwater Flow Velocity

2017B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	2.98	0.574	2.05	2.81
Mid	060 to 063	519.00	2.42	0.466	1.66	2.29
Shallow	061 to 064	519.00	2.87	0.553	1.97	2.71
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.03	0.382	1.36	1.87
Deep	059 to 082	519.00	2.56	0.493	1.76	2.42
Deep	059 to 084	556.00	1.81	0.326	1.16	1.60
		AVG	**2.41**	**0.46**	**1.64**	**2.26**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

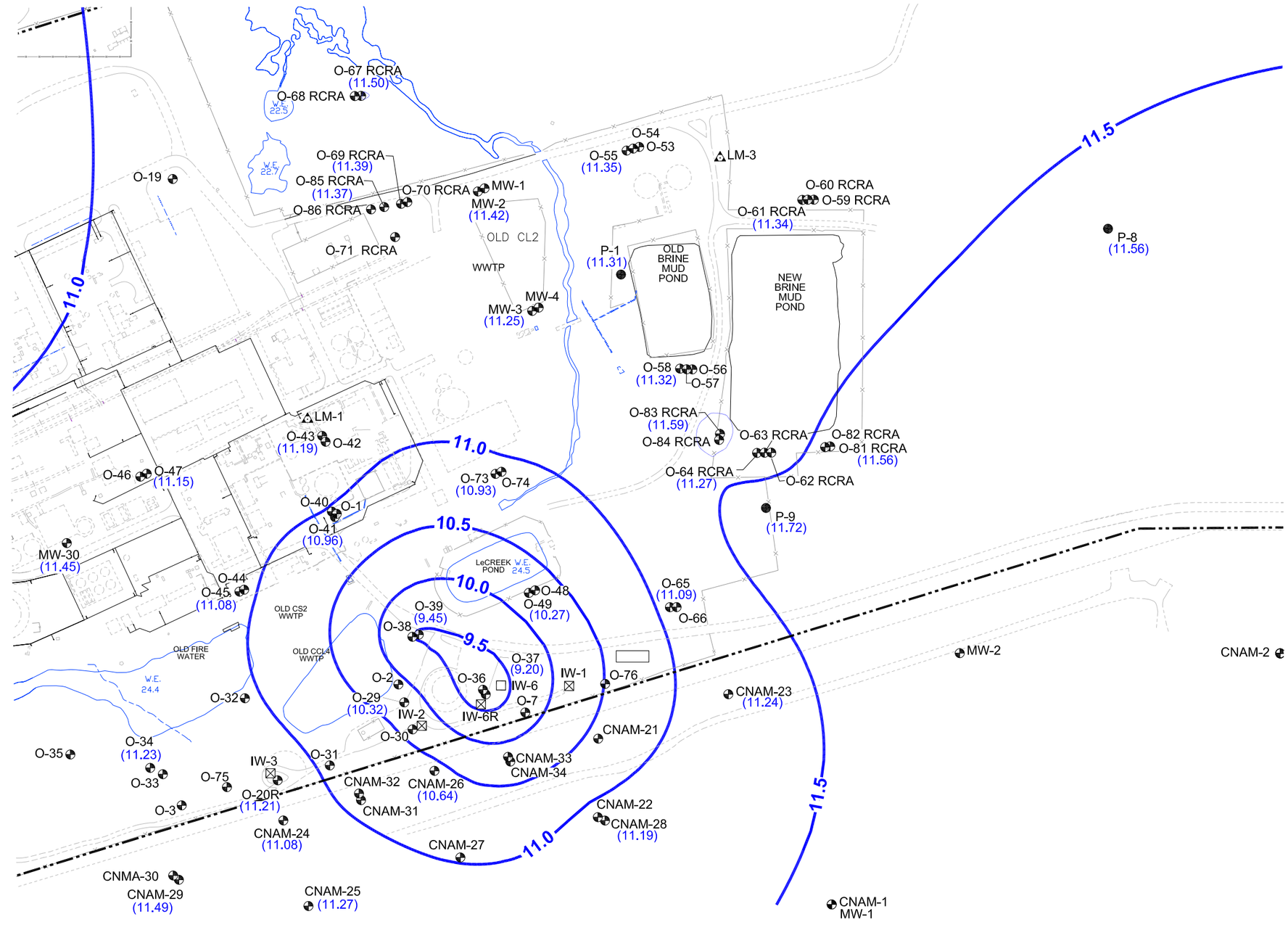
38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifier

DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1.27	0.00	0.04		0.01	0.02	0.01	0.00	0.21	0.00	0.00	0.00
2	0.00	0.00	0.00	0.22	0.00		0.01	0.04	0.12	0.00	0.00	0.00
3	0.04	0.00	0.00	1.35	1.89	1.22	0.00	0.08	0.02	0.00	0.00	0.00
4	0.00	0.00	0.00	0.10	0.29	0.69	0.00	0.31	0.00	0.00	0.00	0.00
5	0.35	0.00	0.00	0.07	0.00	0.27	0.58	0.07	0.00	0.00	0.00	0.24
6	0.56	0.00	0.00	0.00	0.00	0.70	0.09	0.00	0.27	0.00	0.00	0.68
7	0.00	0.39	0.99	0.00	0.00	0.01	0.11	0.06	0.00	2.73	0.00	0.26
8	0.00	2.69	0.00	0.00	0.00	0.00	1.03	0.12	0.00	0.52	0.72	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.18	0.29	0.00
10	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.77	0.00	0.14	0.00	0.21
11	0.00	0.00	0.07	0.00	0.00	0	1.33	0.76	0.01	0.00	0.02	0.00
12	0.00	0.00	0.01		1.72	0.06	0.60	1.55	0.00	0.00	0.03	0.00
13	0.00	0.00	0.15	0.00	0.00	0.06	0.00	0.00	0.00	0.08	0.00	0.00
14	0.00	0.09	0.00	0.00	0.00	0.02	0.02	0.68	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	2.07	0.01	0.86	0.14	0.24	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.20	0.01	0.03	0.12	0.00	0.00	0.00
17	0.00	0.09	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00	0.60
18	0.00	0.01	0.00	0.00	0.00	0.42	0.03	0.37	0.00	0.00	0.00	0.03
19	0.58	0.00	0.00	0.00	0.00	0	0.00	0.00	0.50	0.00	0.00	0.04
20	0.05	0.31	0.00	0.00	3.22	2.72	0.00	0.00	0.48	0.00	0.00	0.30
21	0.60	0.34	0.00	0.00	0.09	1.51	0.00	0.02	0.00	0.00	0.00	0.08
22	0.03	0.00	0.00	0.42	0.28	0.70	0.03	0.00	0.10	2.75	0.00	0.00
23	0.00	0.00	0.00	0.09	0.42	0.00	0.00	0.00	0.11	0.00	0.00	0.06
24	0.00	0.00	0.00	0.00	0.20	0.00	0.10	0.00	0.00	0.00	0.00	0.00
25	0.05	0.00	0.87	0.00	0.01	0.00	0.21	0.00	0.14	0.00	0.00	0.00
26	0.00	0.03	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19
27		0.34	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.10
28		0.01	0.00	0.00	0.05	1.25	0.03	0.00	0.00	0.07	0.00	0.03
29	0.00		0.00	0.00	0.16	0.96	0.25	0.85	0.00	0.00	0.00	0.00
30	0.00		0.88	2.26	0.45		0.00	0.67	0.00	0.00	0.00	0.01
31	0.00		0.00		0.18		0.00	0.37	0.01	0.00	0.09	0.30
Total	3.53	4.30	3.05	4.68	8.97	13.37	4.45	8.06	2.23	6.74	1.15	3.13
Tot for year		63.66										

* gauge did not record, but no rain. PO power outtage

^ gauge was not legible



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (10.93) — GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET

APPROXIMATE SCALE IN FEET

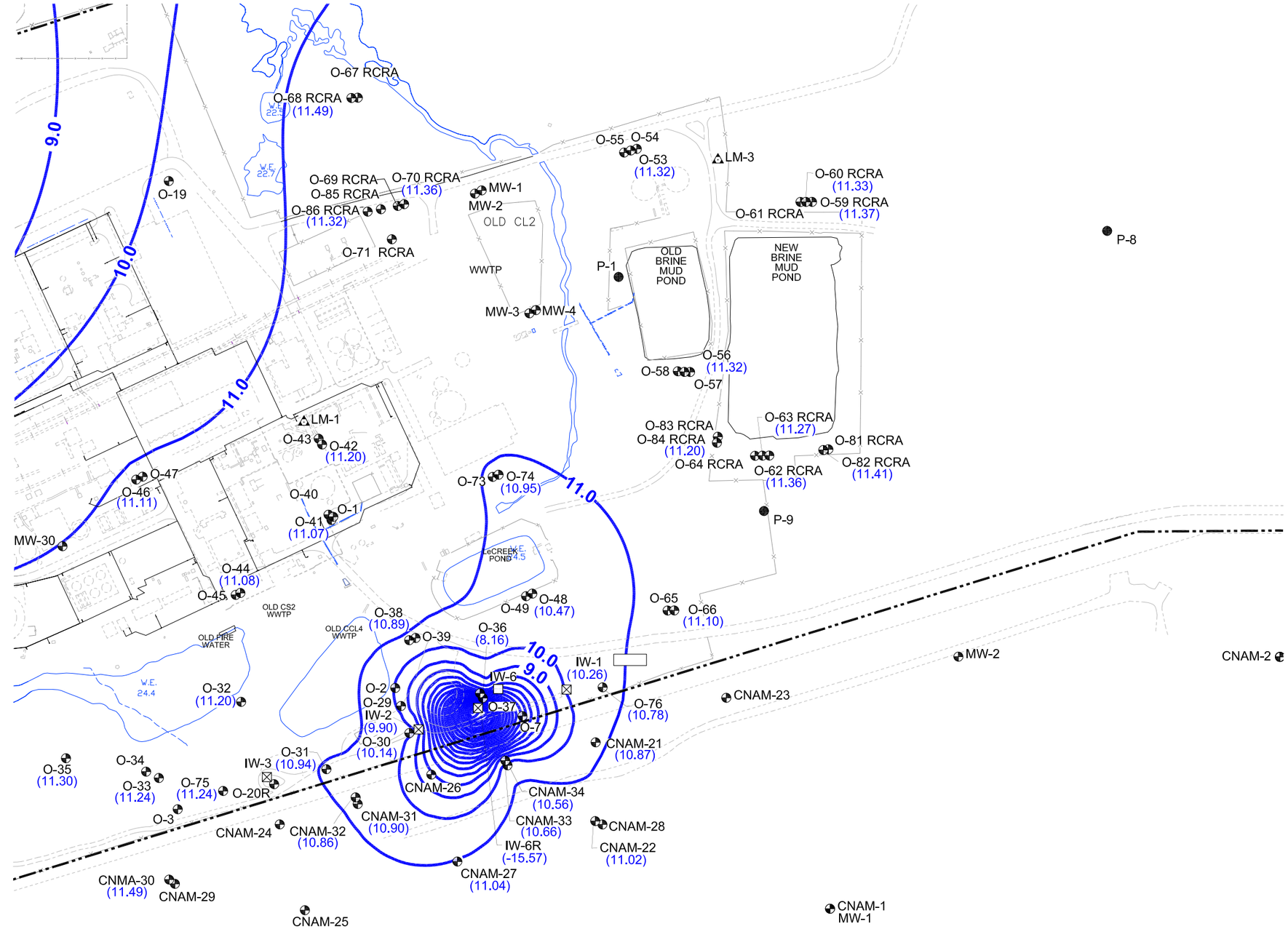
N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: May2017-GW-Shallow-NBMA.dwg Date:07/06/2017

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
16 MAY 2017

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (10.47) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

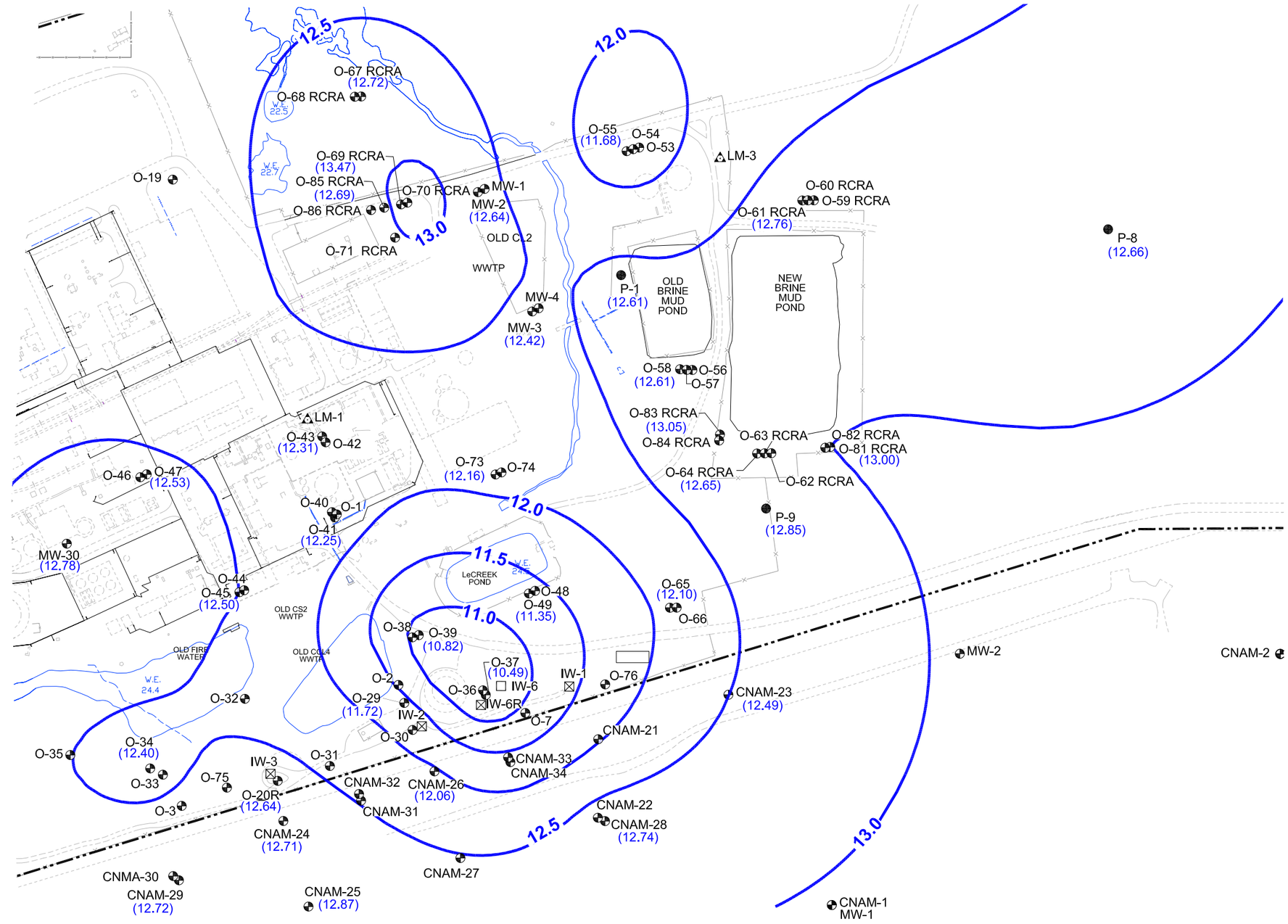
N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: May2017-GW-Deep-NBMA.dwg Date:07/06/2017

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
16 MAY 2017

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (10.82) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

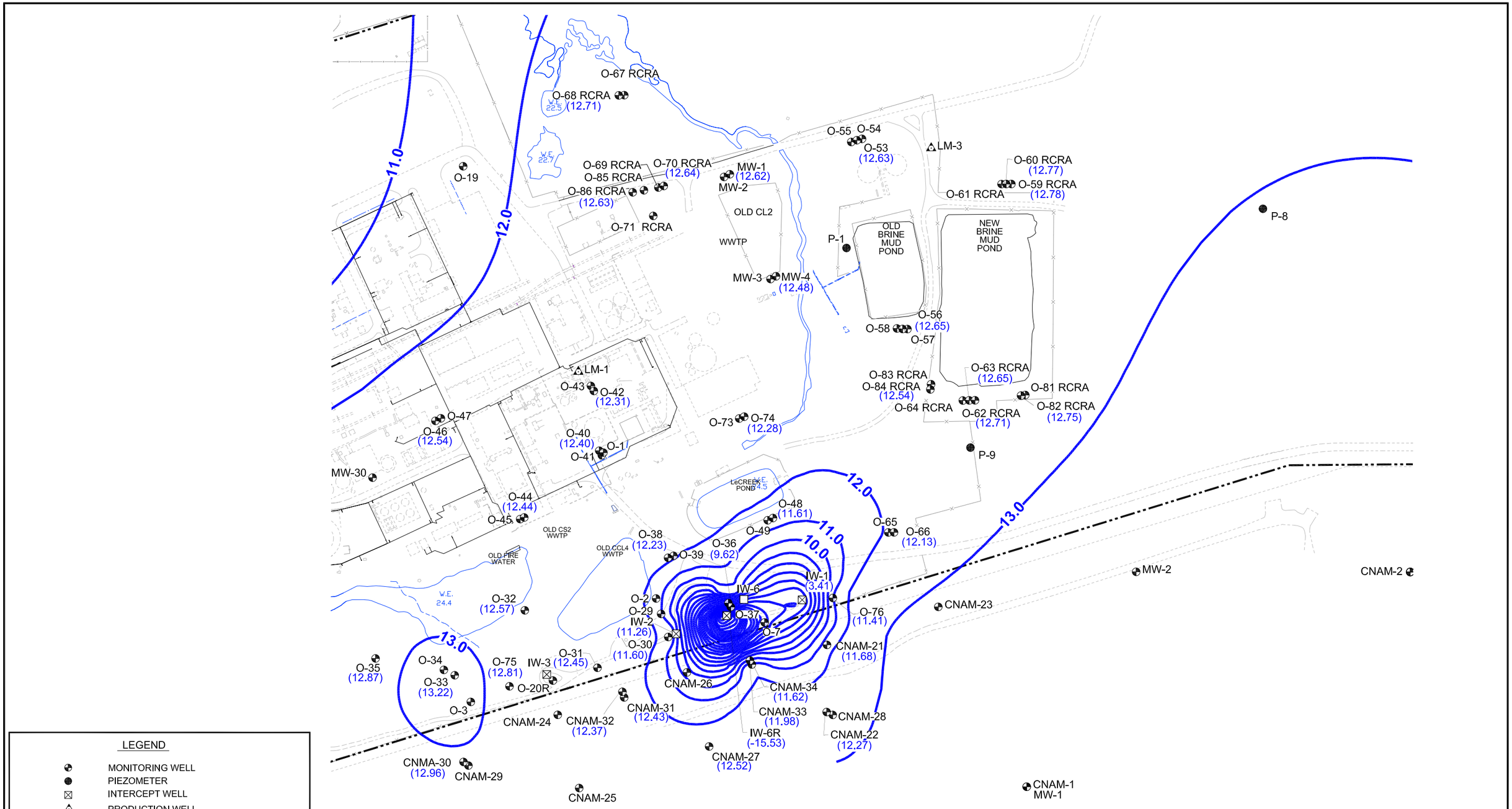
N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: Nov2017-GW-Shallow-NBMA.dwg Date:12/04/2017

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
14 NOVEMBER 2017

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.60) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: Nov2017-GW-Deep-NBMA.dwg Date:12/04/2017

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
14 NOVEMBER 2017

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

Akzo Nobel Functional Chemicals LLC — O-59

LeMoyne Plant

RCRA Groundwater Monitor Well O-59 — Sampling / Inspection Log Sheet

Date: 5-4-16 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	123	125.54
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: B. KITTELL Date: 5/4/16
Company: Sovereign Consulting Inc.
Arrival Time: 0830 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 74° NW 5-10
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 25.19
Depth to Bottom: 119.70

Pump Used: (Yes) / No
Depth of Pump: 27'
Began: 1115 (time)
Ended: 1215 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 180 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 20.5° C
pH: 5.31
Cond: 240 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 20.4° C
pH: 5.28
Cond: 242 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 20.3° C
pH: 5.26
Cond: 245 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60

Sampling / Inspection Log Sheet

Date: 5-4-16 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 37.78

Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.24
Screened Interval	-37.46/-57.46	73/ 93	75. 24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: C racked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No

Any indication of having been contacted by vehicle? Yes /(No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittrell Date : 5/4/16

Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 74° NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.83

Depth to Bottom: 95.25

Pump Used: Yes / No

Depth of Pump: 26'

Began: 1123 (time)

Ended: 1208 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 135 gal/liter

Bailer Used: Yes /(No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes /(No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 20.5 ° C

pH: 4.59

Cond: 220 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2

Water Temperature: 20.5 ° C

pH: 4.47

Cond: 220 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3

Water Temperature: 20.5 ° C

pH: 4.43

Cond: 222 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61

Sampling / Inspection Log Sheet

Date: 5-4-16 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.79
Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	70	72.48
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittrell Date: 5/4/16
Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 74° NW 5-10
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 24.83
Depth to Bottom: 70.10

Pump Used: Yes / No
Depth of Pump: 24'
Began: 1225 (time)
Ended: 1255 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 20.6 ° C
pH: 4.50
Cond: 330 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 20.6 ° C
pH: 4.25
Cond: 370 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 20.6 C
pH: 4.22
Cond: 380 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62

Sampling / Inspection Log Sheet

Date: 5-4-16 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.04

Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	120	121.87
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other: _____

Concrete Pad: Cracks: Yes/(No) Describe: _____

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe: _____

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittell Date: 5/4/16

Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 74° NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.05

Depth to Bottom: 116.68

Pump Used: Yes / No

Depth of Pump: 24'

Began: 1418 (time)

Ended: 1518 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 180 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 19.8 °C

pH: 4.99

Cond: 252 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2

Water Temperature: 19.9 °C

pH: 5.15

Cond: 260 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3

Water Temperature: 19.9 °C

pH: 5.22

Cond: 260 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63

Sampling / Inspection Log Sheet

Date: 5-4-16 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	93	94.99
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:
Concrete Pad: Cracks: Yes/No Describe:
Protective Posts: In position Yes/No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: B. Kittrell Date: 5/4/16
Company: Sovereign Consulting Inc.
Arrival Time: 0830 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 74° NW 5-10
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 22.26
Depth to Bottom: 92.07

Pump Used: Yes / No
Depth of Pump: 24'
Began: 1421 (time)
Ended: 1506 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 135 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 28540
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 19.8 °C
pH: 4.52
Cond: 250 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 19.9 °C
pH: 4.52
Cond: 250 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 20.2 °C
pH: 4.55
Cond: 245 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear. No Odor

Revised: March 20, 1997

FILE: FORMS\WELLS\RCRA\WELLO63.DOC

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64

Sampling / Inspection Log Sheet

Date: 5-4-14 Signed: Brian Kottell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	76	78.02
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: B. Kittell Date: 5/4/16
Company: Sovereign Consulting Inc.
Arrival Time: 0830 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 74° NW 5-10
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 21.82
Depth to Bottom: ~~95.25~~ 77.15 (DM)

Pump Used: (Yes) / No
Depth of Pump: 23'
Began: 1512 (time)
Ended: 1551 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 117 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: ____ (gal/liter)
# of Bails Removed: ____
Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 20.3° C
pH: 4.64
Cond: 100 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 20.1° C
pH: 4.51
Cond: 100 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 20.1° C
pH: 4.55
Cond: 100 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 5-4-16 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	67.5
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittell Date: 5/4/16

Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 74° NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.34

Depth to Bottom: 67.94

Pump Used: (Yes) / No

Depth of Pump: 24'

Began: 1321 (time)

Ended: 1351 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 19.6 °C

pH: 5.34

Cond: 85 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2

Water Temperature: 19.4 C

pH: 5.15

Cond: 80 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3

Water Temperature: 19.4 C

pH: 4.95

Cond: 80 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82

Sampling / Inspection Log Sheet

Date: 5-4-16 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	120	122.62
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittell Date: 5/4/16

Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 74° NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.49

Depth to Bottom: 117.65

Pump Used: (Yes) / No

Depth of Pump: 24'

Began: 1315 (time)

Ended: 1418 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 189 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 23540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 19.6 °C

pH: 5.29

Cond: 245 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2

Water Temperature: 19.7 °C

pH: 5.11

Cond: 245 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3

Water Temperature: 19.7 °C

pH: 5.21

Cond: 241 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83

Sampling / Inspection Log Sheet

Date: 5-5-16 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.82
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. KITTRELL Date: 5/5/16

Company: Sovereign Consulting Inc.

Arrival Time: 0800 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 61° NW 0-5

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.45

Depth to Bottom: 67.87

Pump Used: (Yes) / No

Depth of Pump: 24'

Began: 0900 (time)

Ended: 0930 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: NONE

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 20.6 °C

pH: 4.87

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2

Water Temperature: 20.4 °C

pH: 4.74

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3

Water Temperature: 20.5 °C

pH: 4.75

Cond: 135 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84

Sampling / Inspection Log Sheet

Date: 5-5-16 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.09
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittrell Date: 5/5/16

Company: Sovereign Consulting Inc.

Arrival Time: 0800 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 61° NW 6-5

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.28

Depth to Bottom: 118.02

Pump Used: (Yes) / No

Depth of Pump: 26'

Began: 0850 (time)

Ended: 0950 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 180 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 14.9 °C

pH: 5.46

Cond: 280 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2

Water Temperature: 14.9 °C

pH: 5.24

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3

Water Temperature: 14.9 °C

pH: 5.22

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Functional Chemicals LLC — O-59

LeMoyne Plant

RCRA Groundwater Monitor Well O-59 — Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	123	125.54
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: B. Kittrell Date: 11 / 9 / 16
Company: Sovereign Consulting Inc.
Arrival Time: 1000 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Cloudy 73° NW 0-5
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 27.03
Depth to Bottom: 119.70

Pump Used: Yes / No
Depth of Pump: _____
Began: 1040 (time)
Ended: 1140 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 181 (gal)/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 22952
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 20.4 ° C
pH: 5.50
Cond: 245 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 20.4 ° C
pH: 5.45
Cond: 250 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 20.4 C
pH: 5.39
Cond: 245 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60

Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 37.78

Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.24
Screened Interval	-37.46/-57.46	73/ 93	75. 24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: C racked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes/ No

Any indication of having been contacted by vehicle? Yes / No

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. KITTRELL Date : 11 / 9 / 16

Company: Sovereign Consulting Inc.

Arrival Time: 1000 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.):

Cloudy 73° NW 0-5

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 26.68

Depth to Bottom: 95.25

Pump Used: Yes / No

Depth of Pump: 28'

Began: 1100 (time)

Ended: 1145 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 134 (gal)/liter

Bailer Used: Yes / No

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 7 9 %

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 1009%

Field Measurement No. 1

Water Temperature: 20.6 ° C

pH: 5.06

Cond: 180 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2

Water Temperature: 20.5 ° C

pH: 5.09

Cond: 170 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3

Water Temperature: 20.5 ° C

pH: 4.99

Cond: 170 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61

Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.79
Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	70	72.48
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: B. Kittell Date: 11 / 9 / 16
Company: Sovereign Consulting Inc.
Arrival Time: 1000 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Cloudy 73° NW 0-5
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 26.64
Depth to Bottom: 70.10

Pump Used: Yes / No
Depth of Pump: 28'
Began: 1155 (time)
Ended: 1225 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 85 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 20.7° C
pH: 4.42
Cond: 300 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 20.7° C
pH: 4.30
Cond: 310 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 20.7 C
pH: 4.26
Cond: 310 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62

Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.04

Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	120	121.87
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other: _____

Concrete Pad: Cracks: Yes/(No) Describe: _____

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe: _____

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittrell Date: 11 / 9 / 16

Company: Sovereign Consulting Inc.

Arrival Time: 1000 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 75° NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.78

Depth to Bottom: 116.68

Pump Used: Yes / No

Depth of Pump: 26'

Began: 1350 (time)

Ended: 1450 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 180 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 19.8 ° C

pH: 5.70

Cond: 240 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1410

Field Measurement No. 2

Water Temperature: 19.8 ° C

pH: 5.62

Cond: 240 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1430

Field Measurement No. 3

Water Temperature: 19.8 ° C

pH: 5.59

Cond: 240 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1450

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63

Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	93	94.99
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittrell Date: 11 / 9 / 16
Company: Sovereign Consulting Inc.

Arrival Time: 1000 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 75° NW 5-10
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 24.00
Depth to Bottom: 92.07

Pump Used: Yes / No
Depth of Pump: 26'
Began: 1355 (time)
Ended: 1440 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 135 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 22952
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 19.8 ° C
pH: 4.74
Cond: 240 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor
1410

Field Measurement No. 2
Water Temperature: 19.8 ° C
pH: 4.78
Cond: 240 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor
1425

Field Measurement No. 3
Water Temperature: 19.8 ° C
pH: 4.70
Cond: 240 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor
1440

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64

Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	76	78.02
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes/(No)
Describe:

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: B. Kittell Date: 11 / 9 / 16
Company: Sovereign Consulting Inc.
Arrival Time: 1000 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 75° NW 5-10
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 23.54
Depth to Bottom: 77.15

Pump Used: Yes / No
Depth of Pump: 25'
Began: 1450 (time)
Ended: 1526 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 108 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 22952
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1
Water Temperature: 19.9 ° C
pH: 5.00
Cond: 90 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 19.9 ° C
pH: 4.89
Cond: 90 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 19.9 ° C
pH: 4.82
Cond: 90 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	67.5
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes / (No) Other:

Concrete Pad: Cracks: Yes / (No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittell Date: 11 / 9 / 16

Company: Sovereign Consulting Inc.

Arrival Time: 1000 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.): Cloudy 730 NW 0-5

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.20

Depth to Bottom: 67.94

Pump Used: Yes / No

Depth of Pump: 36'

Began: 1243 (time)

Ended: 1313 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 22952

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 19.4 ° C

pH: 4.96

Cond: 80 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1253

Field Measurement No. 2

Water Temperature: 19.4 ° C

pH: 5.14

Cond: 75 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear. No Odor

1303

Field Measurement No. 3

Water Temperature: 19.3 ° C

pH: 5.18

Cond: 75 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1313

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82

Sampling / Inspection Log Sheet

Date: 11-9-16 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	120	122.62
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittell Date: 11 / 9 / 16

Company: Sovereign Consulting Inc.

Arrival Time: 1000 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.): Cloudy 73° NW 0-5

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.27

Depth to Bottom: 117.65

Pump Used: Yes / No

Depth of Pump:

Began: 1236 (time)

Ended: 1338 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 180 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 19.6 ° C

pH: 5.46

Cond: 210 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1258

Field Measurement No. 2

Water Temperature: 19.6 ° C

pH: 5.30

Cond: 220 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1318

Field Measurement No. 3

Water Temperature: 19.6 ° C

pH: 5.26

Cond: 220 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1338

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83

Sampling / Inspection Log Sheet

Date: 11-10-16 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.82
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittell Date: 11/10/16

Company: Sovereign Consulting Inc.

Arrival Time: 0745 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 60° NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.64

Depth to Bottom: 67.87

Pump Used: Yes / No

Depth of Pump:

Began: 0820 (time)

Ended: 0850 (time)

Pumping Rate: (gpm/lph)

Total Volume Purged: 8490 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 20.2° C

pH: 4.57

Cond: 130 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0830

Field Measurement No. 2

Water Temperature: 20.2° C

pH: 4.54

Cond: 130 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0840

Field Measurement No. 3

Water Temperature: 20.1° C

pH: 4.50

Cond: 130 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear No Odor

0850

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84

Sampling / Inspection Log Sheet

Date: 11-10-16 Signed: B. Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.09
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: B. Kittrell Date: 11/10/16

Company: Sovereign Consulting Inc.

Arrival Time: 0745 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 60° NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 25.20

Depth to Bottom: 118.02

Pump Used: (Yes) / No

Depth of Pump:

Began: 0816 (time)

Ended: 0916 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 180 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 22952

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1

Water Temperature: 19.7 °C

pH: 5.00

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0836

Field Measurement No. 2

Water Temperature: 19.8 °C

pH: 4.97

Cond: 230 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0856

Field Measurement No. 3

Water Temperature: 19.8 °C

pH: 5.06

Cond: 230 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0916

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-137868-1
Client Project/Site: AKZO - Semiannual Hg

For:
Akzo Nobel
Akzo Nobel Functional Chemical
13440 Highway 43 North
Axis, Alabama 36505

Attn: Ms. Sylvia Williams

Authorized for release by:
5/22/2017 3:51:38 PM

Jason Wilson, Project Manager I
(251)706-3217
jason.wilson@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Client: Akzo Nobel
Project/Site: AKZO - Semiannual Hg

TestAmerica Job ID: 400-137868-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Akzo Nobel
Project/Site: AKZO - Semiannual Hg

TestAmerica Job ID: 400-137868-1

Job ID: 400-137868-1

Laboratory: TestAmerica Pensacola

Narrative

Job Narrative
400-137868-1

Comments
No additional comments.

Receipt
The samples were received on 5/12/2017 2:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.4° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: Akzo Nobel
Project/Site: AKZO - Semiannual Hg

TestAmerica Job ID: 400-137868-1

Client Sample ID: O-59 — **Lab Sample ID: 400-137868-1**
Date Collected: 05/10/17 14:02 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 10:38	1

Client Sample ID: O-59 (Equipment Blank) — **Lab Sample ID: 400-137868-2**
Date Collected: 05/10/17 14:05 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 10:39	1

Client Sample ID: O-60 — **Lab Sample ID: 400-137868-3**
Date Collected: 05/10/17 13:56 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 10:41	1

Client Sample ID: O-60 (Equipment Blank) — **Lab Sample ID: 400-137868-4**
Date Collected: 05/10/17 13:59 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 10:43	1

Client Sample ID: O-61 — **Lab Sample ID: 400-137868-5**
Date Collected: 05/10/17 14:41 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 10:45	1

Client Sample ID: O-61 (Equipment Blank) — **Lab Sample ID: 400-137868-6**
Date Collected: 05/10/17 14:45 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 10:46	1

Client Sample ID: O-62 — **Lab Sample ID: 400-137868-7**
Date Collected: 05/11/17 13:37 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 11:46	1

Client Sample ID: O-62 (Equipment Blank) — **Lab Sample ID: 400-137868-8**
Date Collected: 05/11/17 13:40 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 11:48	1

Client Sample ID: O-63 — **Lab Sample ID: 400-137868-9**
Date Collected: 05/11/17 14:10 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 11:50	1

Client Sample ID: O-63 (Equipment Blank) — **Lab Sample ID: 400-137868-10**
Date Collected: 05/11/17 14:14 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 11:51	1

Client Sample ID: O-64 — **Lab Sample ID: 400-137868-11**
Date Collected: 05/11/17 13:15 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 11:53	1

Client Sample ID: O-64(Equipment Blank) — **Lab Sample ID: 400-137868-12**
Date Collected: 05/11/17 13:19 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:00	1

Client Sample ID: O-81 — **Lab Sample ID: 400-137868-13**
Date Collected: 05/11/17 14:58 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:02	1

Client Sample ID: O-81(Equipment Blank) — **Lab Sample ID: 400-137868-14**
Date Collected: 05/11/17 15:02 — **Matrix: Water**
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:27	1

Client Sample ID: O-82
Lab Sample ID: 400-137868-15
Date Collected: 05/11/17 15:21
Matrix: Water
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:29	1

Client Sample ID: O-82(Equipment Blank)
Lab Sample ID: 400-137868-16
Date Collected: 05/11/17 15:25
Matrix: Water
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:31	1

Client Sample ID: O-83
Lab Sample ID: 400-137868-17
Date Collected: 05/11/17 12:01
Matrix: Water
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:32	1

Client Sample ID: O-83(Equipment Blank)
Lab Sample ID: 400-137868-18
Date Collected: 05/11/17 12:05
Matrix: Water
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:34	1

Client Sample ID: O-84
Lab Sample ID: 400-137868-19
Date Collected: 05/11/17 12:26
Matrix: Water
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:36	1

Client Sample ID: O-84(Equipment Blank)
Lab Sample ID: 400-137868-20
Date Collected: 05/11/17 12:30
Matrix: Water
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 12:37	1

Client Sample ID: Duplicate
Lab Sample ID: 400-137868-21
Date Collected: 05/11/17 13:15
Matrix: Water
Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/16/17 10:59	05/18/17 14:18	1

Client: Akzo Nobel
Project/Site: AKZO - Semiannual Hg

TestAmerica Job ID: 400-137868-1

Client Sample ID: Field Blank #1

Lab Sample ID: 400-137868-22

Date Collected: 05/10/17 13:30

Matrix: Water

Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/16/17 10:59	05/18/17 14:47	1

Client Sample ID: Field Blank #2

Lab Sample ID: 400-137868-23

Date Collected: 05/11/17 12:57

Matrix: Water

Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/16/17 10:59	05/18/17 14:48	1

Client Sample ID: Field Spike

Lab Sample ID: 400-137868-24

Date Collected: 05/11/17 13:00

Matrix: Water

Date Received: 05/12/17 14:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/16/17 10:59	05/18/17 14:50	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-353545/14-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 354070 — **Prep Batch: 353545**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/15/17 12:46	05/18/17 14:04	1

Lab Sample ID: LCS 400-353545/15-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 354070 — **Prep Batch: 353545**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000876		mg/L		87	80 - 120

Lab Sample ID: MB 400-353666/14-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 354465 — **Prep Batch: 353666**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/20/17 13:50	05/22/17 10:34	1

Lab Sample ID: LCS 400-353666/15-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 354465 — **Prep Batch: 353666**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.00101		mg/L		101	80 - 120

Lab Sample ID: 400-137868-11 MS — **Client Sample ID: O-64**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 354465 — **Prep Batch: 353666**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00189		mg/L		94	80 - 120

Lab Sample ID: 400-137868-11 MSD — **Client Sample ID: O-64**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 354465 — **Prep Batch: 353666**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00193		mg/L		96	80 - 120	2	20

Client Sample ID: O-59
Lab Sample ID: 400-137868-1
Date Collected: 05/10/17 14:02
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 10:38	JAP	TAL PEN

Client Sample ID: O-59 (Equipment Blank)
Lab Sample ID: 400-137868-2
Date Collected: 05/10/17 14:05
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 10:39	JAP	TAL PEN

Client Sample ID: O-60
Lab Sample ID: 400-137868-3
Date Collected: 05/10/17 13:56
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 10:41	JAP	TAL PEN

Client Sample ID: O-60 (Equipment Blank)
Lab Sample ID: 400-137868-4
Date Collected: 05/10/17 13:59
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 10:43	JAP	TAL PEN

Client Sample ID: O-61
Lab Sample ID: 400-137868-5
Date Collected: 05/10/17 14:41
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 10:45	JAP	TAL PEN

Client Sample ID: O-61 (Equipment Blank)
Lab Sample ID: 400-137868-6
Date Collected: 05/10/17 14:45
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 10:46	JAP	TAL PEN

Client Sample ID: O-62

Lab Sample ID: 400-137868-7

Date Collected: 05/11/17 13:37

Matrix: Water

Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 11:46	JAP	TAL PEN

Client Sample ID: O-62 (Equipment Blank)

Lab Sample ID: 400-137868-8

Date Collected: 05/11/17 13:40

Matrix: Water

Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 11:48	JAP	TAL PEN

Client Sample ID: O-63

Lab Sample ID: 400-137868-9

Date Collected: 05/11/17 14:10

Matrix: Water

Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 11:50	JAP	TAL PEN

Client Sample ID: O-63 (Equipment Blank)

Lab Sample ID: 400-137868-10

Date Collected: 05/11/17 14:14

Matrix: Water

Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 11:51	JAP	TAL PEN

Client Sample ID: O-64

Lab Sample ID: 400-137868-11

Date Collected: 05/11/17 13:15

Matrix: Water

Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 11:53	JAP	TAL PEN

Client Sample ID: O-64(Equipment Blank)

Lab Sample ID: 400-137868-12

Date Collected: 05/11/17 13:19

Matrix: Water

Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:00	JAP	TAL PEN

Client Sample ID: O-81
Lab Sample ID: 400-137868-13

Date Collected: 05/11/17 14:58
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:02	JAP	TAL PEN

Client Sample ID: O-81(Equipment Blank)
Lab Sample ID: 400-137868-14

Date Collected: 05/11/17 15:02
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:27	JAP	TAL PEN

Client Sample ID: O-82
Lab Sample ID: 400-137868-15

Date Collected: 05/11/17 15:21
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:29	JAP	TAL PEN

Client Sample ID: O-82(Equipment Blank)
Lab Sample ID: 400-137868-16

Date Collected: 05/11/17 15:25
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:31	JAP	TAL PEN

Client Sample ID: O-83
Lab Sample ID: 400-137868-17

Date Collected: 05/11/17 12:01
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:32	JAP	TAL PEN

Client Sample ID: O-83(Equipment Blank)
Lab Sample ID: 400-137868-18

Date Collected: 05/11/17 12:05
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:34	JAP	TAL PEN

Client Sample ID: O-84
Lab Sample ID: 400-137868-19

Date Collected: 05/11/17 12:26
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:36	JAP	TAL PEN

Client Sample ID: O-84(Equipment Blank)
Lab Sample ID: 400-137868-20

Date Collected: 05/11/17 12:30
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353666	05/20/17 13:50	DN1	TAL PEN
Total/NA	Analysis	7470A		1	354465	05/22/17 12:37	JAP	TAL PEN

Client Sample ID: Duplicate
Lab Sample ID: 400-137868-21

Date Collected: 05/11/17 13:15
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353545	05/16/17 10:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	354070	05/18/17 14:18	JAP	TAL PEN

Client Sample ID: Field Blank #1
Lab Sample ID: 400-137868-22

Date Collected: 05/10/17 13:30
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353545	05/16/17 10:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	354070	05/18/17 14:47	JAP	TAL PEN

Client Sample ID: Field Blank #2
Lab Sample ID: 400-137868-23

Date Collected: 05/11/17 12:57
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353545	05/16/17 10:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	354070	05/18/17 14:48	JAP	TAL PEN

Client Sample ID: Field Spike
Lab Sample ID: 400-137868-24

Date Collected: 05/11/17 13:00
Matrix: Water
Date Received: 05/12/17 14:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			353545	05/16/17 10:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	354070	05/18/17 14:50	JAP	TAL PEN

Lab Chronicle

Client: Akzo Nobel
Project/Site: AKZO - Semiannual Hg

TestAmerica Job ID: 400-137868-1

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONME

400-137868 COC

Client Information	Sampler:	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-65269-21846.1
Client Contact: Ms. Sylvia Williams	Phone:	E-Mail: jason.wilson@testamericainc.com		Page: Page 1 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	
Phone: 251-679-4315(Tel)	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-59	5-10-17	1402	G	Water			✓		
O-59 (Equipment Blank)		1405		Water					
O-60		1356		Water					
O-60 (Equipment Blank)		1359		Water					
O-61		1441		Water					
O-61 (Equipment Blank)	5-10-17	1445		Water					
O-62	5-11-17	1337		Water					
O-62 (Equipment Blank)		1340		Water					
O-63		1410		Water					
O-63 (Equipment Blank)		1414		Water					
O-64	5-11-17	1315	G	Water			✓		

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time: 5-12-17 1430	Company	Received by:	Date/Time: 5-12-17 1430	Company TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.: 400-137868

Cooler Temperature(s) °C and Other Remarks: 3.4°C #5592

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5/22/2017

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-65269-21846.2
Client Contact: Ms. Sylvia Williams	Phone:	E-Mail: jason.wilson@testamericainc.com		Page: Page 2 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	
Phone: 251-679-4315(Tel)	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	5-11-17	1319	G	Water			✓		
O-81		1458		Water					
O-81 (Equipment Blank)		1502		Water					
O-82		1521		Water					
O-82 (Equipment Blank)		1525		Water					
O-83		1201		Water					
O-83 (Equipment Blank)		1205		Water					
O-84		1226		Water					
O-84 (Equipment Blank)		1230		Water					
Duplicate	5-11-17	1315		Water			✓		
Field Blank #1	5-10-17	1330	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Susan Kettell	Date/Time: 5-12-17 1430	Company	Received by: Meryl Lan	Date/Time: 5-12-17 14:30	Company MA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

5/22/2017

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-65269-21846.3
Client Contact: Ms. Sylvia Williams	Phone:	E-Mail: jason.wilson@testamericainc.com		Page: Page 3 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505				
Phone: 251-679-4315(Tel)	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	5-11-17	1257	G	Water			✓		
MS	↓	1315	↓	Water			↓		
MSD	↓	1315	↓	Water			↓		
Field Spike	5-11-17	1300	G	Water			✓		
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Dean Kuttell	5-12-17 1430			5-12-17 14:30	TA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-146112-1
Client Project/Site: AKZO- Semiannual Hg

For:
Akzo Nobel Functional Chemicals LLC
Akzo Nobel LeMoyne Site
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
11/24/2017 3:39:48 PM

Jason Wilson, Project Manager I
(251)706-3217
jason.wilson@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 400-146112-1

Laboratory: TestAmerica Pensacola

Narrative

Job Narrative
400-146112-1

Comments
No additional comments.

Receipt
The samples were received on 11/16/2017 2:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.3º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-146112-1

Client Sample ID: O-59 — **Lab Sample ID: 400-146112-1**
Date Collected: 11/15/17 14:31 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:21	1

Client Sample ID: O-59 (Equipment Blank) — **Lab Sample ID: 400-146112-2**
Date Collected: 11/15/17 14:35 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:23	1

Client Sample ID: O-60 — **Lab Sample ID: 400-146112-3**
Date Collected: 11/15/17 14:26 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:25	1

Client Sample ID: O-60 (Equipment Blank) — **Lab Sample ID: 400-146112-4**
Date Collected: 11/15/17 14:30 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:28	1

Client Sample ID: O-61 — **Lab Sample ID: 400-146112-5**
Date Collected: 11/15/17 15:07 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:30	1

Client Sample ID: O-61 (Equipment Blank) — **Lab Sample ID: 400-146112-6**
Date Collected: 11/15/17 15:11 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:31	1

Client Sample ID: O-62 — **Lab Sample ID: 400-146112-7**
Date Collected: 11/16/17 11:14 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:44	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-146112-1

Client Sample ID: O-62 (Equipment Blank)

Lab Sample ID: 400-146112-8
Date Collected: 11/16/17 11:18
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:53	1

Client Sample ID: O-63

Lab Sample ID: 400-146112-9
Date Collected: 11/16/17 11:05
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:55	1

Client Sample ID: O-63 (Equipment Blank)

Lab Sample ID: 400-146112-10
Date Collected: 11/16/17 11:09
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:56	1

Client Sample ID: O-64

Lab Sample ID: 400-146112-11
Date Collected: 11/16/17 11:51
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:58	1

Client Sample ID: O-64 (Equipment Blank)

Lab Sample ID: 400-146112-12
Date Collected: 11/16/17 11:55
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 14:05	1

Client Sample ID: O-81

Lab Sample ID: 400-146112-13
Date Collected: 11/16/17 12:45
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 14:07	1

Client Sample ID: O-81 (Equipment Blank)

Lab Sample ID: 400-146112-14
Date Collected: 11/16/17 12:49
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 14:20	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-146112-1

Client Sample ID: O-82 — **Lab Sample ID: 400-146112-15**
Date Collected: 11/16/17 13:14 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 14:21	1

Client Sample ID: O-82 (Equipment Blank) — **Lab Sample ID: 400-146112-16**
Date Collected: 11/16/17 13:18 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 14:23	1

Client Sample ID: O-83 — **Lab Sample ID: 400-146112-17**
Date Collected: 11/16/17 09:41 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 14:25	1

Client Sample ID: O-83 (Equipment Blank) — **Lab Sample ID: 400-146112-18**
Date Collected: 11/16/17 09:44 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 15:47	1

Client Sample ID: O-84 — **Lab Sample ID: 400-146112-19**
Date Collected: 11/16/17 10:04 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 15:48	1

Client Sample ID: O-84 (Equipment Blank) — **Lab Sample ID: 400-146112-20**
Date Collected: 11/16/17 10:08 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 14:30	1

Client Sample ID: Duplicate -O-64 — **Lab Sample ID: 400-146112-21**
Date Collected: 11/16/17 11:51 — **Matrix: Water**
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:55	11/22/17 15:36	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-146112-1

Client Sample ID: Field Blank #1

Lab Sample ID: 400-146112-22

Date Collected: 11/15/17 14:40
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:55	11/22/17 15:37	1

Client Sample ID: Field Blank #2

Lab Sample ID: 400-146112-23

Date Collected: 11/16/17 09:35
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:55	11/22/17 15:50	1

Client Sample ID: Field Spike

Lab Sample ID: 400-146112-24

Date Collected: 11/16/17 09:38
Matrix: Water
Date Received: 11/16/17 14:55

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:55	11/22/17 15:52	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-376260/14-A
Matrix: Water
Analysis Batch: 377059

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 376260

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/16/17 14:41	11/22/17 14:32	1

Lab Sample ID: LCS 400-376260/15-A
Matrix: Water
Analysis Batch: 377059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 376260

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000965		mg/L		96	80 - 120

Lab Sample ID: MB 400-376895/14-A
Matrix: Water
Analysis Batch: 377059

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 376895

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/21/17 16:40	11/22/17 13:18	1

Lab Sample ID: LCS 400-376895/15-A
Matrix: Water
Analysis Batch: 377059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 376895

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000911		mg/L		90	80 - 120

Lab Sample ID: 400-146112-11 MS
Matrix: Water
Analysis Batch: 377059

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 376895

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00193		mg/L		96	80 - 120

Lab Sample ID: 400-146112-11 MSD
Matrix: Water
Analysis Batch: 377059

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 376895

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00185		mg/L		92	80 - 120	4	20

Client Sample ID: O-59
Lab Sample ID: 400-146112-1
Date Collected: 11/15/17 14:31
Matrix: Water
Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:21	JAP	TAL PEN

Client Sample ID: O-59 (Equipment Blank)
Lab Sample ID: 400-146112-2
Date Collected: 11/15/17 14:35
Matrix: Water
Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:23	JAP	TAL PEN

Client Sample ID: O-60
Lab Sample ID: 400-146112-3
Date Collected: 11/15/17 14:26
Matrix: Water
Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:25	JAP	TAL PEN

Client Sample ID: O-60 (Equipment Blank)
Lab Sample ID: 400-146112-4
Date Collected: 11/15/17 14:30
Matrix: Water
Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:28	JAP	TAL PEN

Client Sample ID: O-61
Lab Sample ID: 400-146112-5
Date Collected: 11/15/17 15:07
Matrix: Water
Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:30	JAP	TAL PEN

Client Sample ID: O-61 (Equipment Blank)
Lab Sample ID: 400-146112-6
Date Collected: 11/15/17 15:11
Matrix: Water
Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:31	JAP	TAL PEN

Client Sample ID: O-62

Lab Sample ID: 400-146112-7

Date Collected: 11/16/17 11:14

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:44	JAP	TAL PEN

Client Sample ID: O-62 (Equipment Blank)

Lab Sample ID: 400-146112-8

Date Collected: 11/16/17 11:18

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:53	JAP	TAL PEN

Client Sample ID: O-63

Lab Sample ID: 400-146112-9

Date Collected: 11/16/17 11:05

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:55	JAP	TAL PEN

Client Sample ID: O-63 (Equipment Blank)

Lab Sample ID: 400-146112-10

Date Collected: 11/16/17 11:09

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:56	JAP	TAL PEN

Client Sample ID: O-64

Lab Sample ID: 400-146112-11

Date Collected: 11/16/17 11:51

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 13:58	JAP	TAL PEN

Client Sample ID: O-64 (Equipment Blank)

Lab Sample ID: 400-146112-12

Date Collected: 11/16/17 11:55

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 14:05	JAP	TAL PEN

Client Sample ID: O-81

Lab Sample ID: 400-146112-13

Date Collected: 11/16/17 12:45

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 14:07	JAP	TAL PEN

Client Sample ID: O-81 (Equipment Blank)

Lab Sample ID: 400-146112-14

Date Collected: 11/16/17 12:49

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 14:20	JAP	TAL PEN

Client Sample ID: O-82

Lab Sample ID: 400-146112-15

Date Collected: 11/16/17 13:14

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 14:21	JAP	TAL PEN

Client Sample ID: O-82 (Equipment Blank)

Lab Sample ID: 400-146112-16

Date Collected: 11/16/17 13:18

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 14:23	JAP	TAL PEN

Client Sample ID: O-83

Lab Sample ID: 400-146112-17

Date Collected: 11/16/17 09:41

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 14:25	JAP	TAL PEN

Client Sample ID: O-83 (Equipment Blank)

Lab Sample ID: 400-146112-18

Date Collected: 11/16/17 09:44

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 15:47	JAP	TAL PEN

Client Sample ID: O-84

Lab Sample ID: 400-146112-19

Date Collected: 11/16/17 10:04

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 15:48	JAP	TAL PEN

Client Sample ID: O-84 (Equipment Blank)

Lab Sample ID: 400-146112-20

Date Collected: 11/16/17 10:08

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376895	11/21/17 16:40	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 14:30	JAP	TAL PEN

Client Sample ID: Duplicate -O-64

Lab Sample ID: 400-146112-21

Date Collected: 11/16/17 11:51

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376260	11/21/17 16:55	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 15:36	JAP	TAL PEN

Client Sample ID: Field Blank #1

Lab Sample ID: 400-146112-22

Date Collected: 11/15/17 14:40

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376260	11/21/17 16:55	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 15:37	JAP	TAL PEN

Client Sample ID: Field Blank #2

Lab Sample ID: 400-146112-23

Date Collected: 11/16/17 09:35

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376260	11/21/17 16:55	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 15:50	JAP	TAL PEN

Client Sample ID: Field Spike

Lab Sample ID: 400-146112-24

Date Collected: 11/16/17 09:38

Matrix: Water

Date Received: 11/16/17 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			376260	11/21/17 16:55	JAP	TAL PEN
Total/NA	Analysis	7470A		1	377059	11/22/17 15:52	JAP	TAL PEN

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-146112-1

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

400-146112 COC

Client Information	Sampler: Brian Kittrell	Lab PM: Wilson, Jason A	Ca	COC No: 400-69181-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: jason.wilson@testamericainc.com		Page: Page 1 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:	Analysis Requested
City: Axis	TAT Requested (days):	
State, Zip: AL, 36505		
Phone:	PO #: 4100001642	
Email: sylvia.williams@akzonobel.com	WO #:	
Project Name: AKZO - Semiannual Hg	Project #: 40003052	
Site:	SSOW#:	

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-59	11-15-17	1431	G	Water			✓		
O-59 (Equipment Blank)		1435		Water					
O-60		1426		Water					
O-60 (Equipment Blank)		1430		Water					
O-61		1507		Water					
O-61 (Equipment Blank)	11-15-17	1511		Water					
O-62	11-16-17	1114		Water					
O-62 (Equipment Blank)		1118		Water					
O-63		1105		Water					
O-63 (Equipment Blank)		1109		Water					
O-64	11-16-17	1151	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Brian Kittrell	Date/Time: 11-16-17 1455	Company: SEVERN TRENT	Received by:	Date/Time: 11-16-17 14:55	Company: TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: 400-146112 | Cooler Temperature(s) °C and Other Remarks: 2.3°C #5592

Ver: 08/04/2016

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-69181-21846.2
Client Contact: Ms. Sylvia Williams	Phone:	E-Mail: jason.wilson@testamericainc.com		Page: Page 2 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	11-16-17	1155		Water			✓		
O-81		1245		Water					
O-81 (Equipment Blank)		1249		Water					
O-82		1314		Water					
O-82 (Equipment Blank)		1318		Water					
O-83		0941		Water					
O-83 (Equipment Blank)		0944		Water					
O-84		1604		Water					
O-84 (Equipment Blank)		1008		Water					
Duplicate - O-64	11-16-17	1151		Water			✓		
Field Blank #1	11-15-17	1440		Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:				
Relinquished by: Susan Kilduff	Date/Time: 11-16-17 1455	Company	Received by: Mansfield	Date/Time: 11-16-17 14:[illegible]	Company TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 08/04/2016

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-69181-21846.3
Client Contact: Ms. Sylvia Williams	Phone:	E-Mail: jason.wilson@testamericainc.com		Page: Page 3 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
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C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	11-16-17	0935		Water			✓		
MS 0-64	↓	1151		Water			✓		
MSD 0-64		1151		Water			✓		
Field Spike	11-16-17	0938		Water			✓		
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Pam Kittrell	Date/Time: 11-16-17 1455	Company	Received by: Manfred Lam	Date/Time: 11-16-17 14:55	Company TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 08/04/2016

Sulfur Derivatives 13440 Highway 43 N Tel (251) 675-1310
Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

January 30, 2019

Chief, South Programs Section
RCRA Programs Branch
Waste Management Division
USEPA, Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-3104
Telephone: (404) 562-8174

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Chief,

Please find enclosed copies of the 2018A and 2018B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.65 to 2.27 ft/day during the 2018A event and 1.67 to 2.30 ft/day for the 2018B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315.

Sincerely

Sylvia Williams

Senior Environmental Engineer

Federal Express Tracking Number: 7743 5474 0035

Sulfur Derivatives 13440 Highway 43 N Tel (251) 675-1310
Axis, Al 36505 Fax (251) 679-4368

AkzoNobel

January 30, 2019

Mr. Clay Messer
Chief Land Division
Alabama Department of Environmental Management
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

Re: Akzo Nobel Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Mr. Messer,

Please find enclosed copies of the 2018A and 2018B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.65 to 2.27 ft./day during the 2018A event and 1.67 to 2.30 ft./day for the 2018B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315

Sincerely

Sylvia Williams

Senior Environmental Engineer

CC: Austin Pierce , ADEM Land Division

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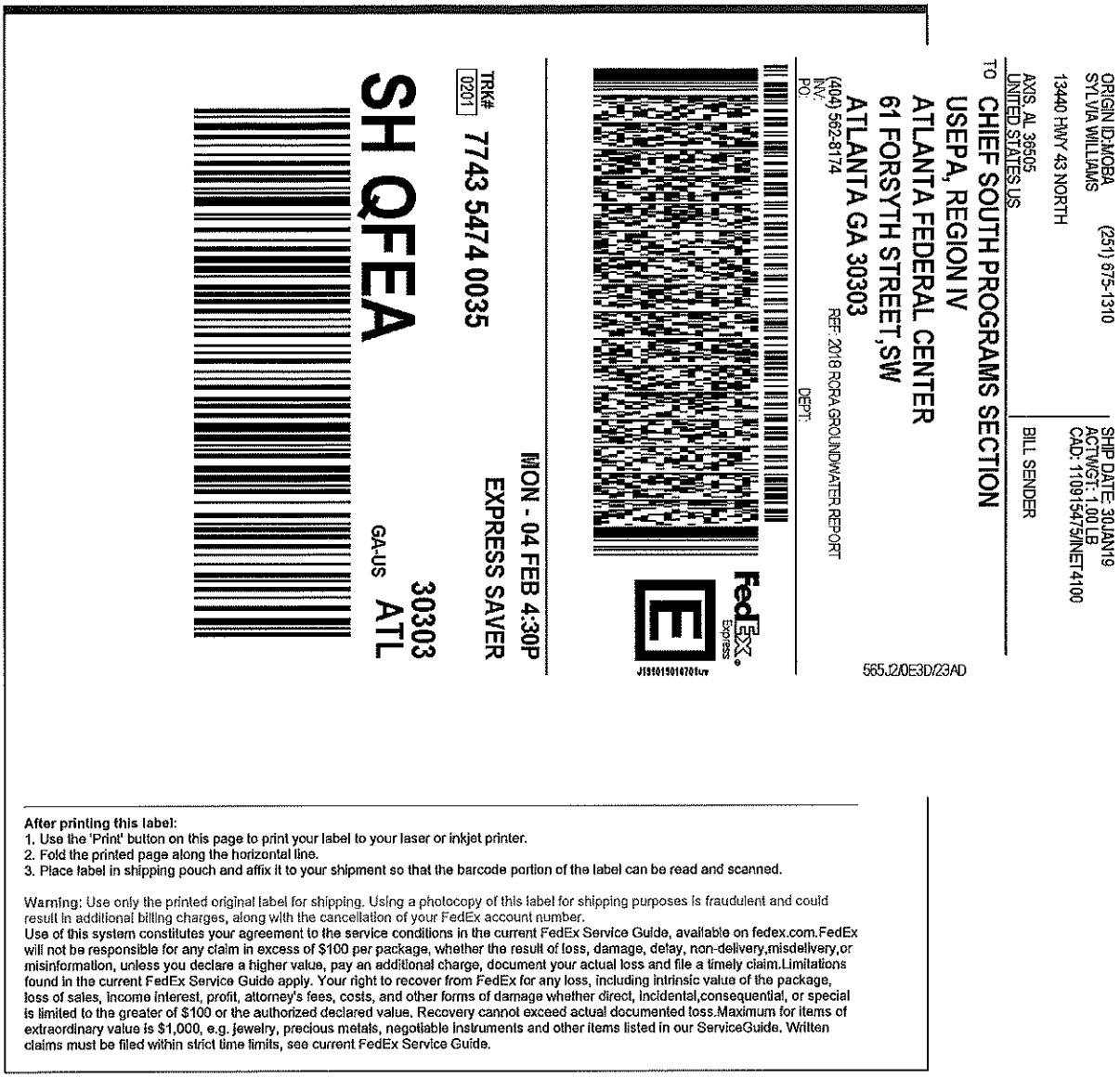

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Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL		Well Data May 2018				
NUMBER	GRADIENT	1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL		Well Data May 2018					Comparison Data		
NUMBER	GRADIENT	1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III

GROUNDWATER LEVEL DETERMINATION

May, 2018

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	26.50	11.63	119.7	
060	37.78	26.10	11.68	95.27	
061	37.79	26.10	11.69	72.00	
062	35.04	23.44	11.60	116.7	
063	35.27	23.65	11.62	92.07	
064	34.86	23.22	11.64	77.14	
067					Water Elevation Only
068					Water Elevation Only
081	35.56	23.73	11.83	67.94	
082	35.52	23.80	11.72	117.66	
083	36.02	24.20	11.82	67.88	
084	36.31	24.75	11.56	119.80	

TABLE IV

Groundwater Flow Velocity

2018A

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.06	0.590	2.10	2.89
Mid	060 to 063	519.00	2.45	0.472	1.68	2.31
Shallow	061 to 064	519.00	2.88	0.555	1.98	2.72
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	1.90	0.358	1.28	1.75
Deep	059 to 082	519.00	2.70	0.520	1.85	2.55
Deep	059 to 084	556.00	1.75	0.315	1.12	1.54
		AVG	**2.42**	**0.46**	**1.65**	**2.27**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

Table I
TOTAL MERCURY (unfiltered)
ANALYSIS RESULTS SUMMARY (Test America Mobile, Al)

Method: Mercury 7470A

WELL		Well Data November 2018				
NUMBER	GRADIENT	1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

Table II
STATISTICAL EVALUATION OF DATA USING ANOVA **

Reference: Statistical Analysis of Variance

Procedure: The downgradient well analyses are compared to the corresponding upgradient well with approximately the same screened internal depth.

WELL		Well Data November 2018					Comparison Data		
NUMBER	GRADIENT	1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L
** The computation of ANOVA is not possilbe as there is no variability of the data.

TABLE III

GROUNDWATER LEVEL DETERMINATION

Elevations taken November ,2018 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	27.70	10.43	119.72	
060	37.78	27.36	10.42	95.29	
061	37.79	27.36	10.43	72.00	
062	35.04	24.63	10.41	116.65	
063	35.27	24.84	10.43	92.29	
064	34.86	24.38	10.48	77.08	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	24.95	10.61	67.92	
082	35.52	25.06	10.46	117.6	
083	36.02	25.37	10.65	67.88	
084	36.31	25.98	10.33	118.02	

TABLE IV

Groundwater Flow Velocity

2018B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.07	0.592	2.11	2.90
Mid	060 to 063	519.00	2.52	0.486	1.73	2.38
Shallow	061 to 064	519.00	2.98	0.574	2.05	2.81
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	1.99	0.375	1.34	1.84
Deep	059 to 082	519.00	2.64	0.509	1.81	2.49
Deep	059 to 084	556.00	1.72	0.309	1.10	1.52
		AVG	**2.45**	**0.47**	**1.67**	**2.30**

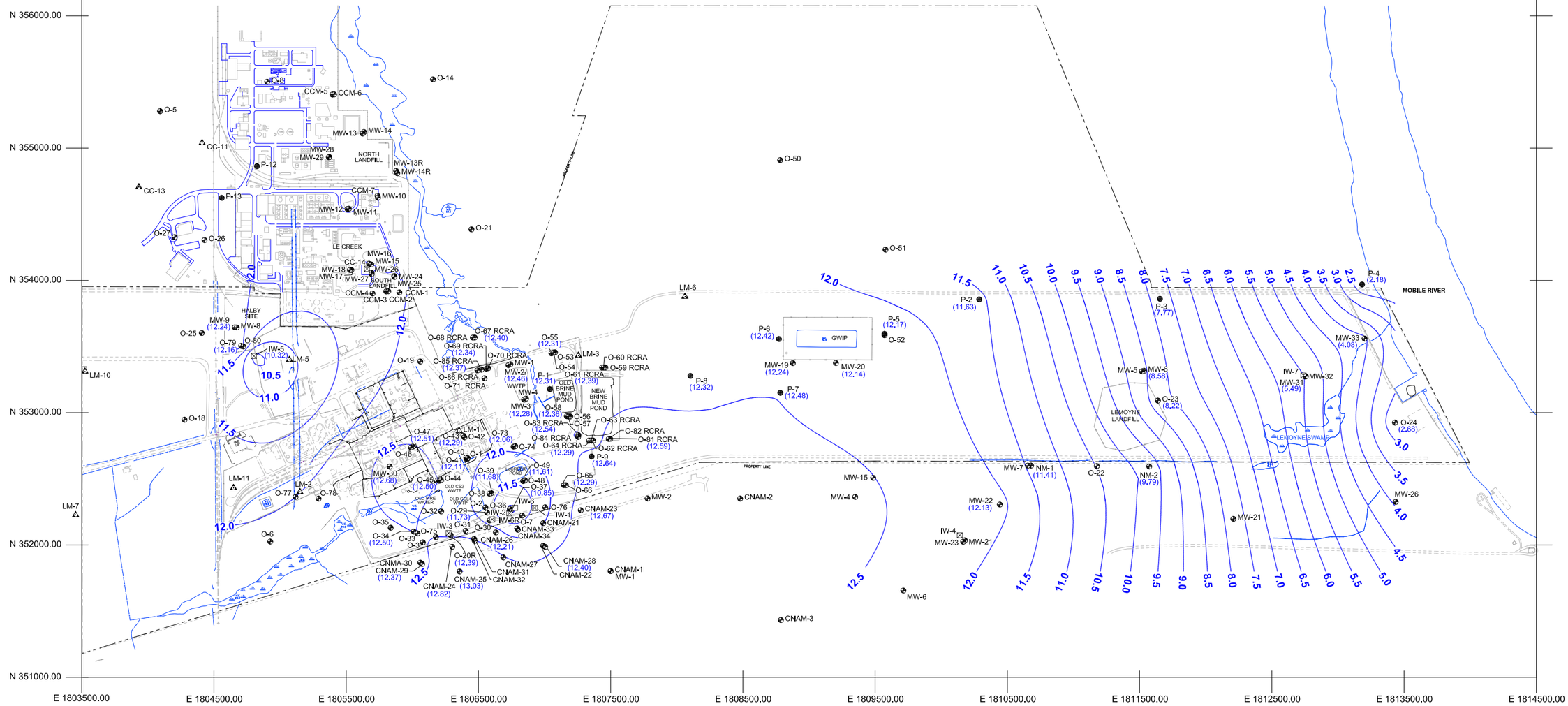
Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.00	0.03	0.05	0.00	0.00	0.00	0.16	0.06	0.09	0.00	0.71	0.17
2	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.37	0.00	0.00	0.00
3	0.00	0.30	0.00	0.25	0.00	0.45	0.48	0.00	0.23	0.00	0.00	0.00
4	0.00	0.05	0.00	0.07	0.00	0.00	0.00	0.00	2.03	0.00	0.06	0.00
5	0.24	0.26	0.04	0.00	0.00	1.20	0.23	0.00	0.49	0.00	0.04	0.00
6	0.68	0.16	0.16	0.58	0.00	0.00	0.00	0.00	1.41	0.00	0.24	0.00
7	0.26	0.13	0.00	0.16	0.00	0.00	0.38	0.01	1.06	0.00	0.41	0.10
8	0.00	0.09	0.00	4.18	0.00	0.00	0.01	0.00	0.00	0.00	0.11	6.17
9	0.00	0.06	0.00	0.00	0.00	0.39	0.00	0.00	0.01	0.03	0.10	0.00
10	0.21	0.07	0.00	0.00	0.00	0.00	0.38	0.10	0.11	0.00	0.01	0.00
11	0.00	0.05	0.50	0.00	0.00	0.43	0.00	0.00	2.79	0.00	0.23	0.01
12	0.00	0.03	0.00	0.00	0.00	0.44	0.00	0.65	0.04	0.00	1.94	0.00
13	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.38	0.00	0.33	0.82
14	0.00	0.06	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.02	0.22
15	0.00	0.08	0.00	1.56	0.00	0.14	0.62	0.00	0.00	0.00	0.00	0.00
16	0.00	0.03	0.55	0.00	0.02	0.03	0.00	0.10	0.00	0.00	0.00	0.00
17	0.60	0.02	0.13	0.00	1.25	0.14	0.97	0.42	0.01	0.00	0.00	0.00
18	0.03	0.03	0.19	0.00	0.00	0.03	0.00	0.70	0.03	0.00	0.00	0.00
19	0.04	0.09	0.10	0.00	0.00	0	0.00	1.93	0.00	0.00	0.00	1.00
20	0.30	0.08	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.30
21	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00
22	0.00	0.07	0.00	0.55	0.29	0.00	0.00	0.00	0.00	0.01	0.00	0.00
23	0.06	0.04	0.00	0.00	0.01	0.37	0.00	0.00	0.00	0.06	0.73	0.00
24	0.00	0.07	0.00	0.00	0.06	0.00	0.00	0.00	0.86	0.15	0.00	0.00
25	0.00	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.11	0.00	0.00	0.00
26	0.00	0.07	0.00	0.14	0.00	0.06	0.00	0.07	0.11	0.00	0.00	0.00
27	0.10	0.06	0.00	0.00	0.02	0.03	0.00	0.00	0.73	0.00	0.00	1.38
28	0.03	0.05	0.00	0.00	0.64	0.19	0.00	0.00	0.02	0.00	0.00	0.39
29	0.00	0.07	1.56		0.07	0.00	0.01	0.62	0.00	0.00	0.00	0.20
30	0.10	0.08	0.00	2.26	0.36	0.44	0.39	0.01	0.53	0.00	0.34	0.01
31	0.30		0.00		0.01		0.93	0.00		0.01		0.62
Total	3.03	2.25	3.28	9.75	2.74	4.50	4.61	5.22	11.41	0.26	5.27	11.39
Tot for year		63.71										
	* gauge did not record, but no rain.				PO power outtage							
	^ gauge was not legible											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LE CREEK
NORTH LANDFILL
SOUTH LANDFILL
HALBY SITE
GWIP
OLD BRINE MUD POND
NEW BRINE MUD POND
WWTP
OLD CS2 WWTP
OLD BRINE WATER
LEMOYNE LANDFILL
LEMOYNE SWAMP
PROPERTY LINE
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CC-11
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MW-13R
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MW-12
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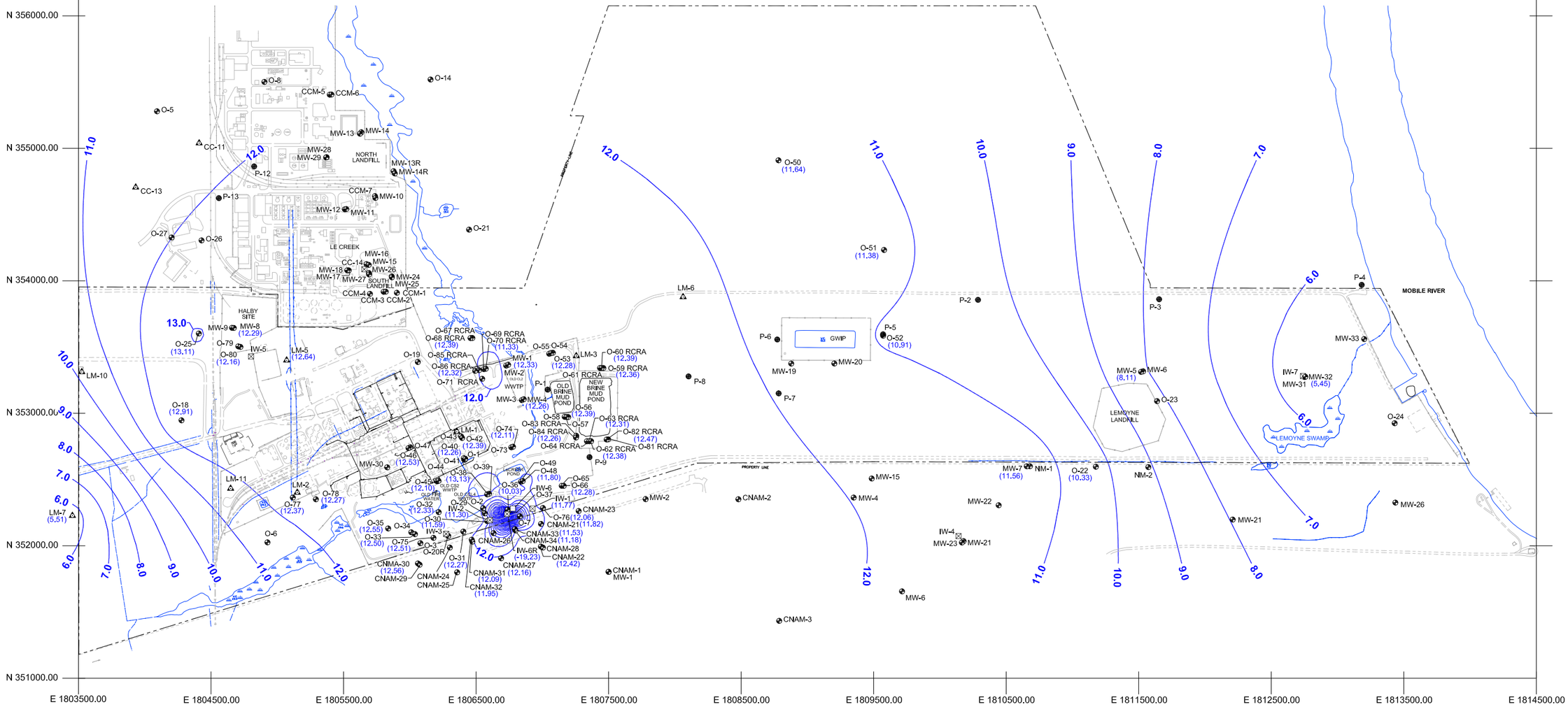


LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (12.06) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET

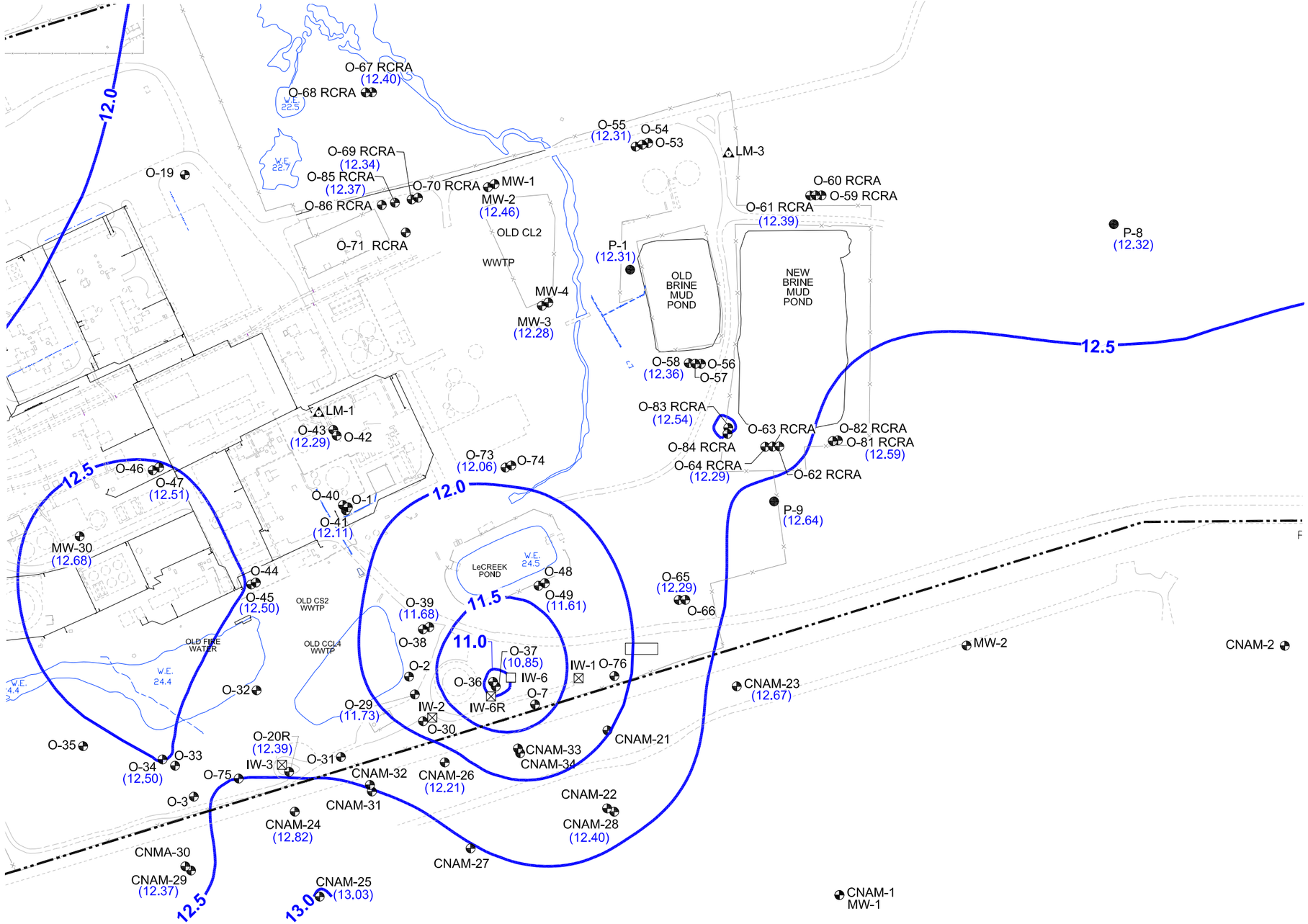
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: May2018-GW-Deep.dwg Date:05/23/2018

GROUNDWATER ELEVATION MAP
DEEP ZONE
15 MAY 2018

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (10.85) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

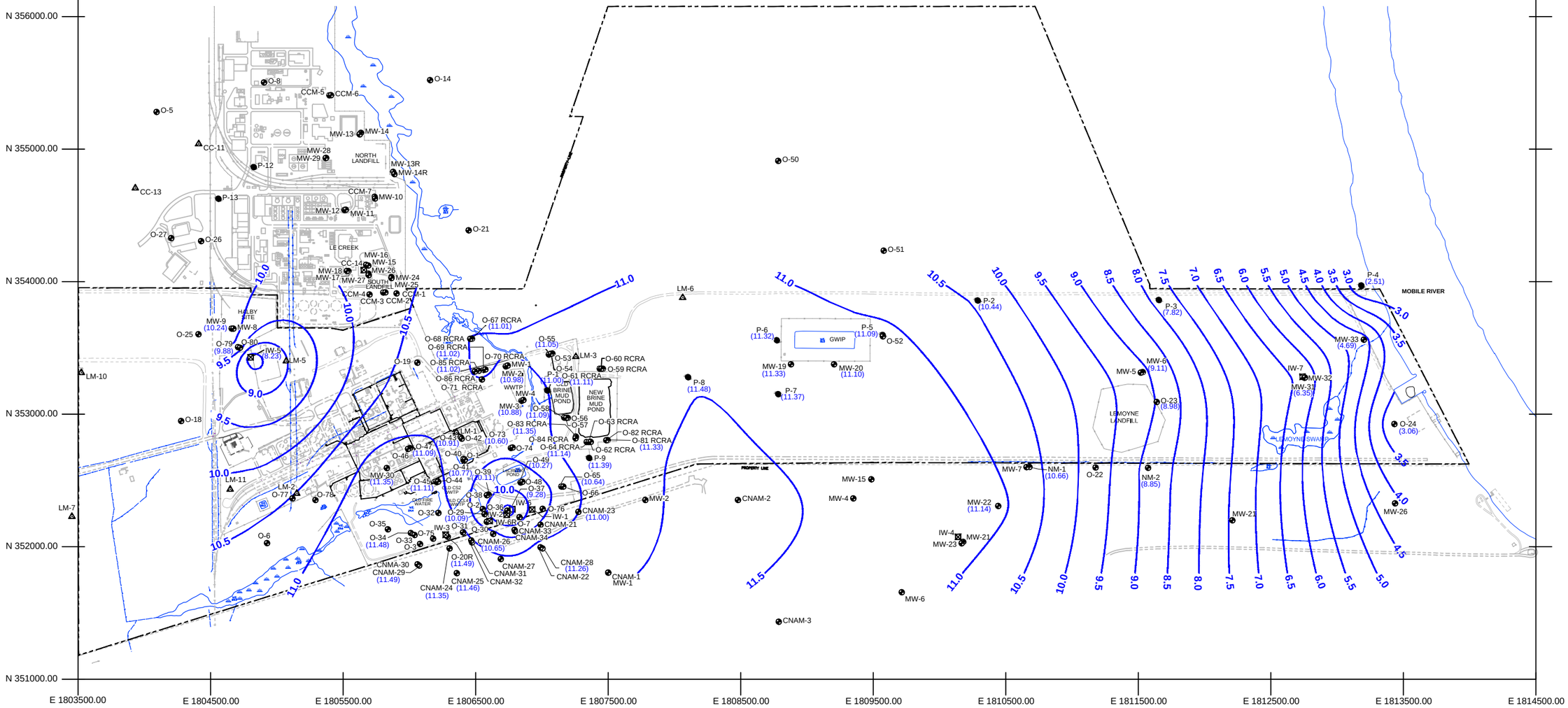
N W E S

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: May2018-GW-Shallow-NBMA.dwg Date:05/25/2018

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
15 MAY 2018

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.35) — GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET

APPROXIMATE SCALE IN FEET

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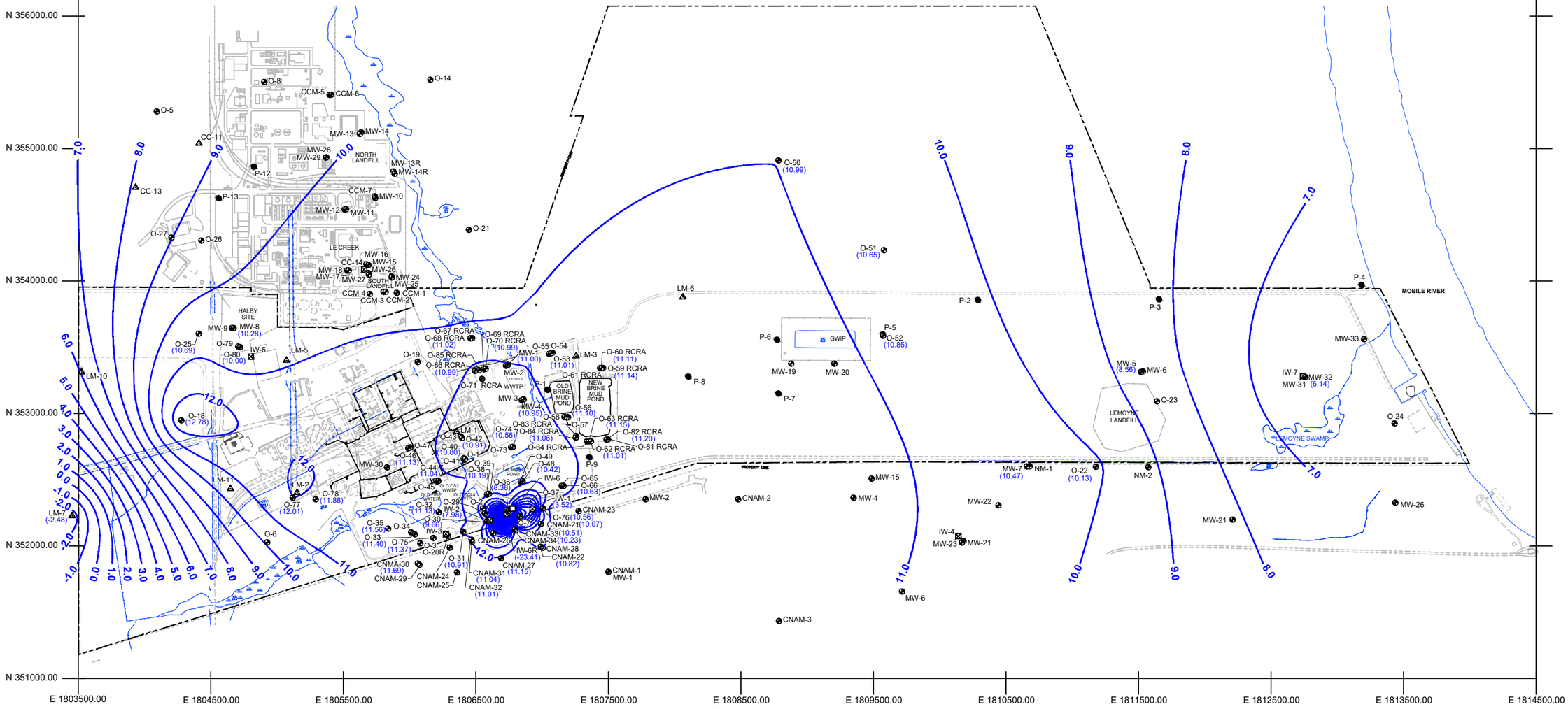
Project No. AN010-012-01 File: November2018-GW-Shallow.dwg Date:12/10/2018

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
13 NOVEMBER 2018

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

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- (11.01) GROUNDWATER ELEVATION
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0 400 800 FEET

APPROXIMATE SCALE IN FEET

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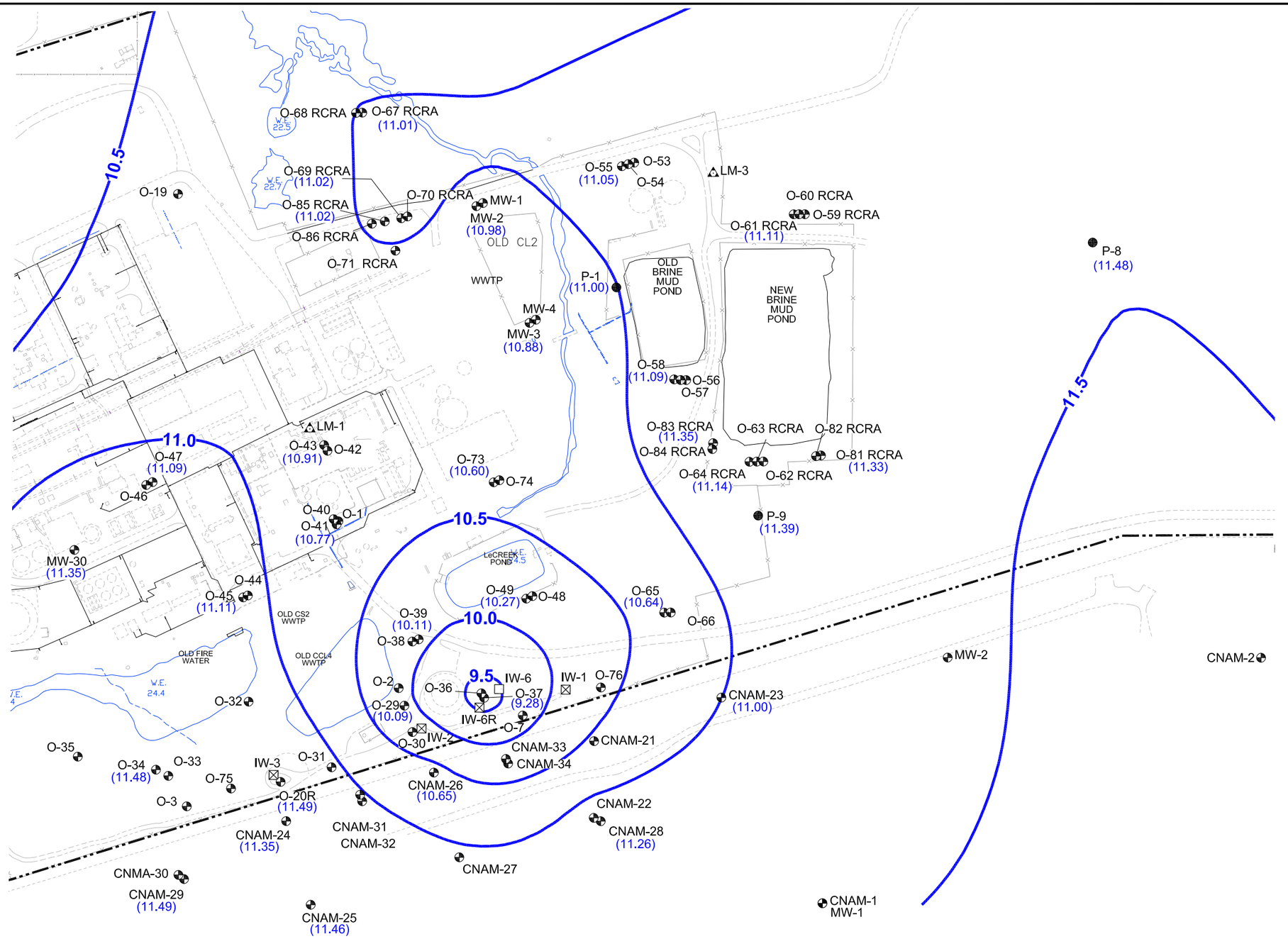
Project No. AN010-012-01 File: November2018-GW-Deep.dwg Date:12/10/2018

GROUNDWATER ELEVATION MAP
DEEP ZONE
13 NOVEMBER 2018

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 10.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.35) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
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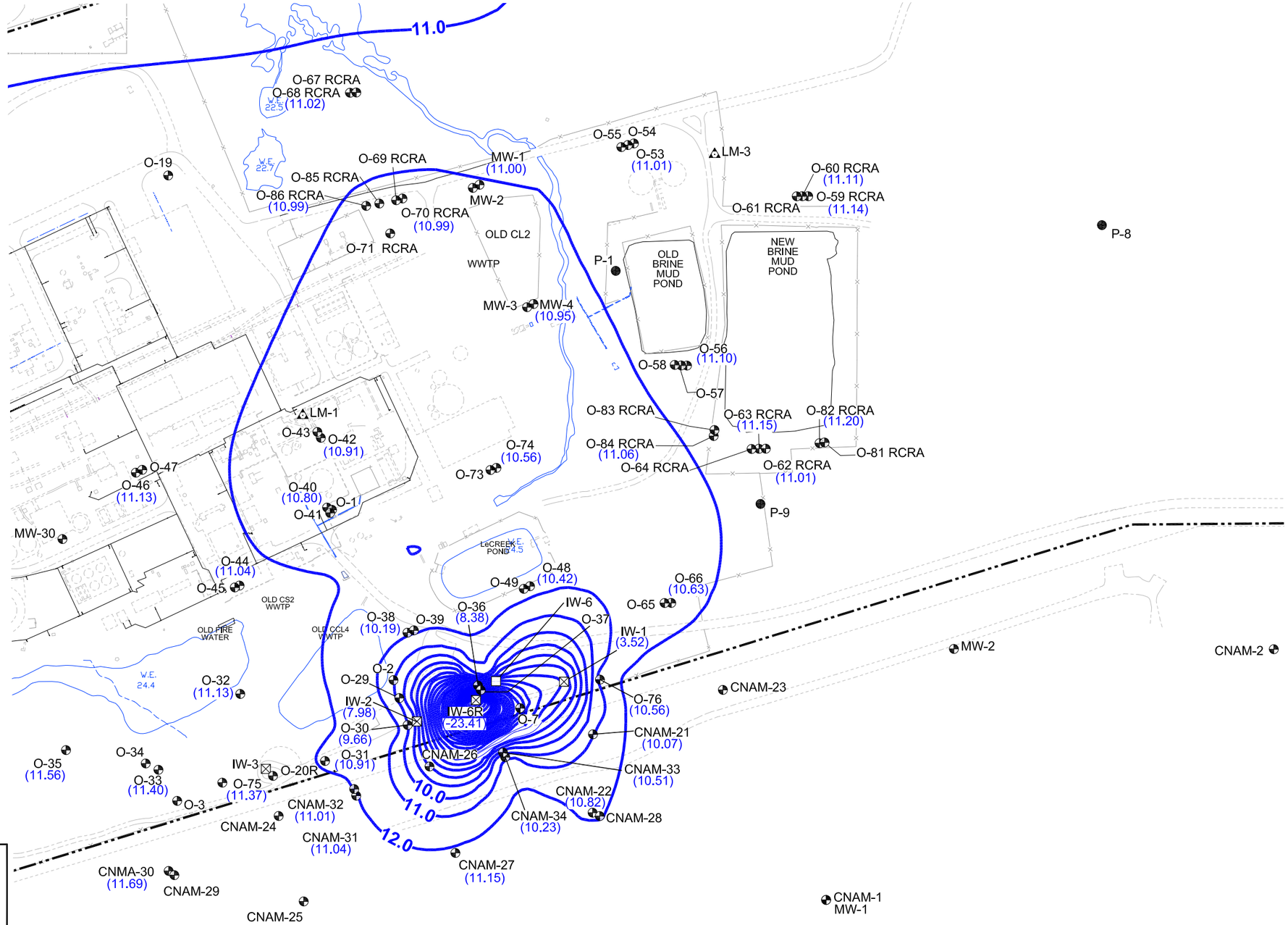
(609) 259-8200 Fax (609) 259-8288

Project No. AN010-012-01 File: November2018-GW-Shallow-NBMA.dwg Date:12/10/2018

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
13 NOVEMBER 2018

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

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0 120 240 FEET
APPROXIMATE SCALE IN FEET

N W E S

Sovereign Consulting Inc.
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Project No. AN010-012-01 File: November2018-GW-Deep-NBMA.dwg Date:12/10/2018

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
13 NOVEMBER 2018

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

Akzo Nobel Functional Chemicals LLC — O-59

LeMoyne Plant

RCRA Groundwater Monitor Well O-59 — Sampling / Inspection Log Sheet

Date: 5.9.18 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	123	125.54
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes /(No)
Describe: _____

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: Brian Kittell Date: 5 / 9 / 18
Company: Sovereign Consulting Inc.
Arrival Time: 0800 Departure Time: 1645
Conditions:
General Weather (recent rain, wind direction, etc.): Sunny, 80°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 26.50
Depth to Bottom: 119.70

Pump Used: (Yes) / No
Depth of Pump: ~28
Began: 1004 (time)
Ended: 1205 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 189 gal/liter

Bailer Used: Yes /(No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes /(No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 99%

1024
Field Measurement No. 1
Water Temperature: 21.0 °C
pH: 6.12
Cond: 235 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1044
Field Measurement No. 2
Water Temperature: 21.0 °C
pH: 6.08
Cond: 240 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1104
Field Measurement No. 3
Water Temperature: 21.1 °C
pH: 6.07
Cond: 240 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60 — Sampling / Inspection Log Sheet

Date: 5-9-18 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.24
Screened Interval	-37.46/-57.46	73/ 93	75. 24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: C racked Yes/No Other:
Concrete Pad: Cracks: Yes/No Describe:
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event
Sampler's Name: Brian Kittell Date: 5 / 9 / 18
Company: Sovereign Consulting Inc.

Arrival Time: 0800 Departure Time: 1645
Conditions:
General Weather (recent rain, wind direction, etc.): Sunny 83°
Standing Water around Well:

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 26.10
Depth to Bottom: 95.27

Pump Used: Yes / No
Depth of Pump: 28'
Began: 1045 (time)
Ended: 1130 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 135 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003
Pump Serial # 28540
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1 — 1100

Water Temperature: 21.0 ° C
pH: 5.10
Cond: 140 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2 — 1115

Water Temperature: _____ ° C
pH: 5.13
Cond: 140 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3 — 1130

Water Temperature: 21.0 ° C
pH: 5.10
Cond: 140 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61 — Sampling / Inspection Log Sheet

Date: 5-9-18 Signed: Brian Kebbell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.79
Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	70	72.48
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kebbell Date: 5 / 9 / 18
Company: Sovereign Consulting Inc.

Arrival Time: 0800 Departure Time: 1645
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 86
Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 26.10
Depth to Bottom: 72.00

Pump Used: Yes / No
Depth of Pump: 28'
Began: 1242 (time)
Ended: 1313 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: _____ gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

1252

Field Measurement No. 1
Water Temperature: 21.3 ° C
pH: 4.63
Cond: 217 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1302

Field Measurement No. 2
Water Temperature: 21.1 ° C
pH: 4.42
Cond: 219 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1312

Field Measurement No. 3
Water Temperature: 21.2 ° C
pH: 4.63
Cond: 220 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62 — Sampling / Inspection Log Sheet

Date: 5-10-18 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.04

Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	120	121.87
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/No Other: _____

Concrete Pad: Cracks: Yes/No Describe: _____

Protective Posts: In position Yes / No

Any indication of having been contacted by vehicle? Yes / No

Describe: _____

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittell Date: 5/10/18

Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time: _____

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 75°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.44

Depth to Bottom: 116.70

Pump Used: Yes / No

Depth of Pump: 26'

Began: 0900 (time)

Ended: 1003 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 189 gal/liter

Bailer Used: Yes / No

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 4910

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 1007o

Field Measurement No. 1 — 0921

Water Temperature: 20.3 ° C

pH: 5.93

Cond: 250 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 — 0942

Water Temperature: 20.1 ° C

pH: 5.91

Cond: 240 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 — 1003

Water Temperature: _____ ° C

pH: _____

Cond: _____ µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63 — Sampling / Inspection Log Sheet

Date: 5-10-18 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	93	94.99
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:
Concrete Pad: Cracks: Yes/No Describe:
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: Brian Kittell Date: 5/10/18
Company: Sovereign Consulting Inc.
Arrival Time: 0830 Departure Time:
Conditions:
General Weather (recent rain, wind direction, etc.): Sunny, 76°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 23.65
Depth to Bottom: 92.07

Pump Used: Yes / No
Depth of Pump: 25'
Began: 0910 (time)
Ended: 0955 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 135 gal/liter

Bailer Used: Yes / No
Bailer Volume: (gal/liter)
# of Bails Removed:
Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 99%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

0925

Field Measurement No. 1
Water Temperature: 20.4 ° C
pH: 4.94
Cond: 150 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0940

Field Measurement No. 2
Water Temperature: 20.2 ° C
pH: 4.97
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0955

Field Measurement No. 3
Water Temperature: 20.1 ° C
pH: 5.00
Cond: 175 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64 — Sampling / Inspection Log Sheet

Date: 5-10-18 Signed: Brian Kuttruff

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	76	78.02
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 23.22
Depth to Bottom: 77.14

Pump Used: Yes / No
Depth of Pump: 25
Began: 1010 (time)
Ended: 1046 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 105 gal/liter

Bailer Used: Yes /(No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kuttruff Date : 5 / 10 / 18
Company: Sovereign Consulting Inc.

Arrival Time: 0832 Departure Time: _____
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 78°
Standing Water around Well: None

Sampling Equipment Information:

Pump Model # 1A106003
Pump Serial # 28540
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 9/10

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 10/10

1022

Field Measurement No. 1
Water Temperature: 20.4 ° C
pH: 4.96
Cond: 80 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1034

Field Measurement No. 2
Water Temperature: 20.4 ° C
pH: 4.88
Cond: 20 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1046

Field Measurement No. 3
Water Temperature: _____ ° C
pH: _____
Cond: _____ µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81 — Sampling / Inspection Log Sheet

Date: 5-9-18 Signed: Brian Kitchell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	67.5
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kitchell Date: 5 / 9 / 18

Company: Sovereign Consulting Inc.

Arrival Time: 0800 Departure Time: 1645

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 88

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 13.73

Depth to Bottom: 47.94

Pump Used: Yes / No

Depth of Pump:

Began: 1418 (time)

Ended: 1449 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

1428

Field Measurement No. 1

Water Temperature: 20.3 ° C

pH: 5.36

Cond: 80 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1438

Field Measurement No. 2

Water Temperature: 20.2 ° C

pH: 5.40

Cond: 80 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1448

Field Measurement No. 3

Water Temperature: 20.2 ° C

pH: 5.38

Cond: 80 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82 — Sampling / Inspection Log Sheet

Date: 5-9-18 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

~~Measuring Point~~ (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	120	122.62
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes / (No) Other:

Concrete Pad: Cracks: Yes / (No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittrell Date: 5 / 9 / 18

Company: Sovereign Consulting Inc.

Arrival Time: 0800 Departure Time: 1645

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 88°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.80

Depth to Bottom: 117.46

Pump Used: Yes / No

Depth of Pump:

Began: 1355 (time)

Ended: 1458 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 999

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 1007

Field Measurement No. 1 — 1416

Water Temperature: 20.5 °C

pH: 5.99

Cond: 220 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2 — 1437

Water Temperature: 20.1 °C

pH: 5.95

Cond: 220 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 — 1458

Water Temperature: 20.2 °C

pH: 5.92

Cond: 220 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83 — Sampling / Inspection Log Sheet

Date: 5-10-18 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.82
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittell Date: 5 / 10 / 18

Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time:

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 80°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.20

Depth to Bottom: 67.88

Pump Used: Yes / No

Depth of Pump: 26'

Began: 11.30 (time)

Ended: 1202 (time)

Pumping Rate: _____ (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1 — 1140

Water Temperature: 21.5 °C

pH: 5.40

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 — 1150

Water Temperature: 21.2 °C

pH: 5.32

Cond: 135 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 — 1200

Water Temperature: 21.4 °C

pH: 5.24

Cond: 130 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear. No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84 — Sampling / Inspection Log Sheet

Date: 5-10-18 Signed: Ryan Kottwitz

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.09
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Ryan Kottwitz Date: 5 / 10 / 18

Company: Sovereign Consulting Inc.

Arrival Time: 0830 Departure Time:

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 82°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.75

Depth to Bottom: 119.80

Pump Used: Yes / No

Depth of Pump: 261

Began: 1105 (time)

Ended: 1209 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 189 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 99%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1 — 1126

Water Temperature: 20.8 °C

pH: 6.03

Cond: 250 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 — 1147

Water Temperature: 20.6 °C

pH: 5.97

Cond: 250 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 — 1208

Water Temperature: 20.5 °C

pH: 5.92

Cond: 250 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Functional Chemicals LLC — O-59

LeMoyne Plant

RCRA Groundwater Monitor Well O-59 — Sampling / Inspection Log Sheet

Date: 11-15-18 Signed: Brian Kotkill

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	123	125.54
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other: _____
Concrete Pad: Cracks: Yes/No Describe: _____
Protective Posts: In position Yes/No
Any indication of having been contacted by vehicle? Yes / No
Describe: _____

Samples:
Purpose of Sampling: RCRA semi-annual event
Sampler's Name: Brian Kotkill Date: 11/15/18
Company: Sovereign Consulting Inc.
Arrival Time: 0820 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny NW 10-15
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 27.70
Depth to Bottom: 119.32

Pump Used: Yes / No
Depth of Pump: 29'
Began: 1142 (time)
Ended: 1249 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 204 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / No
Note any unusual events: No

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

1204

Field Measurement No. 1
Water Temperature: 19.9 °C
pH: 6.22
Cond: 250 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1226

Field Measurement No. 2
Water Temperature: 19.5 °C
pH: 6.21
Cond: 250 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1248

Field Measurement No. 3
Water Temperature: _____ °C
pH: 6.21
Cond: 245 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60 — Sampling / Inspection Log Sheet

Date: 11-15-18 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.24
Screened Interval	-37.46/-57.46	73/ 93	75. 24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: C racked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes/ No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittell Date : 11 / 15 / 18
Company: Sovereign Consulting Inc.

Arrival Time: 0820 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny NW 10-15
Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 27.36
Depth to Bottom: 95.29

Pump Used: Yes / No
Depth of Pump: 29
Began: 1150 (time)
Ended: 1236 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 138 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: No

Sampling Equipment Information:

Pump Model # 1A106003
Pump Serial # 28540
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

1205

Field Measurement No. 1
Water Temperature: 19.9 ° C
pH: 5.65
Cond: 150 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1220

Field Measurement No. 2
Water Temperature: 19.9 C
pH: 5.63
Cond: 150 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1235

Field Measurement No. 3
Water Temperature: 19.9 ° C
pH: 5.62
Cond: 150 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61 — Sampling / Inspection Log Sheet

Date: 11·15·18 Signed: Brian Kolstad

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.79
Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	70	72.48
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kolstad Date: 11 / 15 / 18
Company: Sovereign Consulting Inc.

Arrival Time: 0820 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny NW 15-20
Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 27.36
Depth to Bottom: 72.00

Pump Used: (Yes) / No
Depth of Pump: 29
Began: 1246 (time)
Ended: 1317 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

Field Measurement No. 1 — 1256

Water Temperature: 19.6 °C
pH: 7.00 4.65 (pH)
Cond: 215 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 — 1306

Water Temperature: 20.1 °C
pH: 4.62
Cond: 220 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 — 1316

Water Temperature: _____ °C
pH: 4.64
Cond: 220 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62 — Sampling / Inspection Log Sheet

Date: 11-16-18 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.04

Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	120	121.87
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other: _____

Concrete Pad: Cracks: Yes/(No) Describe: _____

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe: _____

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittell Date: 11 / 16 / 18

Company: Sovereign Consulting Inc.

Arrival Time: 0740 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.63

Depth to Bottom: 116.65

Pump Used: (Yes) / No

Depth of Pump: 26'

Began: 0815 (time)

Ended: 0916 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

0835

Field Measurement No. 1

Water Temperature: 18.6 °C

pH: 5.23

Cond: 220 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0855

Field Measurement No. 2

Water Temperature: 19.2 °C

pH: 5.21

Cond: 220 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0915

Field Measurement No. 3

Water Temperature: 19.0 °C

pH: 5.21

Cond: 220 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63 — Sampling / Inspection Log Sheet

Date: 11-16-18 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	93	94.99
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes/No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittell Date: 11 / 16 / 18
Company: Sovereign Consulting Inc.

Arrival Time: 0740 Departure Time: 1400
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny NW 5-10
Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 24.84
Depth to Bottom: 92.29

Pump Used: Yes / No
Depth of Pump: 26'
Began: 0818 (time)
Ended: 0903 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 135 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

0833

Field Measurement No. 1
Water Temperature: 18.9 °C
pH: 4.92
Cond: 190 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0848

Field Measurement No. 2
Water Temperature: 19.2 °C
pH: 4.94
Cond: 190 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0903

Field Measurement No. 3
Water Temperature: 19.1 °C
pH: 4.91
Cond: 190 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64 — Sampling / Inspection Log Sheet

Date: 11-16-18 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	76	78.02
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittell Date: 11 / 16 / 18
Company: Sovereign Consulting Inc.

Arrival Time: 0740 Departure Time: 1400
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny NW 5-10
Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 24.38
Depth to Bottom: 77.08

Pump Used: (Yes)/ No
Depth of Pump: 26'
Began: 0913 (time)
Ended: 0948 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 105 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 28540
Type Grundfos
Calibration n/a

pH Meter Model # 260
pH Meter Serial # 99280018
Type WTW
Calibration 100%

Cond Meter Model # 260
Cond Meter Serial # 99280018
Type WTW
Calibration 100%

0924

Field Measurement No. 1
Water Temperature: 19.2 °C
pH: 4.83
Cond: 80 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0935

Field Measurement No. 2
Water Temperature: 19.1 °C
pH: 4.80
Cond: 75 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0946

Field Measurement No. 3
Water Temperature: 19.2 °C
pH: 4.79
Cond: 75 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 11-16-18 Signed: Pam Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	67.5
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Pam Kittell Date: 11/16/18

Company: Sovereign Consulting Inc.

Arrival Time: 0740 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny NW 5-10

Standing Water around Well:

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.95

Depth to Bottom: 67.92

Pump Used: (Yes) / No

Depth of Pump: 26'

Began: 0952 (time)

Ended: 1020 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 84 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

1001

Field Measurement No. 1

Water Temperature: 19.0 ° C

pH: 4.83

Cond: 75 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1010

Field Measurement No. 2

Water Temperature: 19.0 ° C

pH: 4.88

Cond: 75 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1019

Field Measurement No. 3

Water Temperature: 19.0 ° C

pH: 4.90

Cond: 75 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82 — Sampling / Inspection Log Sheet

Date: 11-16-18 Signed: Evan Kottell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	120	122.62
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Evan Kottell Date: 11/16/18

Company: Sovereign Consulting Inc.

Arrival Time: 0740 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny NW 5-10

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 25.06

Depth to Bottom: 117.60

Pump Used: (Yes) / No

Depth of Pump: 27'

Began: 0950 (time)

Ended: 1051 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

1010

Field Measurement No. 1

Water Temperature: 19.1 °C

pH: 5.15

Cond: 200 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1030

Field Measurement No. 2

Water Temperature: 19.1 °C

pH: 5.20

Cond: 200 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1050

Field Measurement No. 3

Water Temperature: 19.2 °C

pH: 5.20

Cond: 200 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83 — Sampling / Inspection Log Sheet

Date: 11-15-18 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.82
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kittell Date: 11 / 15 / 18

Company: Sovereign Consulting Inc.

Arrival Time: 0820 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny NW 10-15

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 25.37

Depth to Bottom: 67.88

Pump Used: (Yes)/ No

Depth of Pump: 27'

Began: 1336 (time)

Ended: 1404 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 84 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

1345

Field Measurement No. 1

Water Temperature: 19.2 ° C

pH: 5.10

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1354

Field Measurement No. 2

Water Temperature: 20.3 ° C

pH: 5.12

Cond: 135 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1403

Field Measurement No. 3

Water Temperature: 20.2 C

pH: 5.10

Cond: 135 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84 — Sampling / Inspection Log Sheet

Date: 11-15-18 Signed: Brian Kettrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.09
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA semi-annual event

Sampler's Name: Brian Kettrell Date: 11 / 15 / 18

Company: Sovereign Consulting Inc.

Arrival Time: 0820 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny NW 10-15

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 25.98

Depth to Bottom: 118.02

Pump Used: (Yes) / No

Depth of Pump: 28'

Began: 1333 (time)

Ended: 1434 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type Grundfos

Calibration n/a

pH Meter Model # 260

pH Meter Serial # 99280018

Type WTW

Calibration 100%

Cond Meter Model # 260

Cond Meter Serial # 99280018

Type WTW

Calibration 100%

Field Measurement No. 1 — 1353

Water Temperature: 19.7 ° C

pH: 5.54

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 — 1413

Water Temperature: 20.2 ° C

pH: 5.50

Cond: 235 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 — 1433

Water Temperature: 20.3 ° C

pH: 5.50

Cond: 235 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-153456-1
Client Project/Site: AKZO- Semiannual Hg

For:
Akzo Nobel Functional Chemicals LLC
Akzo Nobel LeMoyne Site
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
5/18/2018 4:15:37 PM

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LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 400-153456-1

Laboratory: TestAmerica Pensacola

Narrative

Job Narrative
400-153456-1

Comments
No additional comments.

Receipt
The samples were received on 5/10/2018 4:12 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-153456-1

Client Sample ID: 0-59 — **Lab Sample ID: 400-153456-1**
Date Collected: 05/09/18 11:05 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:07	1

Client Sample ID: 0-59 (Equipment Blank) — **Lab Sample ID: 400-153456-2**
Date Collected: 05/09/18 11:10 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:09	1

Client Sample ID: 0-60 — **Lab Sample ID: 400-153456-3**
Date Collected: 05/09/18 11:31 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:26	1

Client Sample ID: 0-60 (Equipment Blank) — **Lab Sample ID: 400-153456-4**
Date Collected: 05/09/18 11:36 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:28	1

Client Sample ID: 0-61 — **Lab Sample ID: 400-153456-5**
Date Collected: 05/09/18 13:13 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:29	1

Client Sample ID: 0-61 (Equipment Blank) — **Lab Sample ID: 400-153456-6**
Date Collected: 05/09/18 13:17 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:31	1

Client Sample ID: 0-62 — **Lab Sample ID: 400-153456-7**
Date Collected: 05/10/18 10:04 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:33	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-153456-1

Client Sample ID: 0-62 (Equipment Blank) — **Lab Sample ID: 400-153456-8**
Date Collected: 05/10/18 10:08 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:35	1

Client Sample ID: 0-63 — **Lab Sample ID: 400-153456-9**
Date Collected: 05/10/18 09:56 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:36	1

Client Sample ID: 0-63 (Equipment Blank) — **Lab Sample ID: 400-153456-10**
Date Collected: 05/10/18 10:00 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:38	1

Client Sample ID: 0-64 — **Lab Sample ID: 400-153456-11**
Date Collected: 05/10/18 10:47 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:40	1

Client Sample ID: 0- 64 (Equipment Blank) — **Lab Sample ID: 400-153456-12**
Date Collected: 05/10/18 10:51 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:58	1

Client Sample ID: 0-81 — **Lab Sample ID: 400-153456-13**
Date Collected: 05/09/18 14:49 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:00	1

Client Sample ID: 0-81 (Equipment Blank) — **Lab Sample ID: 400-153456-14**
Date Collected: 05/09/18 14:52 — **Matrix: Water**
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:01	1

Client Sample ID: 0-82
Lab Sample ID: 400-153456-15
Date Collected: 05/09/18 14:59
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:03	1

Client Sample ID: 0-82(Equipment Blank)
Lab Sample ID: 400-153456-16
Date Collected: 05/09/18 15:04
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:05	1

Client Sample ID: 0-83
Lab Sample ID: 400-153456-17
Date Collected: 05/10/18 12:01
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:07	1

Client Sample ID: 0-83(Equipment Blank)
Lab Sample ID: 400-153456-18
Date Collected: 05/10/18 12:05
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:08	1

Client Sample ID: 0-84
Lab Sample ID: 400-153456-19
Date Collected: 05/10/18 12:10
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:10	1

Client Sample ID: 0-84(Equipment Blank)
Lab Sample ID: 400-153456-20
Date Collected: 05/10/18 12:15
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 15:19	1

Client Sample ID: 0-64 Duplicate
Lab Sample ID: 400-153456-21
Date Collected: 05/10/18 10:47
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 12:41	05/16/18 13:38	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-153456-1

Client Sample ID: Field Blank # 1

Lab Sample ID: 400-153456-22

Date Collected: 05/09/18 15:00
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 12:41	05/16/18 13:56	1

Client Sample ID: Field Blank # 2

Lab Sample ID: 400-153456-23

Date Collected: 05/10/18 09:30
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 12:41	05/16/18 13:58	1

Client Sample ID: Field Spike

Lab Sample ID: 400-153456-24

Date Collected: 05/10/18 09:32
Matrix: Water
Date Received: 05/10/18 16:12

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 12:41	05/16/18 14:00	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-397467/14-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 398048 — **Prep Batch: 397467**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 11:59	05/17/18 14:04	1

Lab Sample ID: LCS 400-397467/15-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 398048 — **Prep Batch: 397467**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.00107		mg/L		106	80 - 120

Lab Sample ID: 400-153456-11 MS — **Client Sample ID: 0-64**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 398048 — **Prep Batch: 397467**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00210		mg/L		104	80 - 120

Lab Sample ID: 400-153456-11 MSD — **Client Sample ID: 0-64**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 398048 — **Prep Batch: 397467**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00198		mg/L		98	80 - 120	6	20

Lab Sample ID: MB 400-397476/14-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 397863 — **Prep Batch: 397476**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/14/18 12:41	05/16/18 13:35	1

Lab Sample ID: LCS 400-397476/15-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 397863 — **Prep Batch: 397476**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.00107		mg/L		106	80 - 120

Lab Sample ID: 400-153456-21 MS — **Client Sample ID: 0-64 Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 397863 — **Prep Batch: 397476**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00208		mg/L		103	80 - 120

Lab Sample ID: 400-153456-21 MSD — **Client Sample ID: 0-64 Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 397863 — **Prep Batch: 397476**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00198		mg/L		98	80 - 120	5	20

Client Sample ID: 0-59

Lab Sample ID: 400-153456-1

Date Collected: 05/09/18 11:05

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:07	JAP	TAL PEN

Client Sample ID: 0-59 (Equipment Blank)

Lab Sample ID: 400-153456-2

Date Collected: 05/09/18 11:10

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:09	JAP	TAL PEN

Client Sample ID: 0-60

Lab Sample ID: 400-153456-3

Date Collected: 05/09/18 11:31

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:26	JAP	TAL PEN

Client Sample ID: 0-60 (Equipment Blank)

Lab Sample ID: 400-153456-4

Date Collected: 05/09/18 11:36

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:28	JAP	TAL PEN

Client Sample ID: 0-61

Lab Sample ID: 400-153456-5

Date Collected: 05/09/18 13:13

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:29	JAP	TAL PEN

Client Sample ID: 0-61 (Equipment Blank)

Lab Sample ID: 400-153456-6

Date Collected: 05/09/18 13:17

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:31	JAP	TAL PEN

Client Sample ID: 0-62

Lab Sample ID: 400-153456-7

Date Collected: 05/10/18 10:04

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:33	JAP	TAL PEN

Client Sample ID: 0-62 (Equipment Blank)

Lab Sample ID: 400-153456-8

Date Collected: 05/10/18 10:08

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:35	JAP	TAL PEN

Client Sample ID: 0-63

Lab Sample ID: 400-153456-9

Date Collected: 05/10/18 09:56

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:36	JAP	TAL PEN

Client Sample ID: 0-63 (Equipment Blank)

Lab Sample ID: 400-153456-10

Date Collected: 05/10/18 10:00

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:38	JAP	TAL PEN

Client Sample ID: 0-64

Lab Sample ID: 400-153456-11

Date Collected: 05/10/18 10:47

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:40	JAP	TAL PEN

Client Sample ID: 0- 64 (Equipment Blank)

Lab Sample ID: 400-153456-12

Date Collected: 05/10/18 10:51

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 14:58	JAP	TAL PEN

Client Sample ID: 0-81

Lab Sample ID: 400-153456-13

Date Collected: 05/09/18 14:49

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:00	JAP	TAL PEN

Client Sample ID: 0-81 (Equipment Blank)

Lab Sample ID: 400-153456-14

Date Collected: 05/09/18 14:52

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:01	JAP	TAL PEN

Client Sample ID: 0-82

Lab Sample ID: 400-153456-15

Date Collected: 05/09/18 14:59

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:03	JAP	TAL PEN

Client Sample ID: 0-82(Equipment Blank)

Lab Sample ID: 400-153456-16

Date Collected: 05/09/18 15:04

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:05	JAP	TAL PEN

Client Sample ID: 0-83

Lab Sample ID: 400-153456-17

Date Collected: 05/10/18 12:01

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:07	JAP	TAL PEN

Client Sample ID: 0-83(Equipment Blank)

Lab Sample ID: 400-153456-18

Date Collected: 05/10/18 12:05

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:08	JAP	TAL PEN

Client Sample ID: 0-84

Lab Sample ID: 400-153456-19

Date Collected: 05/10/18 12:10

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:10	JAP	TAL PEN

Client Sample ID: 0-84(Equipment Blank)

Lab Sample ID: 400-153456-20

Date Collected: 05/10/18 12:15

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397467	05/14/18 11:59	JAP	TAL PEN
Total/NA	Analysis	7470A		1	398048	05/17/18 15:19	JAP	TAL PEN

Client Sample ID: 0-64 Duplicate

Lab Sample ID: 400-153456-21

Date Collected: 05/10/18 10:47

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397476	05/14/18 12:41	JAP	TAL PEN
Total/NA	Analysis	7470A		1	397863	05/16/18 13:38	JAP	TAL PEN

Client Sample ID: Field Blank # 1

Lab Sample ID: 400-153456-22

Date Collected: 05/09/18 15:00

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397476	05/14/18 12:41	JAP	TAL PEN
Total/NA	Analysis	7470A		1	397863	05/16/18 13:56	JAP	TAL PEN

Client Sample ID: Field Blank # 2

Lab Sample ID: 400-153456-23

Date Collected: 05/10/18 09:30

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397476	05/14/18 12:41	JAP	TAL PEN
Total/NA	Analysis	7470A		1	397863	05/16/18 13:58	JAP	TAL PEN

Client Sample ID: Field Spike

Lab Sample ID: 400-153456-24

Date Collected: 05/10/18 09:32

Matrix: Water

Date Received: 05/10/18 16:12

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			397476	05/14/18 12:41	JAP	TAL PEN
Total/NA	Analysis	7470A		1	397863	05/16/18 14:00	JAP	TAL PEN

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-153456-1

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

400-153456 COC

Client Information	Sampler: Brian Kittrell	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-74229-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: jason.wilson@testamericainc.com		Page: Page 1 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-59	5-9-18	1105	G	Water			✓		
O-59 (Equipment Blank)		1110		Water					
O-60		1131		Water					
O-60 (Equipment Blank)		1136		Water					
O-61		1313		Water					
O-61 (Equipment Blank)	5-9-18	1317		Water					
O-62	5-10-18	1004		Water					
O-62 (Equipment Blank)		1008		Water					
O-63		0956		Water					
O-63 (Equipment Blank)		1000		Water					
O-64	5-10-18	1047	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Brian Kittrell	5-10-18 1612		[signature]	5/10/18 1612	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
	400-153456	3.8°C #5592

Ver: 08/04/2016

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Kelsall	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-74229-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: jason.wilson@testamericainc.com		Page: Page 2 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	
Phone:	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	5-10-18	1051	G	Water			1		
O-81	5.9.18	1449		Water					
O-81 (Equipment Blank)		1452		Water					
O-82		1459		Water					
O-82 (Equipment Blank)	5-9-18	1504		Water					
O-83	5.10.18	1201		Water					
O-83 (Equipment Blank)		1205		Water					
O-84		1210		Water					
O-84 (Equipment Blank)		1215		Water					
Duplicate O-64	5.10.18	1047		Water					
Field Blank #1	5.9.18	1500	G	Water			1		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Brian Kelsall	Date/Time: 5-10-18 1612	Company	Received by:	Date/Time: 5/10/18 1612	Company TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.: 400-155456	Cooler Temperature(s) °C and Other Remarks:

Ver: 08/04/2016

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Kittell	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-74229-21846.3
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: jason.wilson@testamericainc.com		Page: Page 3 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	5-10-18	0930		Water			✓		
MS D-64	↓	1047		Water			✓		
MSD D-64	↓	1047		Water			✓		
Field Spike	5-10-18	0932		Water			✓		
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:				
Relinquished by: Brian Kittell	Date/Time: 5-10-18 1612	Company	Received by: Julia Dreyfuss	Date/Time: 5/10/18 1612	Company TA		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.: 400-153456	Cooler Temperature(s) °C and Other Remarks:

Ver: 08/04/2016

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

TestAmerica Job ID: 400-162198-1
Client Project/Site: AKZO- Semiannual Hg

For:
Akzo Nobel Functional Chemicals LLC
Akzo Nobel LeMoyne Site
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
11/29/2018 4:39:36 PM

Jason Wilson, Project Manager I
(251)706-3217
jason.wilson@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 400-162198-1

Laboratory: TestAmerica Pensacola

Narrative

Job Narrative
400-162198-1

Comments
No additional comments.

Receipt
The samples were received on 11/16/2018 11:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.3º C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-162198-1

Client Sample ID: O-59
Lab Sample ID: 400-162198-1
Date Collected: 11/15/18 12:49
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:29	1

Client Sample ID: O-59 (Equipment Blank)
Lab Sample ID: 400-162198-2
Date Collected: 11/15/18 12:52
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:31	1

Client Sample ID: O-60
Lab Sample ID: 400-162198-3
Date Collected: 11/15/18 12:36
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:32	1

Client Sample ID: O-60 (Equipment Blank)
Lab Sample ID: 400-162198-4
Date Collected: 11/15/18 12:40
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:34	1

Client Sample ID: O-61
Lab Sample ID: 400-162198-5
Date Collected: 11/15/18 13:16
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:36	1

Client Sample ID: O-61 (Equipment Blank)
Lab Sample ID: 400-162198-6
Date Collected: 11/15/18 13:20
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:38	1

Client Sample ID: O-62
Lab Sample ID: 400-162198-7
Date Collected: 11/16/18 09:16
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:40	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-162198-1

Client Sample ID: O-62 (Equipment Blank)

Lab Sample ID: 400-162198-8
Date Collected: 11/16/18 09:20
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:42	1

Client Sample ID: O-63

Lab Sample ID: 400-162198-9
Date Collected: 11/16/18 09:03
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:44	1

Client Sample ID: O-63 (Equipment Blank)

Lab Sample ID: 400-162198-10
Date Collected: 11/16/18 09:07
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:45	1

Client Sample ID: O-64

Lab Sample ID: 400-162198-11
Date Collected: 11/16/18 09:48
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:51	1

Client Sample ID: O-64 (Equipment Blank)

Lab Sample ID: 400-162198-12
Date Collected: 11/16/18 09:52
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:59	1

Client Sample ID: O-81

Lab Sample ID: 400-162198-13
Date Collected: 11/16/18 10:20
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:00	1

Client Sample ID: O-81 (Equipment Blank)

Lab Sample ID: 400-162198-14
Date Collected: 11/16/18 10:24
Matrix: Water
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:02	1

Client Sample ID: O-82 — **Lab Sample ID: 400-162198-15**
Date Collected: 11/16/18 10:51 — **Matrix: Water**
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:04	1

Client Sample ID: O-82 (Equipment Blank) — **Lab Sample ID: 400-162198-16**
Date Collected: 11/16/18 10:55 — **Matrix: Water**
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:06	1

Client Sample ID: O-83 — **Lab Sample ID: 400-162198-17**
Date Collected: 11/15/18 14:04 — **Matrix: Water**
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:08	1

Client Sample ID: O-83 (Equipment Blank) — **Lab Sample ID: 400-162198-18**
Date Collected: 11/15/18 14:08 — **Matrix: Water**
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:13	1

Client Sample ID: O-84 — **Lab Sample ID: 400-162198-19**
Date Collected: 11/15/18 14:34 — **Matrix: Water**
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:15	1

Client Sample ID: O-84 (Equipment Blank) — **Lab Sample ID: 400-162198-20**
Date Collected: 11/15/18 14:38 — **Matrix: Water**
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 16:17	1

Client Sample ID: Duplicate O-64 — **Lab Sample ID: 400-162198-21**
Date Collected: 11/16/18 09:48 — **Matrix: Water**
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:34	11/28/18 13:33	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-162198-1

Client Sample ID: Field Blank #1

Lab Sample ID: 400-162198-22
Matrix: Water
Date Collected: 11/15/18 14:45
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:34	11/28/18 13:34	1

Client Sample ID: Field Blank #2

Lab Sample ID: 400-162198-23
Matrix: Water
Date Collected: 11/16/18 09:00
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:34	11/28/18 13:36	1

Client Sample ID: Field Spike

Lab Sample ID: 400-162198-24
Matrix: Water
Date Collected: 11/16/18 09:05
Date Received: 11/16/18 11:40

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:34	11/28/18 13:38	1

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-162198-1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-420772/14-A
Matrix: Water
Analysis Batch: 421169

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420772

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 09:49	11/28/18 12:53	1

Lab Sample ID: LCS 400-420772/15-A
Matrix: Water
Analysis Batch: 421169

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420772

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.00104		mg/L		104	80 - 120

Lab Sample ID: MB 400-420780/14-A
Matrix: Water
Analysis Batch: 421067

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420780

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/26/18 10:36	11/27/18 15:14	1

Lab Sample ID: LCS 400-420780/15-A
Matrix: Water
Analysis Batch: 421067

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420780

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000972		mg/L		97	80 - 120

Lab Sample ID: 400-162198-11 MS
Matrix: Water
Analysis Batch: 421067

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 420780

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00199		mg/L		99	80 - 120

Lab Sample ID: 400-162198-11 MSD
Matrix: Water
Analysis Batch: 421067

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 420780

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00192		mg/L		95	80 - 120	3	20

Lab Chronicle

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-162198-1

Client Sample ID: O-59
Lab Sample ID: 400-162198-1
Date Collected: 11/15/18 12:49
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:29	JAP	TAL PEN

Client Sample ID: O-59 (Equipment Blank)
Lab Sample ID: 400-162198-2
Date Collected: 11/15/18 12:52
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:31	JAP	TAL PEN

Client Sample ID: O-60
Lab Sample ID: 400-162198-3
Date Collected: 11/15/18 12:36
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:32	JAP	TAL PEN

Client Sample ID: O-60 (Equipment Blank)
Lab Sample ID: 400-162198-4
Date Collected: 11/15/18 12:40
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:34	JAP	TAL PEN

Client Sample ID: O-61
Lab Sample ID: 400-162198-5
Date Collected: 11/15/18 13:16
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:36	JAP	TAL PEN

Client Sample ID: O-61 (Equipment Blank)
Lab Sample ID: 400-162198-6
Date Collected: 11/15/18 13:20
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:38	JAP	TAL PEN

Client Sample ID: O-62

Lab Sample ID: 400-162198-7

Date Collected: 11/16/18 09:16

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:40	JAP	TAL PEN

Client Sample ID: O-62 (Equipment Blank)

Lab Sample ID: 400-162198-8

Date Collected: 11/16/18 09:20

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:42	JAP	TAL PEN

Client Sample ID: O-63

Lab Sample ID: 400-162198-9

Date Collected: 11/16/18 09:03

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:44	JAP	TAL PEN

Client Sample ID: O-63 (Equipment Blank)

Lab Sample ID: 400-162198-10

Date Collected: 11/16/18 09:07

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:45	JAP	TAL PEN

Client Sample ID: O-64

Lab Sample ID: 400-162198-11

Date Collected: 11/16/18 09:48

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:51	JAP	TAL PEN

Client Sample ID: O-64 (Equipment Blank)

Lab Sample ID: 400-162198-12

Date Collected: 11/16/18 09:52

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 15:59	JAP	TAL PEN

Client Sample ID: O-81
Lab Sample ID: 400-162198-13

Date Collected: 11/16/18 10:20
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:00	JAP	TAL PEN

Client Sample ID: O-81 (Equipment Blank)
Lab Sample ID: 400-162198-14

Date Collected: 11/16/18 10:24
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:02	JAP	TAL PEN

Client Sample ID: O-82
Lab Sample ID: 400-162198-15

Date Collected: 11/16/18 10:51
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:04	JAP	TAL PEN

Client Sample ID: O-82 (Equipment Blank)
Lab Sample ID: 400-162198-16

Date Collected: 11/16/18 10:55
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:06	JAP	TAL PEN

Client Sample ID: O-83
Lab Sample ID: 400-162198-17

Date Collected: 11/15/18 14:04
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:08	JAP	TAL PEN

Client Sample ID: O-83 (Equipment Blank)
Lab Sample ID: 400-162198-18

Date Collected: 11/15/18 14:08
Matrix: Water
Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:13	JAP	TAL PEN

Client Sample ID: O-84

Lab Sample ID: 400-162198-19

Date Collected: 11/15/18 14:34

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:15	JAP	TAL PEN

Client Sample ID: O-84 (Equipment Blank)

Lab Sample ID: 400-162198-20

Date Collected: 11/15/18 14:38

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420780	11/26/18 10:36	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421067	11/27/18 16:17	JAP	TAL PEN

Client Sample ID: Duplicate O-64

Lab Sample ID: 400-162198-21

Date Collected: 11/16/18 09:48

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420772	11/26/18 10:34	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421169	11/28/18 13:33	JAP	TAL PEN

Client Sample ID: Field Blank #1

Lab Sample ID: 400-162198-22

Date Collected: 11/15/18 14:45

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420772	11/26/18 10:34	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421169	11/28/18 13:34	JAP	TAL PEN

Client Sample ID: Field Blank #2

Lab Sample ID: 400-162198-23

Date Collected: 11/16/18 09:00

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420772	11/26/18 10:34	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421169	11/28/18 13:36	JAP	TAL PEN

Client Sample ID: Field Spike

Lab Sample ID: 400-162198-24

Date Collected: 11/16/18 09:05

Matrix: Water

Date Received: 11/16/18 11:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			420772	11/26/18 10:34	JAP	TAL PEN
Total/NA	Analysis	7470A		1	421169	11/28/18 13:38	JAP	TAL PEN

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO- Semiannual Hg

TestAmerica Job ID: 400-162198-1

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRON

400-162198 COC

Client Information	Sampler: Brian Kittrell	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-78531-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: jason.wilson@testamericainc.com		Page: Page 1 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:	Analysis Requested	Preservation Codes:
City: Axis	TAT Requested (days):		A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: AL, 36505			Other:
Phone:	PO #: 4100001642		
Email: sylvia.williams@akzonobel.com	WO #:		
Project Name: AKZO - Semiannual Hg	Project #: 40003052		
Site:	SSOW#:		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-59	11-15-18	1249	G	Water			✓		
O-59 (Equipment Blank)		1252		Water					
O-60		1236		Water					
O-60 (Equipment Blank)		1240		Water					
O-61		1316		Water					
O-61 (Equipment Blank)	11-15-18	1320		Water					
O-62	11-16-18	0916		Water					
O-62 (Equipment Blank)		0920		Water					
O-63		0903		Water					
O-63 (Equipment Blank)		0907		Water			✓		
O-64	11-16-18	0948	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Brian Kittrell	Date/Time: 11-16-18 1140	Company: SOJERAIGN	Received by:	Date/Time: 11-16-18 1140	Company: TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 400-162198	4.3C -559L

Ver: 08/04/2016

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Hilliard	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-78531-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: jason.wilson@testamericainc.com		Page: Page 2 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	
Phone:	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	11-16-18	0952	G	Water			✓		
O-81		1020		Water					
O-81 (Equipment Blank)		1024		Water					
O-82		1051		Water					
O-82 (Equipment Blank)	11-16-18	1055		Water					
O-83	11-15-18	1404		Water					
O-83 (Equipment Blank)		1408		Water					
O-84		1434		Water					
O-84 (Equipment Blank)	11-15-18	1438		Water					
Duplicate 6-64	11-16-18	0948		Water					
Field Blank #1	11-15-18	1445	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Brian Hilliard	Date/Time: 11-16-18 1140	Company	Received by:	Date/Time: 11-16-18 1140	Company TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 400 - 162198

Ver: 08/04/2016

TestAmerica Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone (850) 474-1001 Fax (850) 478-2671

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian Kuttell	Lab PM: Wilson, Jason A	Carrier Tracking No(s):	COC No: 400-78531-21846.3
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: jason.wilson@testamericainc.com		Page: Page 3 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	
Phone:	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	11-16-18	0900	G	Water			✓		
MS 0-64	↓	0948	↓	Water			✓		
MSD 0-64	↓	0948	↓	Water			✓		
Field Spike	11-16-18	0905	G	Water			✓		
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Brian Kuttell	Date/Time: 11-16-18 1140	Company: SA	Received by:	Date/Time: 11-16-18 1140	Company: TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 4.0 - 162198

Ver: 08/04/2016

LeMoyne Site
13440 Highway 43 North
Axis Al 36505

Tel: 251-675-1310

Nouryon

April 28, 2023

Chief Austin R. Pierce
Chief Land Division
Alabama Department of Environmental Management
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

Received
MAY 03 2023
Land Division

Re: Nouryon Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176
Revised 2020 Groundwater Monitoring Report

Dear Chief Pierce,

Please find enclosed the revised copies of the 2020A and 2020B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.61 to 2.21 ft./day during the 2020A event and 1.61 to 2.21 ft./day for the 2020B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315.

Sincerely

Renee Johnston

Renee Johnston

HSE Advisor

CC: Charmaine Roche , ADEM Land Division

2020 Groundwater Monitoring Report

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2020 Groundwater Monitoring Report Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Michael Mitchell
Plant Manager

5/1/23
Date

Table I

Total Mercury (unfiltered)
Analysis Result Summary (Test America of Mobile, AL)

May 2020

Well Number	Gradient	Well Data				
		1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

*Method: Mercury 7470 A

Table II
Statistical Evaluation of Data Using ANOVA**

Reference: Statistical Analysis of Variance
Procedure: The Downgradient well analysis are compared to the corresponding upgradient well with approximately the same screened internal depth

May 2020

Well Number	Gradient	Well Data					Comparison Data		
		1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L

** The computation of ANOVA is not possible as there is no variability of the data.

Table III

Total Mercury (unfiltered)
Analysis Result Summary (Test America of Mobile, AL)

November 2020

Well Number	Gradient	Well Data				
		1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

*Method: Mercury 7470 A

Table IV
Statistical Evaluation of Data Using ANOVA**

Reference: Statistical Analysis of Variance
Procedure: The Downgradient well analysis are compared to the corresponding upgradient well with approximately the same screened internal depth

November 2020

Well Number	Gradient	Well Data					Comparison Data		
		1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L

** The computation of ANOVA is not possible as there is no variability of the data.

TABLE V
GROUNDWATER LEVEL DETERMINATION
Elevations taken May ,2020 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	26.17	11.96	119.7	
060	37.78	25.81	11.97	98.28	
061	37.79	25.82	11.97	70.08	
062	35.04	23.22	11.82	116.65	
063	35.27	23.40	11.87	92.29	
064	34.86	22.95	11.91	77.14	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	23.52	12.04	68	
082	35.52	23.57	11.95	117.6	
083	36.02	24.03	11.99	67.9	
084	36.31	24.51	11.80	118.00	

TABLE VI
Groundwater Flow Velocity

43952

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	2.95	0.568	2.03	2.79
Mid	060 to 063	519.00	2.41	0.464	1.66	2.28
Shallow	061 to 064	519.00	2.87	0.553	1.97	2.71
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	1.79	0.337	1.20	1.65
Deep	059 to 082	519.00	2.60	0.501	1.79	2.46
Deep	059 to 084	556.00	1.66	0.299	1.06	1.46
		AVG	**2.36**	**0.45**	**1.61**	**2.21**

Direction of groundwater flow is South
Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity
38882
Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

TABLE VII

GROUNDWATER LEVEL DETERMINATION

Elevations taken November ,2020 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	27.00	11.13	119.70	
060	37.78	26.64	11.14	98.28	
061	37.79	26.64	11.15	70.08	
062	35.04	23.63	11.41	116.7	
063	35.27	23.84	11.43	92.3	
064	34.86	23.35	11.51	77.1	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	24.17	11.39	68.00	
082	35.52	24.15	11.37	117.60	
083	36.02	24.40	11.62	67.90	
084	36.31	24.85	11.46	118.00	

TABLE VIII

Groundwater Flow Velocity

2020B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.37	0.649	2.31	3.18
Mid	060 to 063	519.00	2.80	0.539	1.92	2.64
Shallow	061 to 064	519.00	3.29	0.634	2.26	3.11
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.24	0.422	1.50	2.07
Deep	059 to 082	519.00	2.85	0.549	1.96	2.69
Deep	059 to 084	556.00	2.15	0.387	1.38	1.90
		AVG	**2.70**	**0.52**	**1.84**	**2.53**

Direction of groundwater flow is South

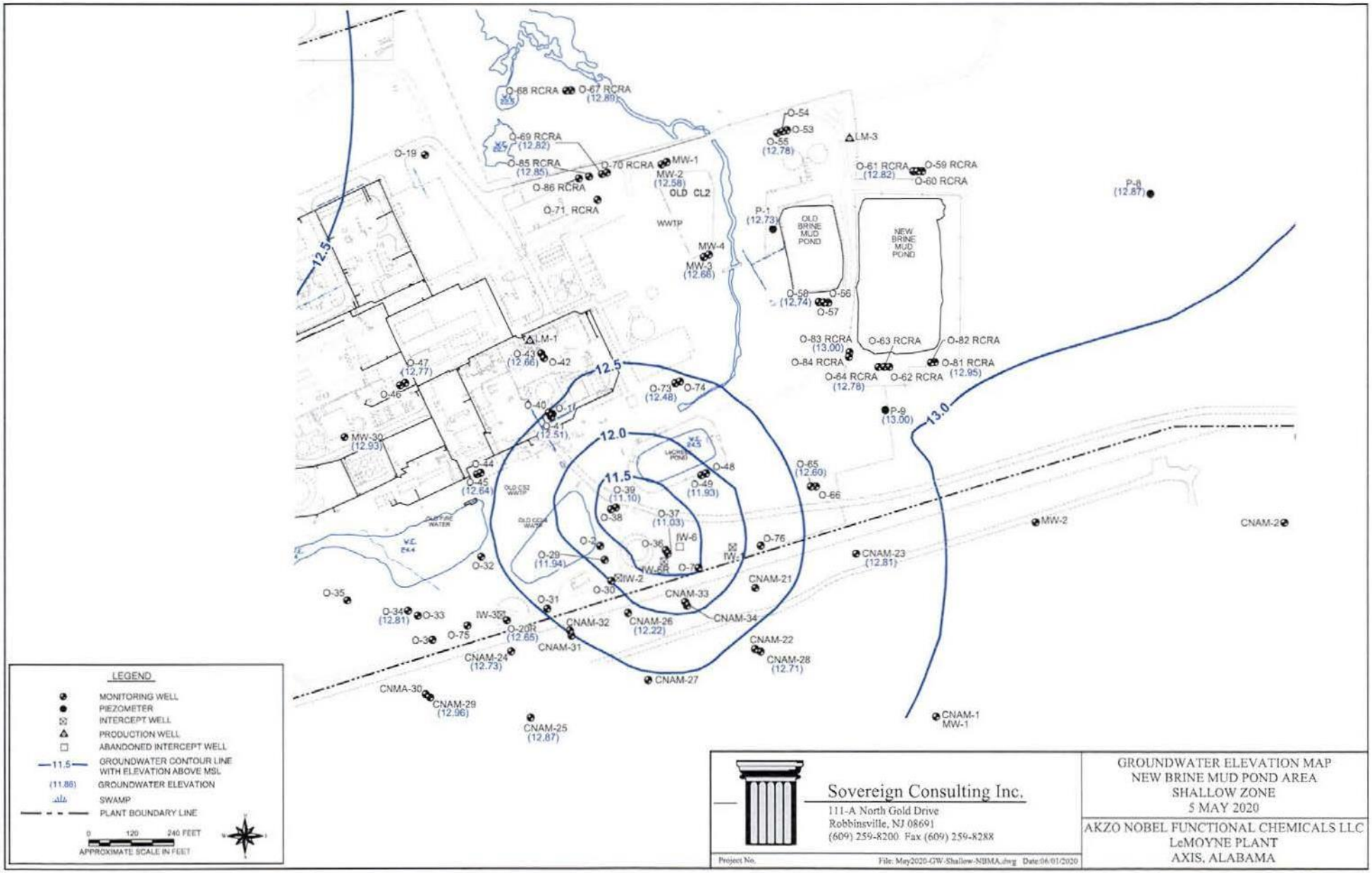
Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifier

Lemoyne Rainfall 2020												
DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.29	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.11	0.00	0.00	0.00
2	2.02	0.00	0.04	0.00	0.00	0.00	0.01	0.09	0.00	0.00	0.00	0.00
3	0.27	0.01	0.14	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.43
4	0.00	0.07	0.75	0.07	0.00	0.00	1.81	0.00	0.00	0.00	0.00	0.00
5	0.00	1.58	0.01	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00	0.00
6	0.00	0.36	0.01	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.07
7	0.00	0.00	0.00	0.01	0.00	3.58	1.96	0.00	0.00	0.01	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	1.25	0.17	0.00	0.00	0.91	0.00	0.00
9	0.03	0.00	0.01	0.31	0.00	0.40	0.00	0.00	0.00	1.09	0.02	0.00
10	0.17	0.00	0.13	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.01	0.00
11	0.79	0.01	0.00	0.00	0	0.00	0.00	1.29	0.00	0.00	0.00	0.00
12	0.03	0.66	0.00	0.09	0.00	0.00	0.01	0.04	0.08	0.00	0.00	0.03
13	0.11	0.00	0.00	0.00	0.00	0.00	0.54	0.10	0.24	0.00	0.00	0.09
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.01
15	0.00	0.64	0.00	0.00	0.00	0.00	0.68	0.00	3.00	0.00	0.00	0.50
16	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.01
17	0.00	0.00	0.00	0.02	0.32	0.00	0.00	0.00	0.01	0.00	0.01	0.00
18	0.57	0.03	0.00	0.00	0.32	0.00	0.30	0.00	0.40	0.00	0.01	0.00
19	0.00	0.15	0.00	0.67	0.01	0.00	0.01	0.14	0.68	0.00	0.00	0.22
20	0.00	0.71	0.22	0.00	0.01	0.00	0.00	0.00	0.71	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.13	0.03	0.00	0.00	0.00
22	0.00	0.00	0.00	2.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
23	0.14	0.00	0.00	0.27	0.29	0.37	0.21	0.05	0.15	0.42	0.00	1.13
24	0.00	0.38	0.00	0.00	0.20	0.45	0.03	0.41	0.20	0.05	0.00	0.30
25	0.00	0.00	0.00	0.00	0.01	0.00	0.35	0.28	0.00	0.00	0.24	0.00
26	0.38	0.02	0.00	0.00	0.30	0.00	0.61	0.21	0.00	0.00		0.00
27	0.00	0.02	0.00	0.00	0.37	0.00	0.31	0.36	0.00	0.18		0.00
28	0.10	0.00	0.00	0.15	0.37	0.22	0.25	0.44	0.17	0.21	0.39	0.00
29	0.51		0.00	0.35	0.16	0.01	0.10	0.33	0.03	0.00	0.26	0.00
30	0.06		0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
31	0.16		0.22		0.00		0.00	0.12		0.00		0.76
Total	5.63	4.97	1.53	4.21	2.36	6.61	9.97	4.08	6.78	2.87	0.94	3.55
Tot for year		53.50										
	* gauge did not record, but no rain.					PO power outtage						
	^ gauge was not legible											

Groundwater Elevation Map



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 11.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.86) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

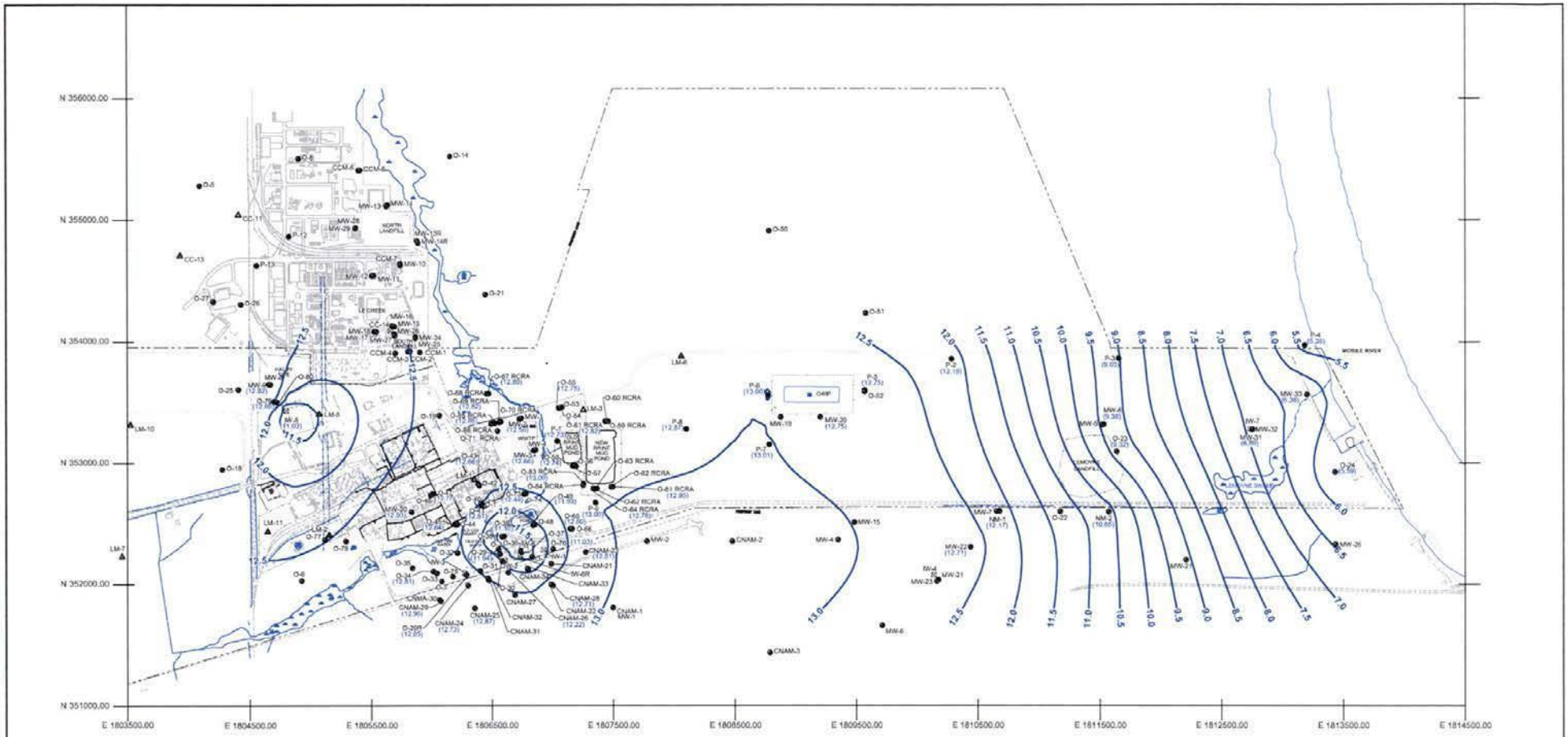
0 120 240 FEET
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. File: May2020-GW-Shallow-NBMA.dwg Date:06/01/2020

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
5 MAY 2020

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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GROUNDWATER ELEVATION MAP
SHALLOW ZONE
5 MAY 2020

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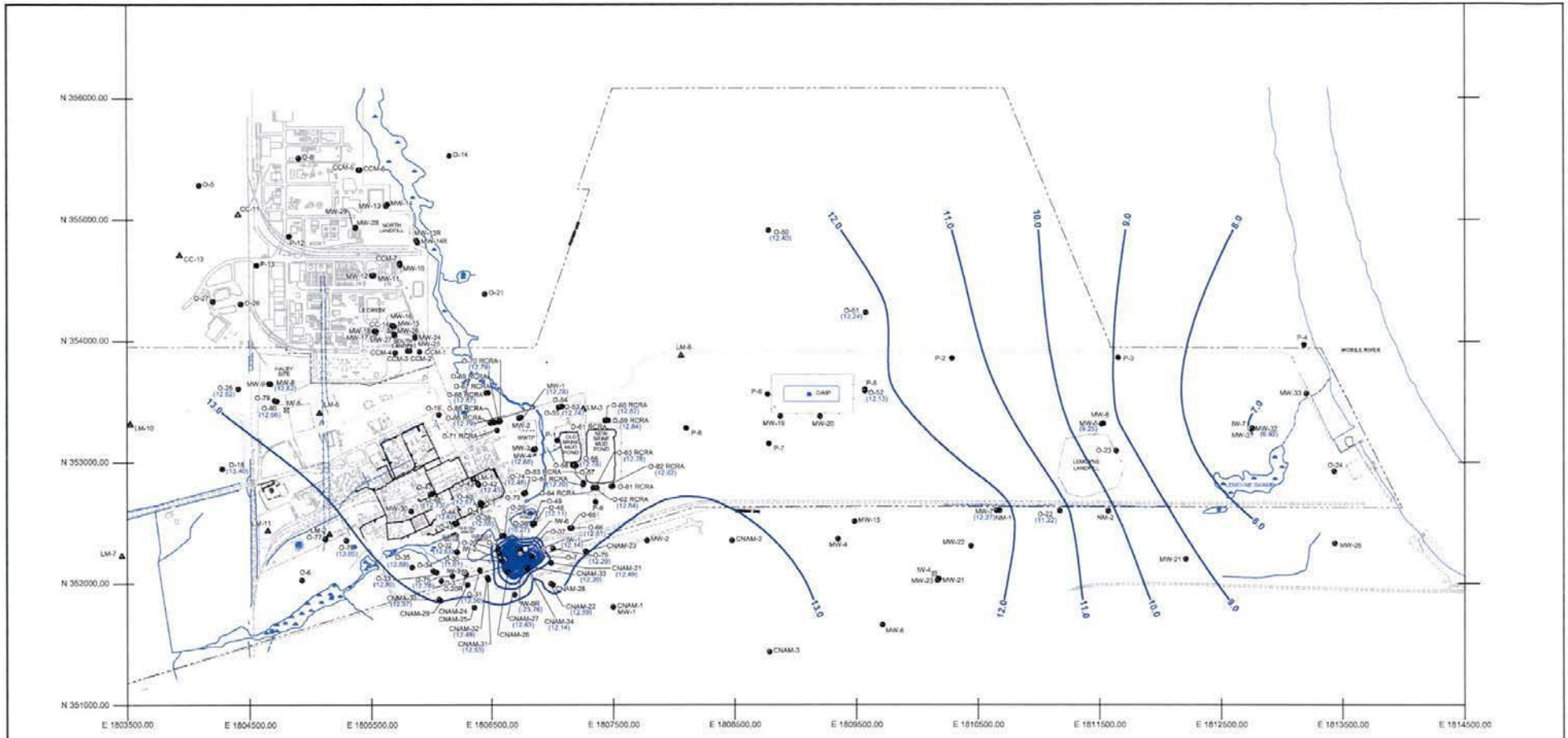
AXIS, ALABAMA



LEGEND

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- —10.0— GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.92) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
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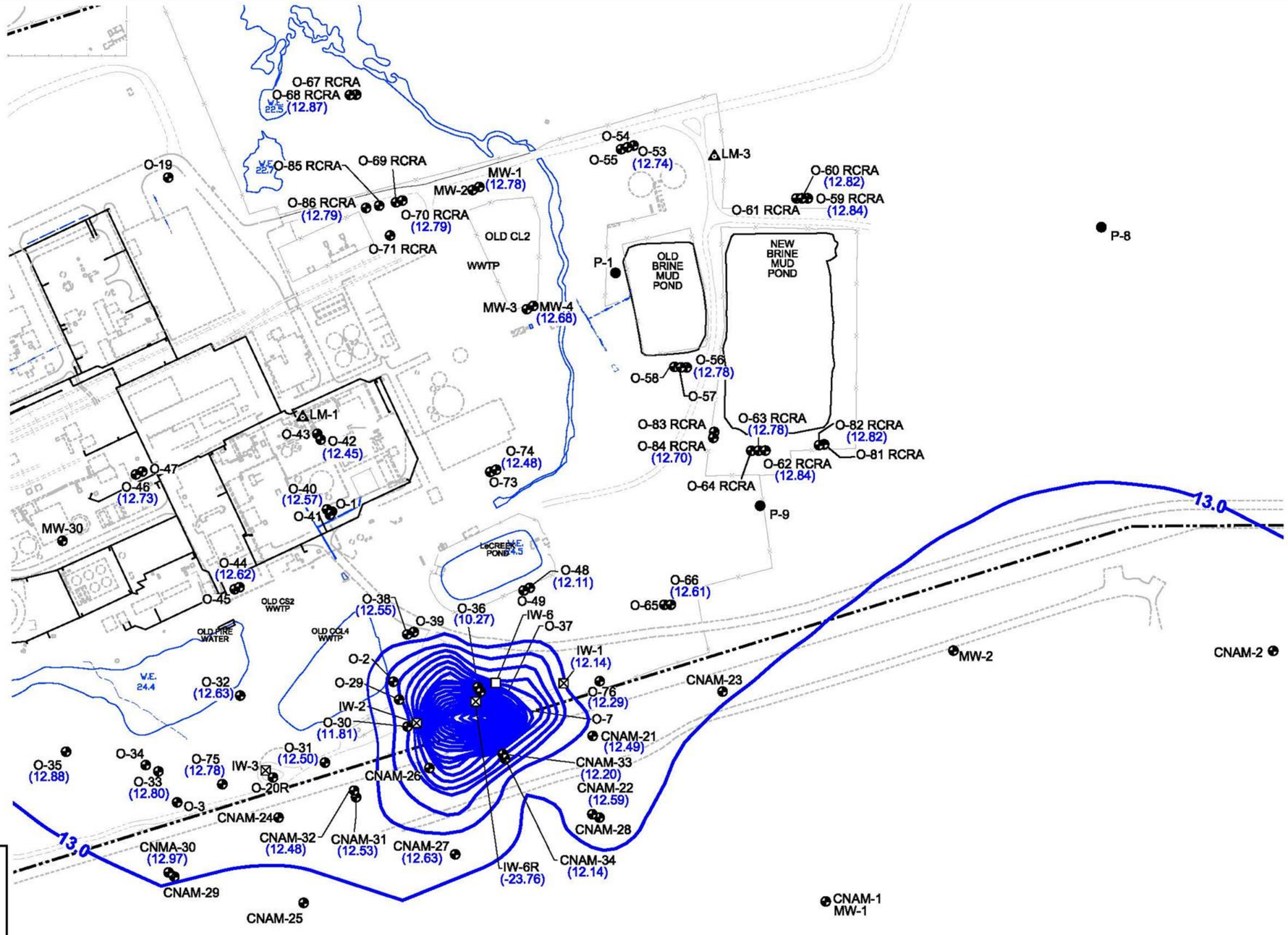
Project No.

File: May2020-GW-Deep.dwg Date:06/01/2020

GROUNDWATER ELEVATION MAP
DEEP ZONE
5 MAY 2020

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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0 120 240 FEET
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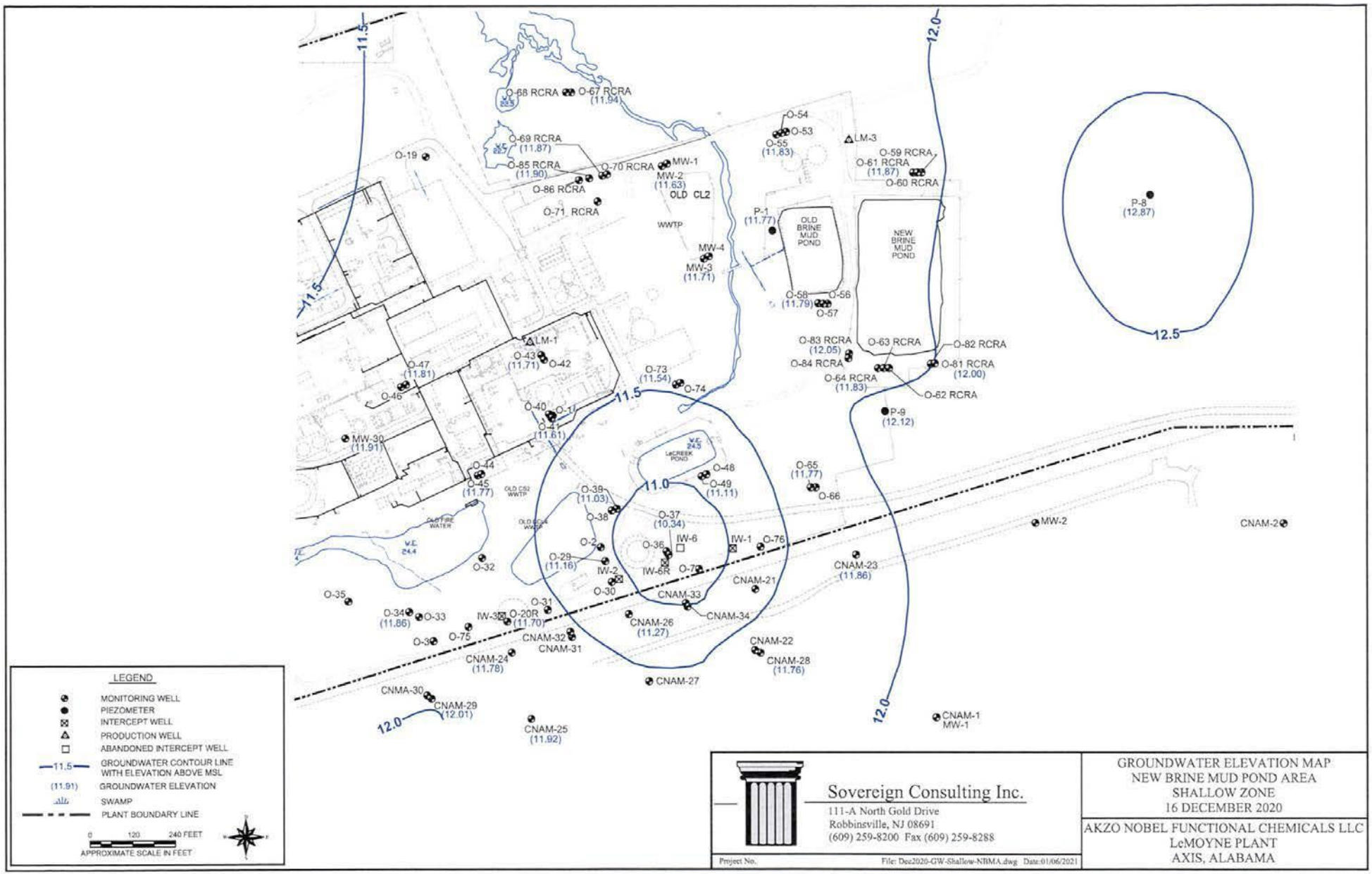
GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
5 MAY 2020

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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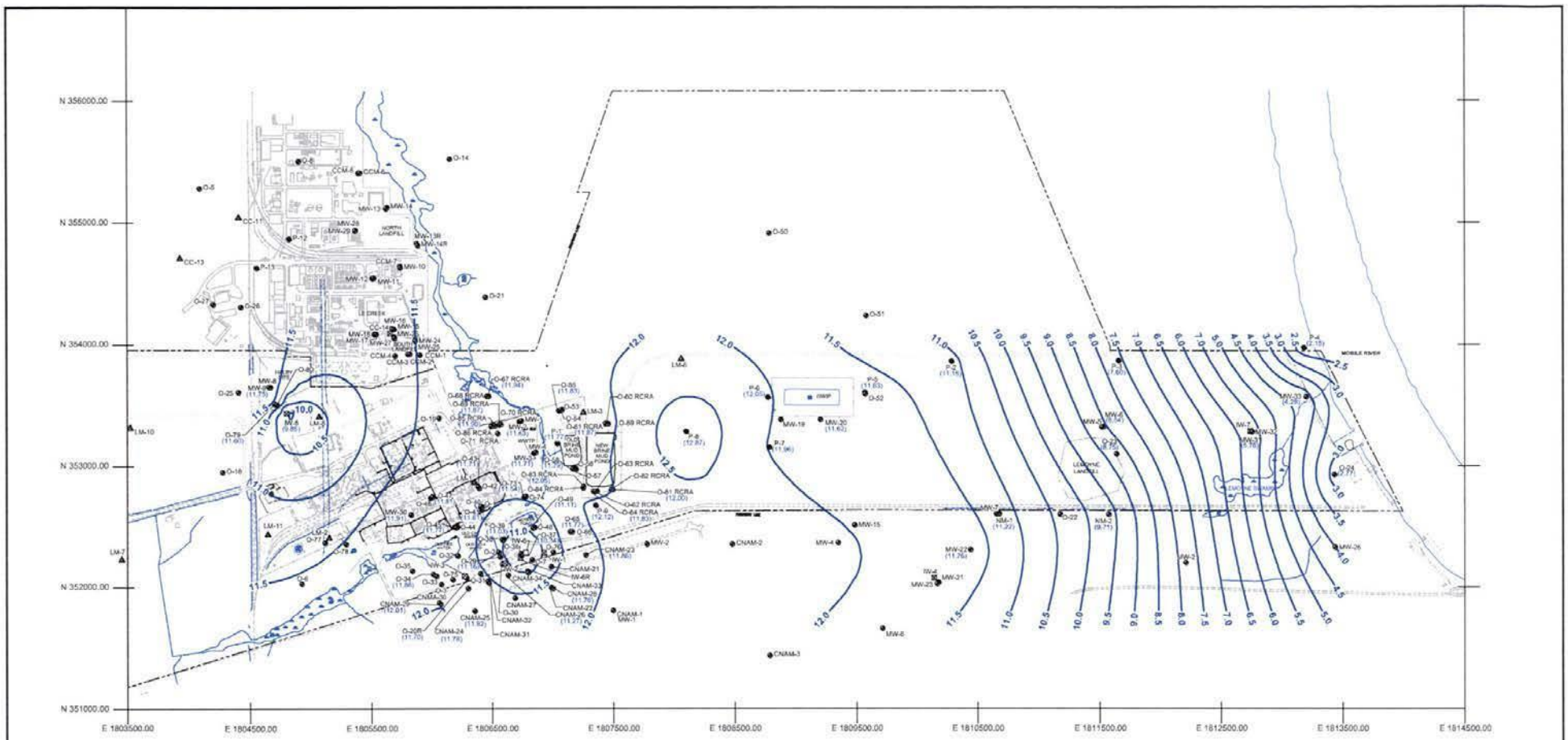
Project No. File: Dec2020-GW-Shallow-NBMA.dwg Date:01/06/2021

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
16 DECEMBER 2020

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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APPROXIMATE SCALE IN FEET

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Project No.

File: Dec2020-GW-Shallow.dwg Date:01/05/2021

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
16 DECEMBER 2020

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
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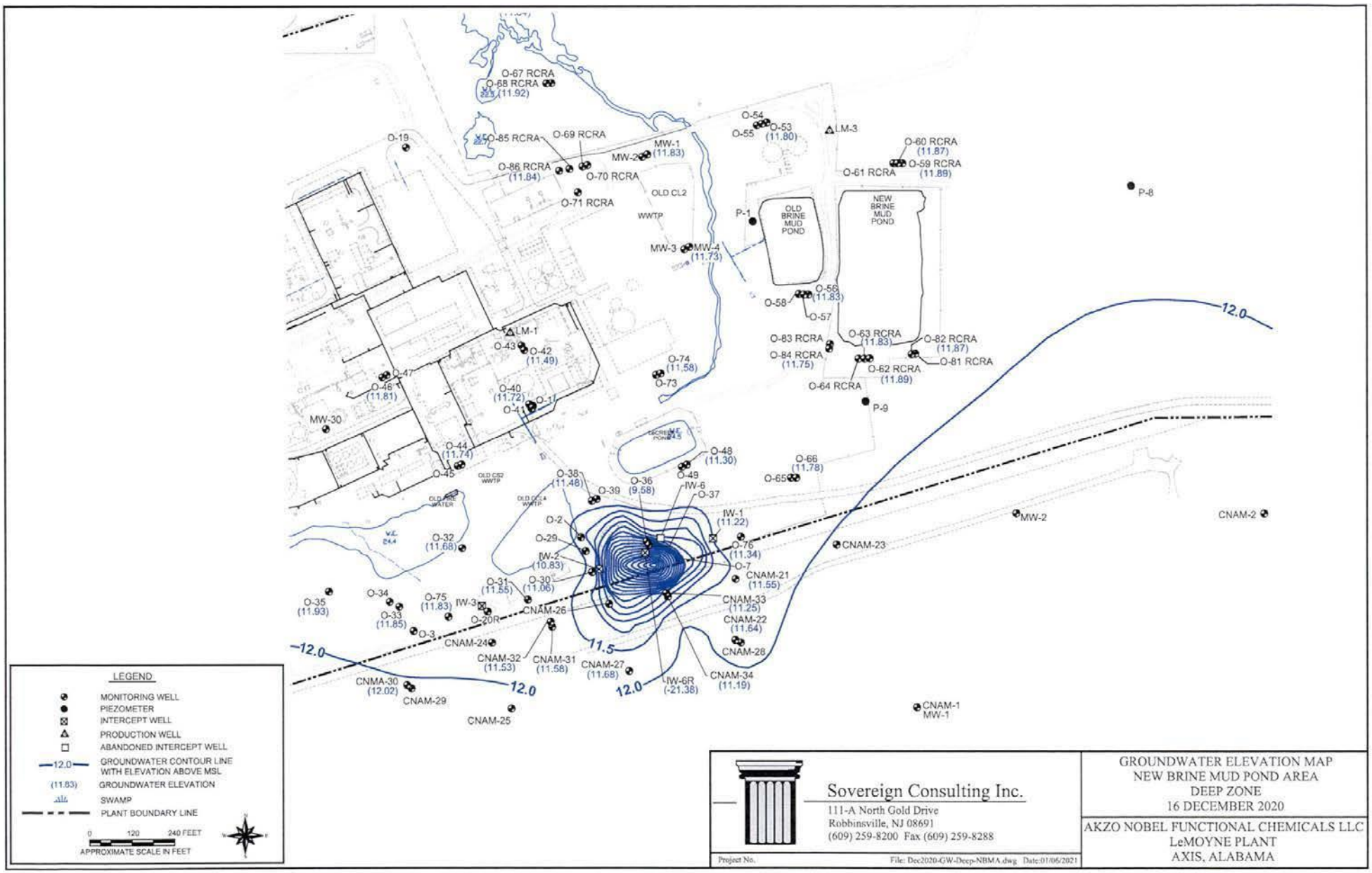
AXIS, ALABAMA



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Project No.

File: Dec2020-GW-Deep-NBMA.dwg Date:01/06/2021

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
16 DECEMBER 2020

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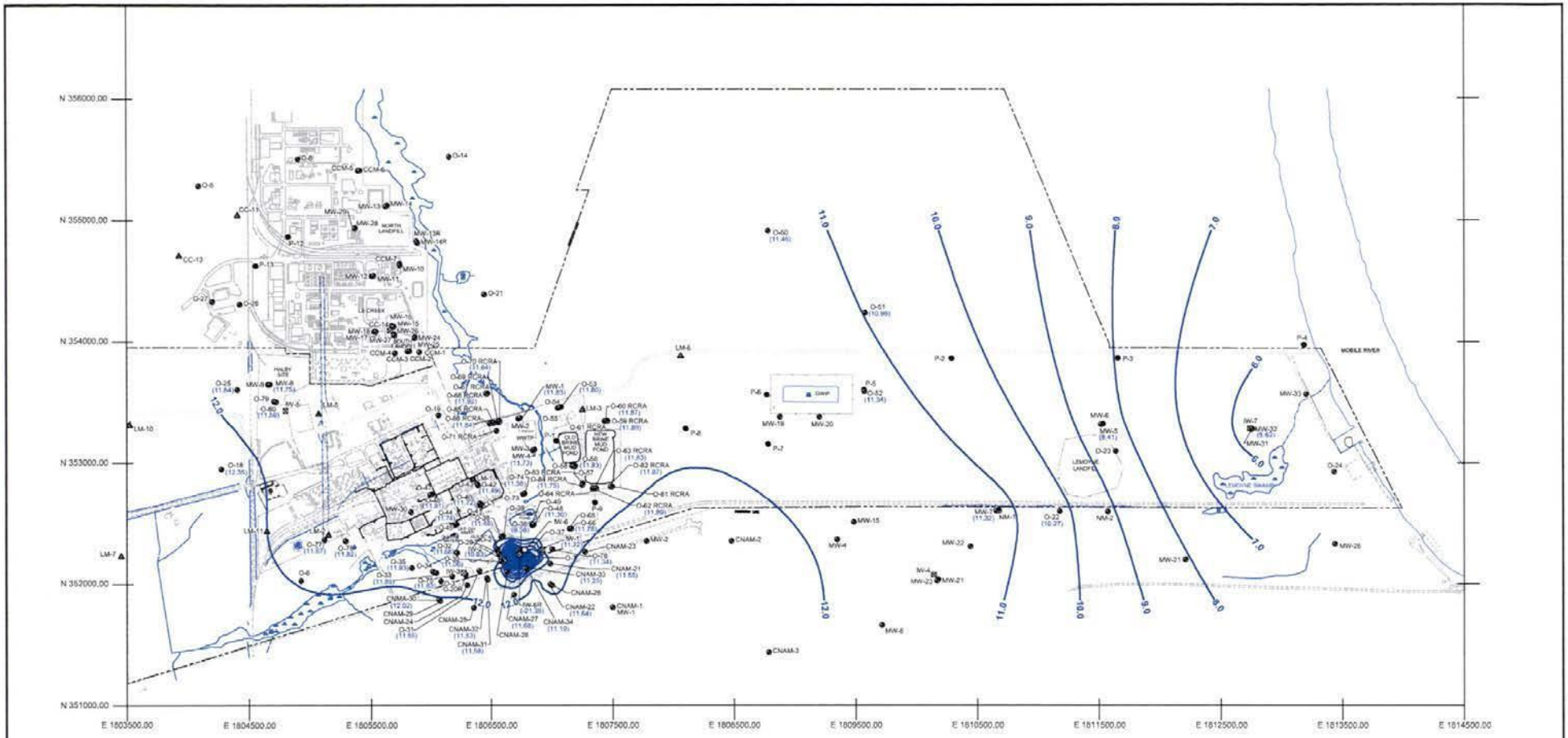
LeMOYNE PLANT
AXIS, ALABAMA



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GROUNDWATER ELEVATION MAP
DEEP ZONE
16 DECEMBER 2020

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

May 2020 Field Forms

Akzo Nobel Functional Chemicals LLC

LeMoyne Plant

O-59

RCRA Groundwater Monitor Well O-59

Sampling / Inspection Log Sheet

Date: 5-6-20 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	117.16	119.70
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
_____
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA Semi Annual
Sampler's Name: Brian Kittell Date: 5/6/20
Company: Severn Trent
Arrival Time: 0755 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 83°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 26.17
Depth to Bottom: 119.70

Pump Used: Yes / No
Depth of Pump: 28'
Began: 0904 (time)
Ended: 1007 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 189 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A1060003
Pump Serial # 34607
Type GRUNDFOS
Calibration N/A

pH Meter Model # HI991301
pH Meter Serial # TA01320042
Type HANNA
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial # _____
Type _____
Calibration _____

Field Measurement No. 1
Water Temperature: 20.4 °C
pH: 5.91
Cond: 270 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2
Water Temperature: 20.5 °C
pH: 5.84
Cond: 280 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3
Water Temperature: 20.6 °C
pH: 5.86
Cond: 270 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60

Sampling / Inspection Log Sheet

Date: 5-7-20 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.28
Screened Interval	-37.46/-57.46	73/93	75.24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi Annual
Sampler's Name: Brian Kittell Date: 5/6/20
Company: Sovereign
Arrival Time: 0800 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 830
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 25.81
Depth to Bottom: 98.28

Pump Used: (Yes) / No
Depth of Pump: 27'
Began: 0919 (time)
Ended: 1004 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 135 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # IA106003
Pump Serial # 28540
Type Grundfos
Calibration N/A

pH Meter Model # HI991301
pH Meter Serial # TA013200042
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial #
Type
Calibration

Pump Information:

0934

Field Measurement No. 1
Water Temperature: 20.8 ° C
pH: 4.70
Cond: 180 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

0949

Field Measurement No. 2
Water Temperature: 20.9 ° C
pH: 4.78
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1004

Field Measurement No. 3
Water Temperature: 20.8 ° C
pH: 4.76
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61

Sampling / Inspection Log Sheet

Date: 5-6-20 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.79
Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	68	70.08
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:
Concrete Pad: Cracks: Yes/No Describe:
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA SEMI ANNUAL
Sampler's Name: Brian Kittell Date: 5 / 6 / 20
Company: SOUTHERN
Arrival Time: 0800 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 83°
Standing Water around Well: NONE

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 25.82
Depth to Bottom: 70.08

Pump Used: Yes / No
Depth of Pump: 27'
Began: 1013 (time)
Ended: 1043 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 90 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type GRUNDFOS
Calibration N/A

pH Meter Model # HI991301
pH Meter Serial # TA01320042
Type HANNA
Calibration 100%

Cond Meter Model # SAME
Cond Meter Serial #
Type
Calibration

Pump Information:

1023

Field Measurement No. 1
Water Temperature: 21.1 °C
pH: 4.46
Cond: 210 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1033

Field Measurement No. 2
Water Temperature: 21.2 °C
pH: 4.40
Cond: 210 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1043

Field Measurement No. 3
Water Temperature: 21.2 °C
pH: 4.42
Cond: 210 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62

Sampling / Inspection Log Sheet

Date: 5·7·20 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.04
Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	115	116.65
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked ( )
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA Semi Annual
Sampler's Name: Brian Kittell Date: 5/7/20
Company: Severn Trent
Arrival Time: 0800 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 65°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 23.22
Depth to Bottom: 116.65

Pump Used: Yes / No
Depth of Pump: 25'
Began: 0828 (time)
Ended: 0928 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 182 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type Grundfos
Calibration N/A

pH Meter Model # HI991301
pH Meter Serial # TA01320042
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial # _____
Type _____
Calibration _____

Pump Information:

0848
Field Measurement No. 1
Water Temperature: 20.1 °C
pH: 5.73
Cond: 220 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0908
Field Measurement No. 2
Water Temperature: 19.8 °C
pH: 5.74
Cond: 210 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0928
Field Measurement No. 3
Water Temperature: 19.7 °C
pH: 5.72
Cond: 210 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63 — Sampling / Inspection Log Sheet

Date: 5/7/20 Signed: [signature]

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	90	92.29
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:
Concrete Pad: Cracks: Yes/No Describe:
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: Anthony Boros Date: 5/7/20
Company: Arcadis
Arrival Time: 0800 Departure Time: 0922
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny & 65°F
Standing Water around Well: No

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 23.40
Depth to Bottom: 92.29

Pump Used: Yes / No
Depth of Pump: 26.00
Began: 0830 (time)
Ended: 0915 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 134.0 gal/liter

Bailer Used: Yes / No
Bailer Volume: ____ (gal/liter)
# of Bails Removed: ____
Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events:

Sampling Equipment Information:
Pump Model # 1.A1106003
Pump Serial # 28540
Type ~~Bladder~~ Grundfos
Calibration NA

pH Meter Model # H1991301
pH Meter Serial # 042906
Type Hanna
Calibration 100 %

Cond Meter Model # SAME
Cond Meter Serial #
Type
Calibration

Pump Information:

0845

Field Measurement No. 1
Water Temperature: 19.9 °C
pH: 4.80
Cond: 250 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear & No Odor

0900

Field Measurement No. 2
Water Temperature: 19.9 °C
pH: 4.81
Cond: 240 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear & No Odor

0915

Field Measurement No. 3
Water Temperature: 19.8 °C
pH: 4.79
Cond: 240 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear & No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64

Sampling / Inspection Log Sheet

Date: 5/7/20 Signed: [signature]

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 34.86

Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	75	77.14
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked ( )

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / No

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: Anthony Boros Date: 5/7/20

Company: Arcadis

Arrival Time: 0925 Departure Time: 1014

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny, breezy & 65°

Standing Water around Well: No

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.95

Depth to Bottom: 77.14

Pump Used: (Yes) / No

Depth of Pump: 26.00

Began: 0927 (time)

Ended: _____ (time)

Pumping Rate: 4 (gpm/lph)

Total Volume Purged: 106.0 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: _____

Sampling Equipment Information:

Pump Model # 14106003

Pump Serial # 34602

Type GRUNDFOS

Calibration N/A

pH Meter Model # H1991301

pH Meter Serial # 042906

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

0939

Field Measurement No. 1

Water Temperature: 19.9 °C

pH: 4.88

Cond: 80 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear & no odor

0951

Field Measurement No. 2

Water Temperature: 20.0 °C

pH: 4.89

Cond: 80 **µmhos/cm**

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear & No odor

1003

Field Measurement No. 3

Water Temperature: 20.0 °C

pH: 4.87

Cond: ~~or~~ 80 **µmhos/cm**

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear & No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 5-6-20 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	68
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA SEMI ANNUAL

Sampler's Name: Brian Kittell Date: 5 / 6 / 20

Company:

Arrival Time: 0800 Departure Time: 1530

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 84°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.52

Depth to Bottom: 68.00

Pump Used: (Yes) / No

Depth of Pump: 25'

Began: 1102 (time)

Ended: 1129 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 81 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 346072

Type GRUNDFOS

Calibration N/A

pH Meter Model # HI991301

pH Meter Serial # TA01320042

Type HANNA

Calibration 100%

Cond Meter Model # SAME

Cond Meter Serial #

Type

Calibration

Pump Information:

1111

Field Measurement No. 1

Water Temperature: 20.7 ° C

pH: 5.18

Cond: 100 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1120

Field Measurement No. 2

Water Temperature: 20.7 ° C

pH: 5.10

Cond: 100 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1129

Field Measurement No. 3

Water Temperature: 20.6 ° C

pH: 5.11

Cond: 100 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82 — Sampling / Inspection Log Sheet

Date: 5-6-20 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	115	117.60
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: Brian Kittrell Date: 5/6/20

Company: Sovereign

Arrival Time: 0800 Departure Time: 1530

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 85°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.57

Depth to Bottom: 117.60

Pump Used: (Yes) / No

Depth of Pump:

Began: 1100 (time)

Ended: 1203 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 139 gal/liter

Bailer Used: (Yes) / No

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A1060 03

Pump Serial # 28540

Type Grundfos

Calibration N/A

pH Meter Model # HI991301

pH Meter Serial # TA013200 42

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1121

Field Measurement No. 1

Water Temperature: 20.0 ° C

pH: 5.29

Cond: 190 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1142

Field Measurement No. 2

Water Temperature: 20.1 ° C

pH: 5.35

Cond: 190 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1203

Field Measurement No. 3

Water Temperature: 20.0 ° C

pH: 5.36

Cond: 200 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83 — Sampling / Inspection Log Sheet

Date: 5-7-20 Signed: Brian Kuttall

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.90
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes / No

Any indication of having been contacted by vehicle? Yes / No

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: Brian Kuttall Date: 5/7/20

Company: Severn Trent

Arrival Time: 0755 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 70°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.03

Depth to Bottom: 67.90

Pump Used: Yes / No

Depth of Pump: 26'

Began: 1025 (time)

Ended: 1055 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / No

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A1060003

Pump Serial # 34607

Type Grundfos

Calibration N/A

pH Meter Model # HI 991301

pH Meter Serial # TA01320042

Type Hanna

Calibration 100%

Cond Meter Model # SAME

Cond Meter Serial #

Type

Calibration

Pump Information:

1035

Field Measurement No. 1

Water Temperature: 21.0 °C

pH: 4.95

Cond: 120 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1045

Field Measurement No. 2

Water Temperature: 20.9 °C

pH: 4.88

Cond: 120 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1055

Field Measurement No. 3

Water Temperature: 20.1 °C

pH: 4.94

Cond: 130 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84 — Sampling / Inspection Log Sheet

Date: 5/7/20 Signed: [signature]

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.00
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes / No

Any indication of having been contacted by vehicle? Yes / No

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: Anthony Coros Date: 5/7/20

Company: Arcadis

Arrival Time: 1019 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny & 67°

Standing Water around Well: No

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.51

Depth to Bottom: 118.00

Pump Used: Yes / No

Depth of Pump: 28.00

Began: 1025 (time)

Ended: _____ (time)

Pumping Rate: 7.0 (gpm/lph)

Total Volume Purged: 182.0 gal/liter

Bailer Used: Yes / No

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No

Note any unusual events: _____

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type ~~Hanna~~ Grundfos

Calibration ~~100 %~~ NA

pH Meter Model # H1991301

pH Meter Serial # 042906

Type Hanna

Calibration 100 %

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1045

Field Measurement No. 1

Water Temperature: 20.6 °C

pH: 5.84

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear & No Odor

1105

Field Measurement No. 2

Water Temperature: 20.5 °C

pH: 5.74

Cond: 230 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear & No Odor

1125

Field Measurement No. 3

Water Temperature: 20.5 °C

pH: 5.81

Cond: 230 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear & No Odor

November 2020 Field Forms

Akzo Nobel Functional Chemicals LLC

LeMoyne Plant

O-59

RCRA Groundwater Monitor Well O-59

Sampling / Inspection Log Sheet

Date: 11-4-20 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	117.16	119.70
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
_____
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA SEMI ANNUAL
Sampler's Name: B. KITTRELL Date: 11 / 4 / 20
Company: SOVEREIGN
Arrival Time: 0830 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 73°
Standing Water around Well: NONE

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 27.00
Depth to Bottom: 119.70

Pump Used: Yes / No
Depth of Pump: 29'
Began: 1130 (time)
Ended: 1233 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 197 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / (No)
Note any unusual events: NONE

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 34602
Type GRUNDFOS
Calibration —

pH Meter Model # HI 991301
pH Meter Serial # 95222
Type HANNA
Calibration 100%

Cond Meter Model # SAME
Cond Meter Serial # _____
Type _____
Calibration _____

Field Measurement No. 1
Water Temperature: 21.1 °C
pH: 4.41
Cond: 300 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2
Water Temperature: 20.6 °C
pH: 4.96
Cond: 295 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3
Water Temperature: 20.7 C
pH: 4.46
Cond: 300 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60

Sampling / Inspection Log Sheet

Date: 11-4-20 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.28
Screened Interval	-37.46/-57.46	73/93	75.24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: B. KITTRELL Date: 11/4/20
Company: SOUEREIGN
Arrival Time: 0830 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 73°
Standing Water around Well: NONE

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 26.64
Depth to Bottom: 98.28

Pump Used: Yes / No
Depth of Pump: 28'
Began: 1145 (time)
Ended: 1230 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 135 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: NONE

Sampling Equipment Information:
Pump Model # HI 991301
Pump Serial # 95222
Type HANNA
Calibration 100%

pH Meter Model # SAME
pH Meter Serial #
Type
Calibration

Cond Meter Model #
Cond Meter Serial #
Type
Calibration

Pump Information:

Field Measurement No. 1
Water Temperature: 20.8 °C
pH: 3.78
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2
Water Temperature: 20.7 °C
pH: 3.82
Cond: 175 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3
Water Temperature: 20.7 °C
pH: 3.85
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.) CLEAR, NO ODOR

Akzo Nobel Chemicals Inc **O-61**

LeMoyne Plant

RCRA Groundwater Monitor Well O-61 Sampling / Inspection Log Sheet

Date: 11-4-20 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.79
Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	68	70.08
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: B. Kittrell Date: 11 / 4 / 20
Company: Sovereign
Arrival Time: 0830 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 74°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 26.64
Depth to Bottom: 70.08

Pump Used: (Yes) / No
Depth of Pump: 28'
Began: 1244 (time)
Ended: 1314 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 346602
Type Grundfos
Calibration

pH Meter Model # HI 991301
pH Meter Serial # 95222
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial #
Type
Calibration
Pump Information:

Field Measurement No. 1
Water Temperature: 21.0° C
pH: 3.61
Cond: 220 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2
Water Temperature: 21.0 ° C
pH: 3.64
Cond: 220 **µmhos/cm**
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3
Water Temperature: 21.0 ° C
pH: 3.66
Cond: 220 **µmhos/cm**
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62

Sampling / Inspection Log Sheet

Date: 11-5-20 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.04
Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	115	116.65
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
_____
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA Semi-Annual
_____
Sampler's Name: B. Kittrell Date: 11 / 5 / 20
Company: Sovereign
Arrival Time: 0900 Departure Time: 1400
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 70°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 23.63
Depth to Bottom: 116.65

Pump Used: (Yes) / No
Depth of Pump: 25'
Began: 1000 (time)
Ended: 1101 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # 1A10600 3
Pump Serial # 34602
Type GRUNDFOS
Calibration _____

pH Meter Model # HI 9913 05
pH Meter Serial # 95222
Type HANNA
Calibration 100%

Cond Meter Model # SAME
Cond Meter Serial # _____
Type _____
Calibration _____

Pump Information:

Field Measurement No. 1
Water Temperature: 20.2 ° C
pH: 5.03
Cond: 220 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2
Water Temperature: 20.2 ° C
pH: 4.94
Cond: 220 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3
Water Temperature: 20.1 ° C
pH: 4.90
Cond: 220 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63

Sampling / Inspection Log Sheet

Date: 11-5-20 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	90	92.29
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: B. KITTRELL Date: 11/5/20
Company: SOUTHERN
Arrival Time: 0900 Departure Time: 1400
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 70°
Standing Water around Well: NONE

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 23.84
Depth to Bottom: 92.29

Pump Used: (Yes) / No
Depth of Pump: 25'
Began: 1010 (time)
Ended: 1056 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 138 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: NONE

Sampling Equipment Information:
Pump Model # 1A106003
Pump Serial # 28540
Type GRUNDFOS
Calibration

pH Meter Model # HI 991301
pH Meter Serial # 95222
Type HANNA
Calibration 100%

Cond Meter Model # SAME
Cond Meter Serial #
Type
Calibration

Pump Information:

Field Measurement No. 1
Water Temperature: 20.2 ° C
pH: 3.95
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2
Water Temperature: 20.2 ° C
pH: 3.85
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3
Water Temperature: 20.2 ° C
pH: 3.87
Cond: 170 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64

Sampling / Inspection Log Sheet

Date: 11/5/20 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	75	77.14
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: B. Kittrell Date: 11/5/20
Company: Sovereign
Arrival Time: 0900 Departure Time: 1400
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 74°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 23.35
Depth to Bottom: 77.14

Pump Used: Yes / No
Depth of Pump: 25'
Began: 1105 (time)
Ended: 1142 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 108 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: ____ (gal/liter)
# of Bails Removed: ____
Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # IA106003
Pump Serial # 34602
Type Grundfos
Calibration —

pH Meter Model # HI 991301
pH Meter Serial # 95222
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial #
Type
Calibration

Pump Information:

Field Measurement No. 1
Water Temperature: 20.5 °C
pH: 3.78
Cond: 90 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.) CLEAR, No Odor

Field Measurement No. 2
Water Temperature: 20.6 °C
pH: 3.80
Cond: 90 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.) CLEAR, No Odor

Field Measurement No. 3
Water Temperature: 20.5 °C
pH: 3.79
Cond: 85 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 11-4-20 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	68
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes /(No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: B. Kittell Date: 11 / 4 / 20

Company: Sovereign

Arrival Time: 0830 Departure Time: 1530

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 74°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.17

Depth to Bottom: 68.00

Pump Used: (Yes) / No

Depth of Pump: 26'

Began: 1332 (time)

Ended: 1402 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes /(No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type GRUNDFOS

Calibration

pH Meter Model # HI 991301

pH Meter Serial # 95222

Type HANNA

Calibration 100%

Cond Meter Model # SAME

Cond Meter Serial #

Type

Calibration

Pump Information:

Field Measurement No. 1

Water Temperature: 19.8 °C

pH: 4.21

Cond: 100 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2

Water Temperature: 19.7 °C

pH: 4.18

Cond: 100 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3

Water Temperature: 19.7 °C

pH: 4.22

Cond: 100 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82

Sampling / Inspection Log Sheet

Date: 11-4-20 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	115	117.60
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B. Kittrell Date: 11/4/20

Company: Sovereign

Arrival Time: 0830 Departure Time: 1530

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 74°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.15

Depth to Bottom: 117.60

Pump Used: Yes / No

Depth of Pump: 26'

Began: 1327 (time)

Ended: 1427 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 180 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A1060003

Pump Serial # 28540

Type Grundfos

Calibration —

pH Meter Model # HJ 991301

pH Meter Serial # 95222

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

Field Measurement No. 1

Water Temperature: 19.8 °C

pH: 4.71

Cond: 200 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2

Water Temperature: 19.7 °C

pH: 4.78

Cond: 200 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3

Water Temperature: 19.7 °C

pH: 4.73

Cond: 210 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83

Sampling / Inspection Log Sheet

Date: 11-5-20 Signed: Russ Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.90
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA SEMI-ANNUAL

Sampler's Name: B. KITTRELL Date: 11/5/20

Company: SOVEREIGN

Arrival Time: 0900 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.):

SUNNY 75°

Standing Water around Well: NONE

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.40

Depth to Bottom: 67.90

Pump Used: Yes / No

Depth of Pump: 26'

Began: 1159 (time)

Ended: 1229 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: NONE

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 28540

Type GRUNDFOS

Calibration

pH Meter Model # HI991301

pH Meter Serial # 95222

Type HANNA

Calibration 100%

Cond Meter Model # SAME

Cond Meter Serial #

Type

Calibration

Pump Information:

Field Measurement No. 1

Water Temperature: 21.3 °C

pH: 4.22

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2

Water Temperature: 21.3 °C

pH: 4.21

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3

Water Temperature: 21.0 °C

pH: 4.25

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84

Sampling / Inspection Log Sheet

Date: 11-5-20 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.00
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No

Any indication of having been contacted by vehicle? Yes /(No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B. Kittrell Date: 11 / 5 / 20

Company: Sovereign

Arrival Time: 0900 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 75°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.85

Depth to Bottom: 118.00

Pump Used: Yes / No

Depth of Pump: 26'

Began: 1154 (time)

Ended: 1255 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # 1A106003

Pump Serial # 34602

Type Grundfos

Calibration —

pH Meter Model # HI 991301

pH Meter Serial # 93982

Type Hanna

Calibration 10070

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

Field Measurement No. 1

Water Temperature: 20.5 ° C

pH: 4.80

Cond: 230 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2

Water Temperature: 20.5 ° C

pH: 4.87

Cond: 230 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR. No Odor

Field Measurement No. 3

Water Temperature: 20.5 ° C

pH: 4.85

Cond: 230 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

May 2020 Analytical Results

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

Laboratory Job ID: 400-187819-1
Client Project/Site: AKZO-Semiannual Hg
Revision: 1

For:
Akzo Nobel Functional Chemicals LLC
Akzo Nobel LeMoyne Site
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
5/21/2020 4:13:38 PM
Isabel Enfinger, Project Manager I
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Designee for

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..... LINKS .....

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 400-187819-1

Laboratory: Eurofins TestAmerica, Pensacola

Narrative

Job Narrative
400-187819-1

Comments
No additional comments.

Receipt
The samples were received on 5/8/2020 3:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.7° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: O-59

Lab Sample ID: 400-187819-1
Matrix: Water
Date Collected: 05/06/20 10:08
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:17	1

Client Sample ID: O-59 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-2
Matrix: Water
Date Collected: 05/06/20 10:12
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:19	1

Client Sample ID: O-60

Lab Sample ID: 400-187819-3
Matrix: Water
Date Collected: 05/06/20 10:05
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:21	1

Client Sample ID: O-60 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-4
Matrix: Water
Date Collected: 05/06/20 10:09
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:23	1

Client Sample ID: O-61

Lab Sample ID: 400-187819-5
Matrix: Water
Date Collected: 05/06/20 10:24
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:25	1

Client Sample ID: O-61 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-6
Matrix: Water
Date Collected: 05/06/20 10:28
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:26	1

Client Sample ID: O-62

Lab Sample ID: 400-187819-7
Matrix: Water
Date Collected: 05/07/20 09:28
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:32	1

Client Sample ID: O-62 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-8
Date Collected: 05/07/20 09:32
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:34	1

Client Sample ID: O-63

Lab Sample ID: 400-187819-9
Date Collected: 05/07/20 09:16
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:36	1

Client Sample ID: O-63 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-10
Date Collected: 05/07/20 09:20
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:38	1

Client Sample ID: O-64

Lab Sample ID: 400-187819-11
Date Collected: 05/07/20 10:04
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:39	1

Client Sample ID: O-64 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-12
Date Collected: 05/07/20 10:08
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:49	1

Client Sample ID: O-81

Lab Sample ID: 400-187819-13
Date Collected: 05/06/20 11:30
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:54	1

Client Sample ID: O-81 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-14
Date Collected: 05/06/20 11:34
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:56	1

Client Sample ID: O-82
Date Collected: 05/06/20 12:04
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-15
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:58	1

Client Sample ID: O-82 (EQUIPMENT BLANK)
Date Collected: 05/06/20 12:08
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-16
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 14:00	1

Client Sample ID: O-83
Date Collected: 05/07/20 10:55
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-17
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 14:02	1

Client Sample ID: O-83 (EQUIPMENT BLANK)
Date Collected: 05/07/20 10:59
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-18
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/21/20 08:06	05/21/20 12:28	1

Client Sample ID: O-84
Date Collected: 05/07/20 11:25
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-19
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 14:06	1

Client Sample ID: O-84 (EQUIPMENT BLANK)
Date Collected: 05/07/20 11:29
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-20
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 12:19	1

Client Sample ID: FIELD BLANK #1
Date Collected: 05/06/20 11:50
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-21
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/21/20 08:06	05/21/20 12:30	1

Client Sample ID: FIELD BLANK #2
Lab Sample ID: 400-187819-22
Date Collected: 05/07/20 08:41
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/21/20 08:06	05/21/20 12:31	1

Client Sample ID: FIELD SPIKE
Lab Sample ID: 400-187819-23
Date Collected: 05/07/20 08:45
Matrix: Water
Date Received: 05/08/20 15:30

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.00035**		0.00020		mg/L		05/18/20 08:15	05/18/20 12:34	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-489115/14-A
Matrix: Water
Analysis Batch: 489514

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 489115

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 13:13	1

Lab Sample ID: LCS 400-489115/15-A
Matrix: Water
Analysis Batch: 489514

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 489115

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.00110		mg/L		109	80 - 120

Lab Sample ID: 400-187819-11 MS
Matrix: Water
Analysis Batch: 489514

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 489115

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00195		mg/L		97	80 - 120

Lab Sample ID: 400-187819-11 MSD
Matrix: Water
Analysis Batch: 489514

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 489115

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00211		mg/L		105	80 - 120	8	20

Lab Sample ID: 400-187819-11 DU
Matrix: Water
Analysis Batch: 489514

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 489115

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Mercury	<0.00020		<0.00020		mg/L		NC	20

Lab Sample ID: MB 400-489119/14-A
Matrix: Water
Analysis Batch: 489514

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 489119

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/18/20 08:15	05/18/20 12:15	1

Lab Sample ID: LCS 400-489119/15-A
Matrix: Water
Analysis Batch: 489514

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 489119

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.00108		mg/L		108	80 - 120

Lab Sample ID: 400-187819-20 MS
Matrix: Water
Analysis Batch: 489514

Client Sample ID: O-84 (EQUIPMENT BLANK)
Prep Type: Total/NA
Prep Batch: 489119

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00217		mg/L		99	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: 400-187819-20 MSD
Matrix: Water
Analysis Batch: 489514

Client Sample ID: O-84 (EQUIPMENT BLANK)
Prep Type: Total/NA
Prep Batch: 489119

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00224		mg/L		103	80 - 120	3	20

Lab Chronicle

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO-Semiannual Hg

Job ID: 400-187819-1

Client Sample ID: O-59
Date Collected: 05/06/20 10:08
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:17	JAP	TAL PEN

Client Sample ID: O-59 (EQUIPMENT BLANK)
Date Collected: 05/06/20 10:12
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:19	JAP	TAL PEN

Client Sample ID: O-60
Date Collected: 05/06/20 10:05
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:21	JAP	TAL PEN

Client Sample ID: O-60 (EQUIPMENT BLANK)
Date Collected: 05/06/20 10:09
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:23	JAP	TAL PEN

Client Sample ID: O-61
Date Collected: 05/06/20 10:24
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:25	JAP	TAL PEN

Client Sample ID: O-61 (EQUIPMENT BLANK)
Date Collected: 05/06/20 10:28
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:26	JAP	TAL PEN

Client Sample ID: O-62

Lab Sample ID: 400-187819-7

Date Collected: 05/07/20 09:28

Matrix: Water

Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:32	JAP	TAL PEN

Client Sample ID: O-62 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-8

Date Collected: 05/07/20 09:32

Matrix: Water

Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:34	JAP	TAL PEN

Client Sample ID: O-63

Lab Sample ID: 400-187819-9

Date Collected: 05/07/20 09:16

Matrix: Water

Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:36	JAP	TAL PEN

Client Sample ID: O-63 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-10

Date Collected: 05/07/20 09:20

Matrix: Water

Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:38	JAP	TAL PEN

Client Sample ID: O-64

Lab Sample ID: 400-187819-11

Date Collected: 05/07/20 10:04

Matrix: Water

Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:39	JAP	TAL PEN

Client Sample ID: O-64 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-12

Date Collected: 05/07/20 10:08

Matrix: Water

Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:49	JAP	TAL PEN

Lab Chronicle

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO-Semiannual Hg

Job ID: 400-187819-1

Client Sample ID: O-81
Date Collected: 05/06/20 11:30
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:54	JAP	TAL PEN

Client Sample ID: O-81 (EQUIPMENT BLANK)
Date Collected: 05/06/20 11:34
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-14
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:56	JAP	TAL PEN

Client Sample ID: O-82
Date Collected: 05/06/20 12:04
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 13:58	JAP	TAL PEN

Client Sample ID: O-82 (EQUIPMENT BLANK)
Date Collected: 05/06/20 12:08
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-16
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 14:00	JAP	TAL PEN

Client Sample ID: O-83
Date Collected: 05/07/20 10:55
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-17
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 14:02	JAP	TAL PEN

Client Sample ID: O-83 (EQUIPMENT BLANK)
Date Collected: 05/07/20 10:59
Date Received: 05/08/20 15:30

Lab Sample ID: 400-187819-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489743	05/21/20 08:06	JAP	TAL PEN
Total/NA	Analysis	7470A		1	490052	05/21/20 12:28	JAP	TAL PEN

Lab Chronicle

Client: Akzo Nobel Functional Chemicals LLC
Project/Site: AKZO-Semiannual Hg

Job ID: 400-187819-1

Client Sample ID: O-84

Lab Sample ID: 400-187819-19
Matrix: Water
Date Collected: 05/07/20 11:25
Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489115	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 14:06	JAP	TAL PEN

Client Sample ID: O-84 (EQUIPMENT BLANK)

Lab Sample ID: 400-187819-20
Matrix: Water
Date Collected: 05/07/20 11:29
Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489119	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 12:19	JAP	TAL PEN

Client Sample ID: FIELD BLANK #1

Lab Sample ID: 400-187819-21
Matrix: Water
Date Collected: 05/06/20 11:50
Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489743	05/21/20 08:06	JAP	TAL PEN
Total/NA	Analysis	7470A		1	490052	05/21/20 12:30	JAP	TAL PEN

Client Sample ID: FIELD BLANK #2

Lab Sample ID: 400-187819-22
Matrix: Water
Date Collected: 05/07/20 08:41
Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489743	05/21/20 08:06	JAP	TAL PEN
Total/NA	Analysis	7470A		1	490052	05/21/20 12:31	JAP	TAL PEN

Client Sample ID: FIELD SPIKE

Lab Sample ID: 400-187819-23
Matrix: Water
Date Collected: 05/07/20 08:45
Date Received: 05/08/20 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			489119	05/18/20 08:15	JAP	TAL PEN
Total/NA	Analysis	7470A		1	489514	05/18/20 12:34	JAP	TAL PEN

Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins Environment Testing TestA

400-187819 COC

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-94129-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: taylor.bruzzio@testamericainc.com		Page: Page 1 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	
Phone:	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

TEST AMERICA INC.
700 - MOBILE

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-59	5-6-20	1008	G	Water			✓		
O-59 (Equipment Blank)		1012		Water					
O-60		1005		Water					
O-60 (Equipment Blank)		1009		Water					
O-61		1024		Water					
O-61 (Equipment Blank)	5-6-20	1028		Water					
O-62	5-7-20	0928		Water					
O-62 (Equipment Blank)		0932		Water					
O-63		0916		Water					
O-63 (Equipment Blank)		0920		Water					
O-64	5-7-20	1004	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Brian Kittrell	Date/Time: 5-8-20 1410	Company	Received by: M. Padgett	Date/Time: 5/8/2020 1410	Company
Relinquished by: M. Padgett	Date/Time: 5/8/2020 1410	Company	Received by: N Jaccaway	Date/Time: 05-08-20 1410	Company
Relinquished by: N Jaccaway	Date/Time: 05-08-20 1530	Company	Received by: Meyan Hinds II	Date/Time: 5-8-20 1730	Company: TAEN

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 0.7 °C IR8

Ver: 01/16/2019

5/21/2020 (Rev. 1)

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information	Sampler: BRIAN KITTRELL	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-94129-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: taylor.bruzzio@testamericainc.com		Page: Page 2 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:	Analysis Requested		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify); Other:
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Sample Identification — TEST AMERICA INC. 700 - MOBILE	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	5-7-20	1008	G	Water			✓		
O-81	5-6-20	1130		Water					
O-81 (Equipment Blank)		1134		Water					
O-82		1204		Water					
O-82 (Equipment Blank)	5-6-20	1208		Water					
O-83	5-7-20	1055		Water					
O-83 (Equipment Blank)		1059		Water					
O-84		1125		Water					
O-84 (Equipment Blank)	5-7-20	1129		Water					
Duplicate O-64	5-7-20	1004		Water			✓		
Field Blank #1	5-6-20	1150	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	5-8-20 1410		M. Peddycord	5/8/2020 1410	
2	M. Peddycord	5/8/2020 1410		N MacCauley	05-08-20 1411	
3	N MacCauley	05-08-20 1530		Megan Hudson	5-8-20 1530	TAPEN

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 0.7°C ID8

Ver: 01/16/2019

5/21/2020 (Rev. 1)

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information	Sampler:	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-94129-21846.3
Client Contact: Ms. Sylvia Williams	Phone:	E-Mail: taylor.bruzzio@testamericainc.com		Page: Page 3 of 5
Company: Akzo Nobel				Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North
City: Axis
State, Zip: AL, 36505
Phone:
Email: sylvia.williams@akzonobel.com
Project Name: AKZO - Semiannual Hg
Site:

Due Date Requested:
TAT Requested (days):
PO #: 4100001642
WO #:
Project #: 40003052
SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	5-7-20	0841	G	Water					
MS 0-64	↓	1004	↓	Water					
MSD 0-64	↓	1004	↓	Water					
Field Spike	5-7-20	0845	G	Water					
				Water					
				Water					
				Water					
TEST AMERICA INC. 700 - MOBILE				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Logan Kittell	5.8.20 1410		M. Pickett	5/8/2020 1410	
2	M Pickett	5/8/2020 1410		N Sneadaway	05-08-20 1410	
3	N Sneadaway	05-08-20 1530		Morgan Hinson	5-8-20 1530	TAL PEN

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 0.7c IR

Ver: 01/16/2019

November 2020 Analytical Results

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

Laboratory Job ID: 400-195462-1
Client Project/Site: Nouryon - Semiannual Hg

For:
Nouryon Functional Chemicals, LLC
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
11/11/2020 3:00:56 PM

Taylor Bruzzio, Project Manager I
(850)471-6226
Taylor.Bruzzio@Eurofinset.com

..... LINKS .....

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 400-195462-1

Laboratory: Eurofins TestAmerica, Pensacola

Narrative

Job Narrative
400-195462-1

Comments
No additional comments.

Receipt
The samples were received on 11/5/2020 4:00 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: O-59
Lab Sample ID: 400-195462-1
Date Collected: 11/04/20 12:33
Matrix: Water
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:19	1

Client Sample ID: O-59 (EQUIPMENT BLANK)
Lab Sample ID: 400-195462-2
Date Collected: 11/04/20 12:37
Matrix: Water
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:21	1

Client Sample ID: O-60
Lab Sample ID: 400-195462-3
Date Collected: 11/04/20 12:30
Matrix: Water
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:27	1

Client Sample ID: O- 60 (EQUIPMENT BLANK)
Lab Sample ID: 400-195462-4
Date Collected: 11/04/20 12:40
Matrix: Water
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:28	1

Client Sample ID: O- 61
Lab Sample ID: 400-195462-5
Date Collected: 11/04/20 13:15
Matrix: Water
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:30	1

Client Sample ID: O- 61 (EQUIPMENT BLANK)
Lab Sample ID: 400-195462-6
Date Collected: 11/04/20 13:19
Matrix: Water
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.00020**		0.00020		mg/L		11/06/20 09:34	11/06/20 13:32	1

Client Sample ID: O-62
Lab Sample ID: 400-195462-7
Date Collected: 11/05/20 11:01
Matrix: Water
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:34	1

Client Sample ID: O- 62 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-8
Matrix: Water
Date Collected: 11/05/20 11:05
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:36	1

Client Sample ID: O-63

Lab Sample ID: 400-195462-9
Matrix: Water
Date Collected: 11/05/20 10:56
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:38	1

Client Sample ID: O-63 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-10
Matrix: Water
Date Collected: 11/05/20 11:00
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:40	1

Client Sample ID: 0-64

Lab Sample ID: 400-195462-11
Matrix: Water
Date Collected: 11/05/20 11:42
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:42	1

Client Sample ID: O-64 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-12
Matrix: Water
Date Collected: 11/05/20 11:46
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:53	1

Client Sample ID: O-81

Lab Sample ID: 400-195462-13
Matrix: Water
Date Collected: 11/04/20 14:03
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:55	1

Client Sample ID: O- 81 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-14
Matrix: Water
Date Collected: 11/04/20 14:07
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:57	1

Client Sample ID: O- 82 — **Lab Sample ID: 400-195462-15**
Date Collected: 11/04/20 14:28 — **Matrix: Water**
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:32	1

Client Sample ID: O-82 (EQUIPMENT BLANK) — **Lab Sample ID: 400-195462-16**
Date Collected: 11/04/20 14:32 — **Matrix: Water**
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:34	1

Client Sample ID: O-83 — **Lab Sample ID: 400-195462-17**
Date Collected: 11/05/20 12:30 — **Matrix: Water**
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:36	1

Client Sample ID: O-83 (EQUIPMENT BLANK) — **Lab Sample ID: 400-195462-18**
Date Collected: 11/05/20 12:34 — **Matrix: Water**
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:38	1

Client Sample ID: O-84 — **Lab Sample ID: 400-195462-19**
Date Collected: 11/05/20 12:55 — **Matrix: Water**
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:40	1

Client Sample ID: O-84 (EQUIPMENT BLANK) — **Lab Sample ID: 400-195462-20**
Date Collected: 11/05/20 12:59 — **Matrix: Water**
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:42	1

Client Sample ID: DUPLICATE O-64 — **Lab Sample ID: 400-195462-21**
Date Collected: 11/05/20 11:42 — **Matrix: Water**
Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:43	1

Client Sample ID: FIELD BLANK #1

Lab Sample ID: 400-195462-22

Date Collected: 11/04/20 12:55

Matrix: Water

Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:45	1

Client Sample ID: FIELD BLANK #2

Lab Sample ID: 400-195462-23

Date Collected: 11/05/20 10:30

Matrix: Water

Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:51	1

Client Sample ID: FIELD SPIKE

Lab Sample ID: 400-195462-24

Date Collected: 11/05/20 10:40

Matrix: Water

Date Received: 11/05/20 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:53	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-509607/14-A
Matrix: Water
Analysis Batch: 509729

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 509607

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/06/20 09:34	11/06/20 13:04	1

Lab Sample ID: LCS 400-509607/15-A
Matrix: Water
Analysis Batch: 509729

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 509607

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000911		mg/L		90	80 - 120

Lab Sample ID: 400-195462-11 MS
Matrix: Water
Analysis Batch: 509729

Client Sample ID: 0-64
Prep Type: Total/NA
Prep Batch: 509607

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00193		mg/L		96	80 - 120

Lab Sample ID: 400-195462-11 MSD
Matrix: Water
Analysis Batch: 509729

Client Sample ID: 0-64
Prep Type: Total/NA
Prep Batch: 509607

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00200		mg/L		99	80 - 120	4	20

Lab Sample ID: MB 400-509933/14-A
Matrix: Water
Analysis Batch: 510257

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 509933

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/09/20 15:33	11/10/20 17:13	1

Lab Sample ID: LCS 400-509933/15-A
Matrix: Water
Analysis Batch: 510257

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 509933

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000969		mg/L		96	80 - 120

Client Sample ID: O-59

Lab Sample ID: 400-195462-1
Matrix: Water
Date Collected: 11/04/20 12:33
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:19	NET	TAL PEN

Client Sample ID: O-59 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-2
Matrix: Water
Date Collected: 11/04/20 12:37
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:21	NET	TAL PEN

Client Sample ID: O-60

Lab Sample ID: 400-195462-3
Matrix: Water
Date Collected: 11/04/20 12:30
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:27	NET	TAL PEN

Client Sample ID: O- 60 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-4
Matrix: Water
Date Collected: 11/04/20 12:40
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:28	NET	TAL PEN

Client Sample ID: O- 61

Lab Sample ID: 400-195462-5
Matrix: Water
Date Collected: 11/04/20 13:15
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:30	NET	TAL PEN

Client Sample ID: O- 61 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-6
Matrix: Water
Date Collected: 11/04/20 13:19
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:32	NET	TAL PEN

Client Sample ID: O-62

Lab Sample ID: 400-195462-7

Date Collected: 11/05/20 11:01

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:34	NET	TAL PEN

Client Sample ID: O- 62 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-8

Date Collected: 11/05/20 11:05

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:36	NET	TAL PEN

Client Sample ID: O-63

Lab Sample ID: 400-195462-9

Date Collected: 11/05/20 10:56

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:38	NET	TAL PEN

Client Sample ID: O-63 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-10

Date Collected: 11/05/20 11:00

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:40	NET	TAL PEN

Client Sample ID: 0-64

Lab Sample ID: 400-195462-11

Date Collected: 11/05/20 11:42

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:42	NET	TAL PEN

Client Sample ID: O-64 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-12

Date Collected: 11/05/20 11:46

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:53	NET	TAL PEN

Client Sample ID: O-81

Lab Sample ID: 400-195462-13

Date Collected: 11/04/20 14:03
Matrix: Water
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:55	NET	TAL PEN

Client Sample ID: O- 81 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-14

Date Collected: 11/04/20 14:07
Matrix: Water
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509607	11/06/20 09:34	NET	TAL PEN
Total/NA	Analysis	7470A		1	509729	11/06/20 13:57	NET	TAL PEN

Client Sample ID: O- 82

Lab Sample ID: 400-195462-15

Date Collected: 11/04/20 14:28
Matrix: Water
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:32	NET	TAL PEN

Client Sample ID: O-82 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-16

Date Collected: 11/04/20 14:32
Matrix: Water
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:34	NET	TAL PEN

Client Sample ID: O-83

Lab Sample ID: 400-195462-17

Date Collected: 11/05/20 12:30
Matrix: Water
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:36	NET	TAL PEN

Client Sample ID: O-83 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-18

Date Collected: 11/05/20 12:34
Matrix: Water
Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:38	NET	TAL PEN

Client Sample ID: O-84

Lab Sample ID: 400-195462-19

Date Collected: 11/05/20 12:55

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:40	NET	TAL PEN

Client Sample ID: O-84 (EQUIPMENT BLANK)

Lab Sample ID: 400-195462-20

Date Collected: 11/05/20 12:59

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:42	NET	TAL PEN

Client Sample ID: DUPLICATE O-64

Lab Sample ID: 400-195462-21

Date Collected: 11/05/20 11:42

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:43	NET	TAL PEN

Client Sample ID: FIELD BLANK #1

Lab Sample ID: 400-195462-22

Date Collected: 11/04/20 12:55

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:45	NET	TAL PEN

Client Sample ID: FIELD BLANK #2

Lab Sample ID: 400-195462-23

Date Collected: 11/05/20 10:30

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:51	NET	TAL PEN

Client Sample ID: FIELD SPIKE

Lab Sample ID: 400-195462-24

Date Collected: 11/05/20 10:40

Matrix: Water

Date Received: 11/05/20 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			509933	11/09/20 15:33	NET	TAL PEN
Total/NA	Analysis	7470A		1	510257	11/10/20 17:53	NET	TAL PEN

Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-97190-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com		Page: Page 1 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days): STANDARD			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

400-195462 COC

TEST AMERICA INC. 700 - MOBILE Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-59	11.4.20	1233	G	Water			✓		
O-59 (Equipment Blank)		1237		Water					
O-60		1230		Water					
O-60 (Equipment Blank)		1240		Water					
O-61		1315		Water					
O-61 (Equipment Blank)	11.4.20	1319		Water					
O-62	11.5.20	1101		Water					
O-62 (Equipment Blank)		1105		Water					
O-63		1056		Water					
O-63 (Equipment Blank)		1100		Water					
O-64	11.5.20	1142	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Brian Kittrell	11.5.20 1418	SA		11.5.20 1418	TA
2		11.5.20 1435	TA		11/5/20 1435	TA
3		11/5/20 1600	TA		11/5/20 16:00	TA

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.6°C IR

Ver: 01/16/2019

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11/11/2020

Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: B. KITTRELL	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-97190-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com		Page: Page 2 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Ww=water, Sl=solid, O=wastecil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	11-5-20	1146	G	Water			✓		
O-81	11-4-20	1403		Water					
O-81 (Equipment Blank)		1407		Water					
O-82		1428		Water					
O-82 (Equipment Blank)	11-4-20	1432		Water					
O-83	11-5-20	1230		Water					
O-83 (Equipment Blank)		1234		Water					
O-84		1255		Water					
O-84 (Equipment Blank)		1259		Water					
Duplicate O-64	11-5-20	1142		Water					
Field Blank #1	11-4-20	1255	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		11-5-20 1418			11-5-20 1418	
2		11-5-20 1435			11/5/20 1435	
3		11/5/20 1600			11-5-20 1600	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.6° C IR8

Ver: 01/16/2019

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11/11/2020

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: B. Kittell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-97190-21846.3
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com		Page: Page 3 of 5
Company: Akzo Nobel				Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days): STANDARD			
State, Zip: AL, 36505				
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

TEST AMERICA INC.
700 - MOBILE

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	11-5-20	1030		Water					
MS 0-64	11-5-20	1142		Water					
MSD 0-64	11-5-20	1142		Water					
Field Spike	11-5-20	1040		Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Brian Kittell	11-5-20 1518			11-5-20 1418	KA
2		11-5-20 1435	TH		11/5/20 1435	TH
3		11/5/20 1600	TA		11-5-20 1600	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.6°C IR9

Ver: 01/16/2019

LeMoyne Site
13440 Highway 43 North
Axis Al 36505

Tel: 251-675-1310

Nouryon

April 28, 2023

Received
MAY 03 2023
Land Division

Chief Austin R. Pierce
Chief Land Division
Alabama Department of Environmental Management
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

Re: Nouryon Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176
Revise 2021 Groundwater Monitoring Report

Dear Chief Pierce,

Please find enclosed the revised copies of the 2021A and 2021B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.68 to 2.31 ft./day during the 2021A event and 1.73 to 2.39 ft./day for the 2021B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Sylvia Williams at (251) 679-4315.

Sincerely

Renee Johnston

Renee Johnston

HSE Advisor

CC: Charmaine Roche , ADEM Land Division

2021 Groundwater Monitoring Report

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2021 Groundwater Monitoring Report Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Michael Mitchell
Plant Manager

5/1/23
Date

Table I

Total Mercury (unfiltered)
Analysis Result Summary (Test America of Mobile, AL)

May 2021

Well Number	Gradient	Well Data				
		1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

*Method: Mercury 7470 A

Table II
Statistical Evaluation of Data Using ANOVA**

Reference: Statistical Analysis of Variance
Procedure: The Downgradient well analysis are compared to the corresponding upgradient well with approximately the same screened internal depth

May 2021

Well Number	Gradient	Well Data					Comparison Data		
		1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L.

** The computation of ANOVA is not possible as there is no variability of the data.

Table III

Total Mercury (unfiltered)
Analysis Result Summary (Test America of Mobile, AL)

November 2021

Well Number	Gradient	Well Data				
		1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

*Method: Mercury 7470 A

Table IV
Statistical Evaluation of Data Using ANOVA**

Reference: Statistical Analysis of Variance
Procedure: The Downgradient well analysis are compared to the corresponding upgradient well with approximately the same screened internal depth

November 2021

Well Number	Gradient	Well Data					Comparison Data		
		1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L

** The computation of ANOVA is not possible as there is no variability of the data.

TABLE V
GROUNDWATER LEVEL DETERMINATION

Elevations taken May ,2021 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	25.75	12.38	119.7	
060	37.78	25.40	12.38	98.28	
061	37.79	25.40	12.39	70.08	
062	35.04	22.65	12.39	116.65	
063	35.27	22.85	12.42	92.29	
064	34.86	22.43	12.43	77.14	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	23.02	12.54	68.00	
082	35.52	23.10	12.42	117.6	
083	36.02	23.37	12.65	67.9	
084	36.31	24.00	12.31	118.00	

TABLE VI
Groundwater Flow Velocity

2021A

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.10	0.597	2.13	2.93
Mid	060 to 063	519.00	2.55	0.491	1.75	2.41
Shallow	061 to 064	519.00	2.97	0.572	2.04	2.81
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.03	0.382	1.36	1.87
Deep	059 to 082	519.00	2.65	0.511	1.82	2.50
Deep	059 to 084	556.00	1.75	0.315	1.12	1.54
		AVG	**2.47**	**0.47**	**1.68**	**2.31**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

TABLE VII

GROUNDWATER LEVEL DETERMINATION

Elevations taken November ,2021 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	25.34	12.79	119.69	
060	37.78	24.95	12.83	98.28	
061	37.79	24.95	12.84	70.08	
062	35.04	22.12	12.92	116.7	
063	35.27	22.30	12.97	92.3	
064	34.86	21.83	13.03	77.2	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	22.87	12.69	68.00	
082	35.52	22.80	12.72	117.60	
083	36.02	22.82	13.20	67.90	
084	36.31	23.40	12.91	118.00	

TABLE VIII

Groundwater Flow Velocity

2021B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.22	0.620	2.21	3.04
Mid	060 to 063	519.00	2.65	0.511	1.82	2.50
Shallow	061 to 064	519.00	3.12	0.601	2.14	2.95
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.13	0.401	1.43	1.97
Deep	059 to 082	519.00	2.54	0.489	1.74	2.40
Deep	059 to 084	556.00	1.94	0.349	1.24	1.71
		AVG	**2.55**	**0.49**	**1.73**	**2.39**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

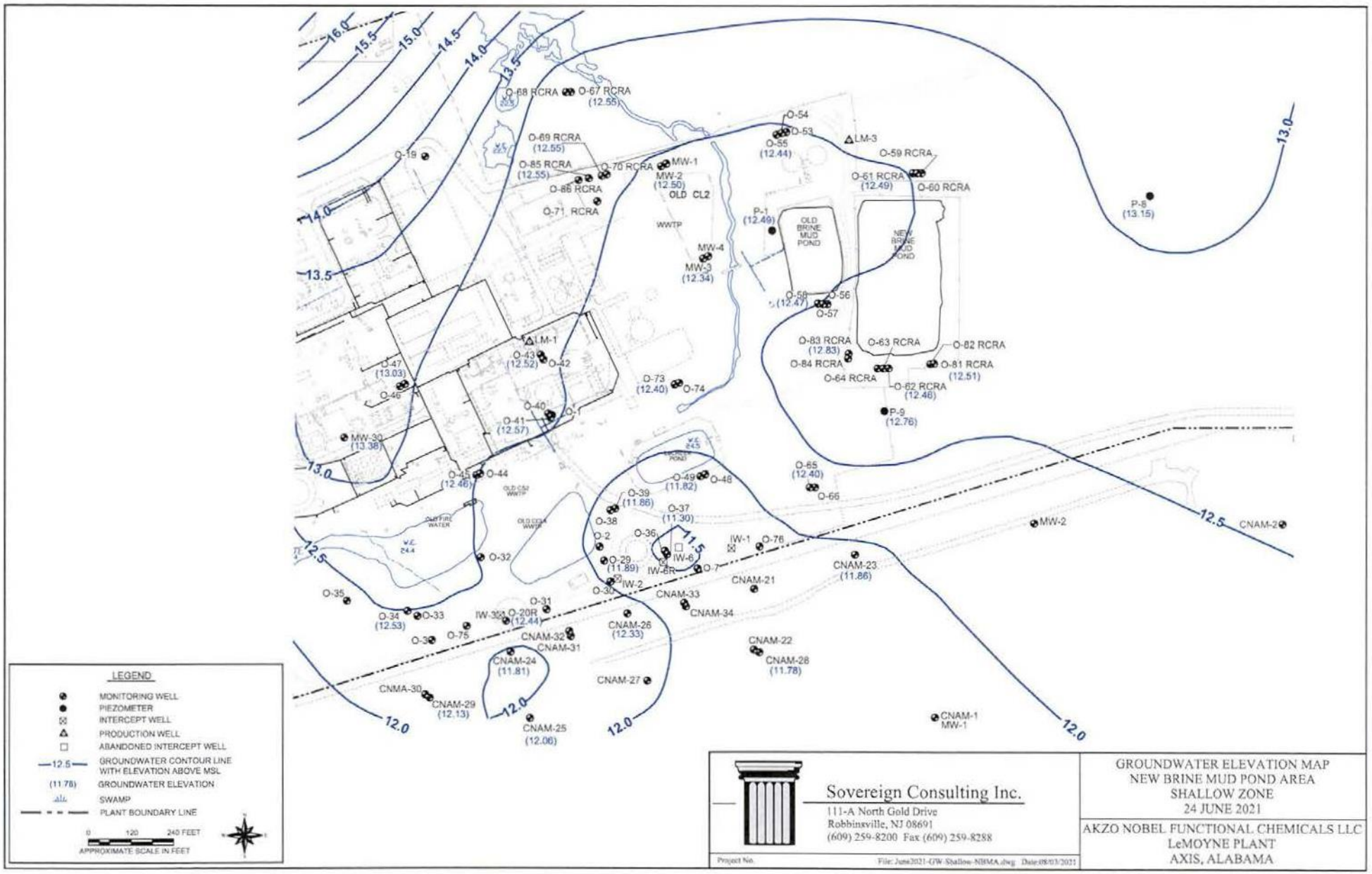
Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

Table IX - Rainfall for 2021

DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.00	0.00	0.08	0.00	0.00	0.00	0.01	0.00	0.33	0.00	0.00	0.00
2	0.00	0.00	1.23	0.00	0.16	0.01	0.38	1.29	0.00	0.79	0.00	0.00
3	0.00	0.00	0.00	0.00	0.12	0.09	0.04	0.00	0.00	0.00	0.00	0.00
4	0.01	0.14	0.00	0.00	1.52	0.01	1.31	0.00	0.00	0.88	0.00	0.00
5	0.00	0.32	0.00	0.00	0.10	0.04	0.00	0.56	0.00	0.00	0.00	0.00
6	0.15	0.19	0.00	0.00	0.10	3.10	0.02	0.00	0.07	0.00	0.00	1.09
7	0.04	0.00	0.00	0.27	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.15
8	0.00	0.18	0.00	0.12	0.00	0.00	0.88	0.00	0.01	0.00	0.00	0.04
9	0.00	0.07	0.00	1.78	0.39	0.00	0.36	0.00	0.00	0.00	0.00	1.07
10	0.46	0.04	0.00	0.00	0.15	0.00	0.16	0.04	0.00	0.00	0.00	0.06
11	0.10	0.07	0.00	0.00	0.82	0.00	0.20	0.04	0.00	0.00	0.00	0.05
12	0.00	0.10	0.00	0.00	0.27	0.00	0.04	0.45	0.15	0.00	0.00	0.00
13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.50	0.62	0.00	0.00	0.00
14	0.00	0.02	0.00	1.61	0.00	0.07	0.00	0.00	0.36	0.00	0.16	0.00
15	0.00	0.02	0.00	0.54	0.00	0.00	0.05	0.00	2.98	0.04	0.00	0.01
16	0.00	0.00	0.04	2.60	0.00	0.00	0.15	0.00	0.04	0.01	0.00	0.00
17	0.00	0.49	1.25	0.10	0.00	0.00	0.65	0.00	0.88	0.00	0.00	1.16
18	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.00	2.27
19	0.00	0.00	0.00	0.00	0.00	2.85	0.26	0.00	0.23	0.00	0.00	0.00
20	0.00	0.00	0.00	0.02	0.00	0.09	0.63	1.29	0.02	0.04	0.00	0.06
21	0.74	0.09	0.00	0.00	0.00	0.00	0.02	0.00	0.15	0.27	0.35	0.01
22	0.03	0.10	0.00	0.00	0.00	1.32	0.00	0.23	0.00	0.00	0.00	0.00
23	0.00	0.00	1.62	0.88	0.00	0.09	0.53	0.32	0.00	0.00	0.00	0.00
24	0.01	0.00	0.34	1.65	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00
25	0.11	0.00	0.21	0.00	0.00	0.09	0.19	0.06	0.00	0.00	0.00	0.00
26	0.12	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.06	0.12	0.00	0.00	0.48	0.39	0.00	0.00	1.74	0.00	0.04
28	0.00	0.01	0.14	0.00	0.23	0.00	0.00	0.00	0.05	0.00	0.05	0.14
29	0.00		0.04	0.00	0.00	0.08	0.00	3.82	0.55	0.00	0.00	0.02
30	0.01		0.04	0.00	0.00	0.10	0.00	3.07	0.04	0.00	0.00	0.01
31	0.01		0.20		0.00	0.04	0.00	0.01		0.00		0.00
Total	1.79	1.92	5.48	9.58	3.86	8.73	7.12	11.68	6.48	3.77	0.56	6.18

Tot for year 67.15

Groundwater Elevation Map



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- —12.5— GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.78) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

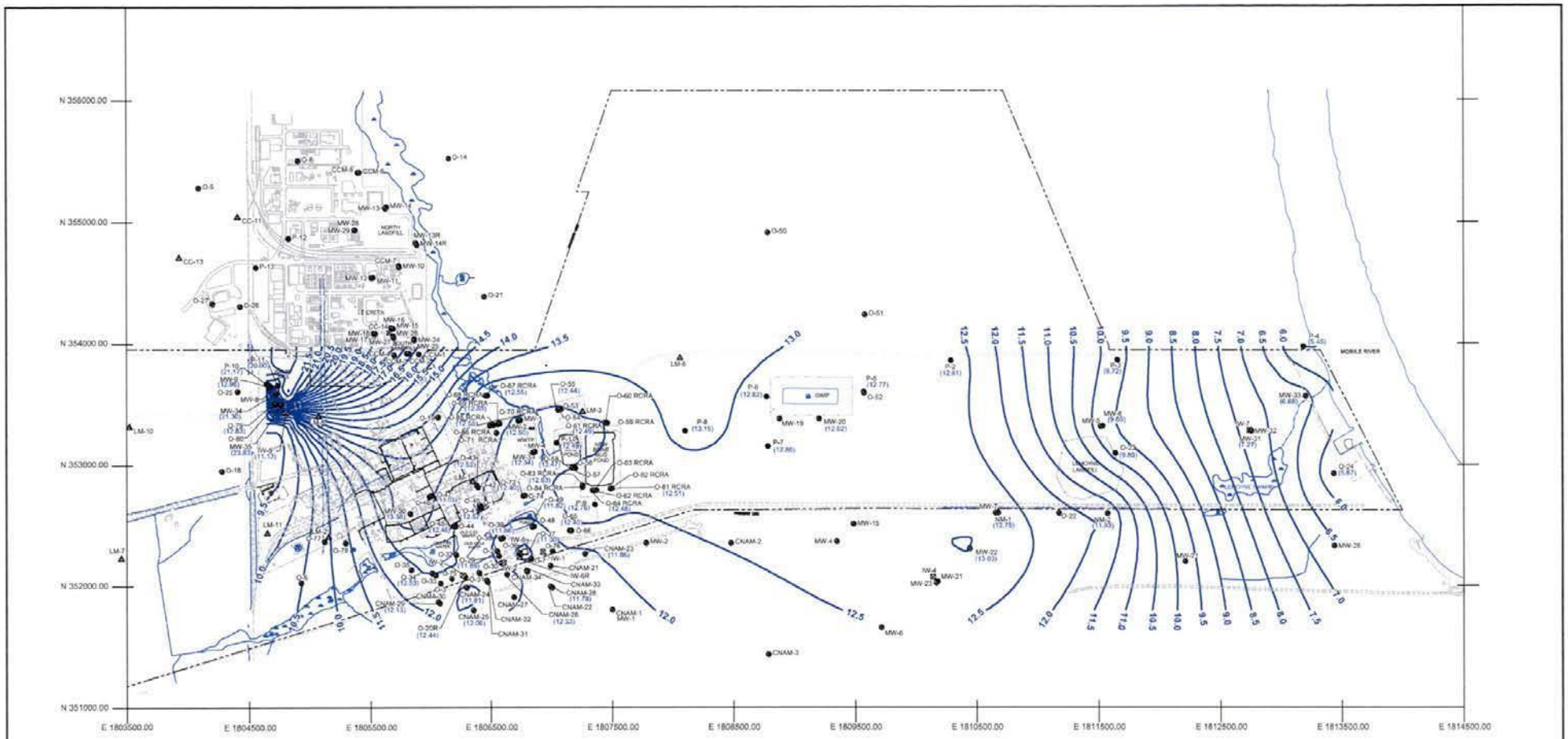
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: June2021-GW-Shallow-NBMA.dwg Date:08/03/2021

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
24 JUNE 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 12.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (11.81) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET
APPROXIMATE SCALE IN FEET

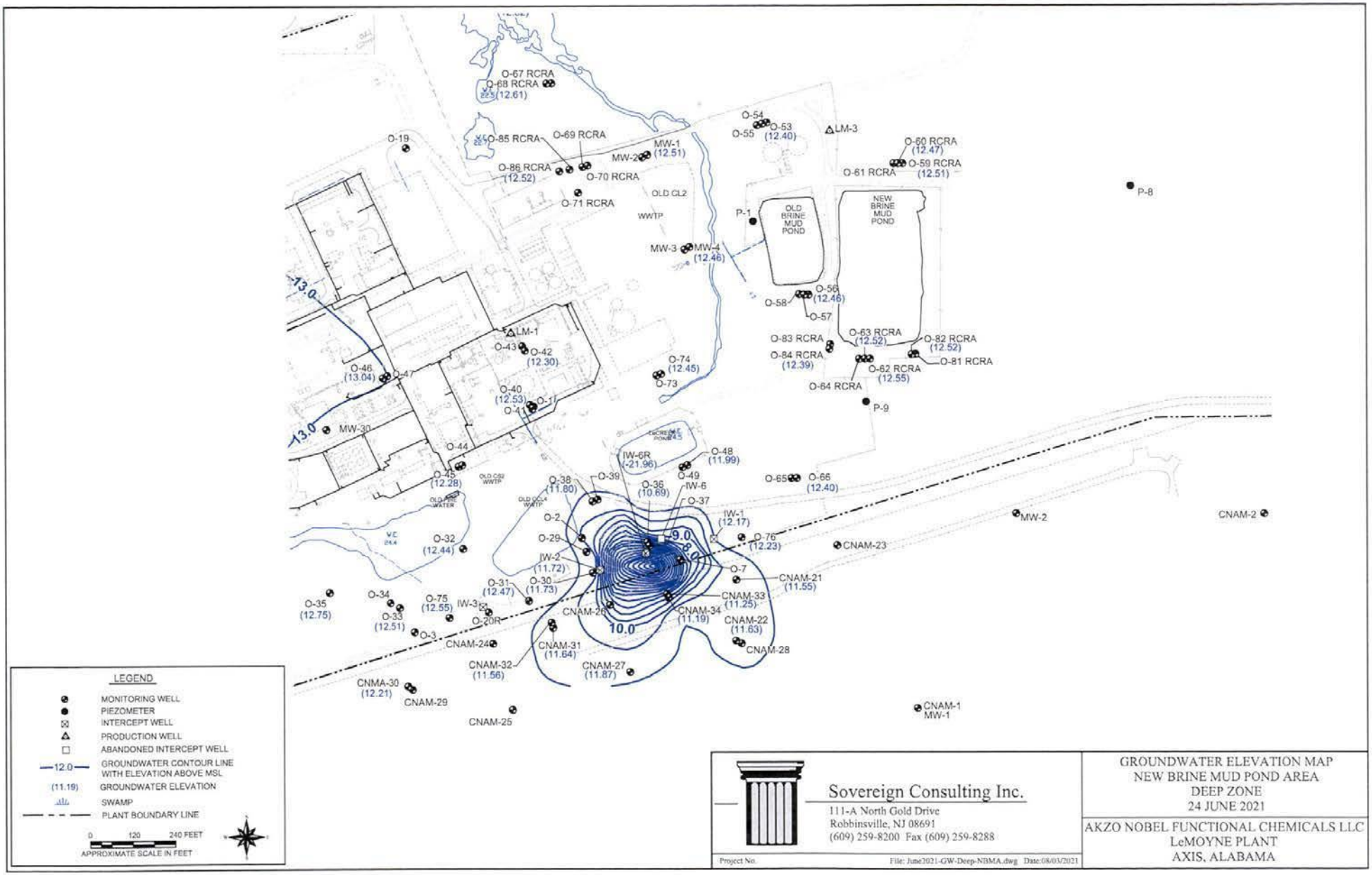
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: June2021-GW-Shallow.dwg Date:08/02/2021

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
24 JUNE 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



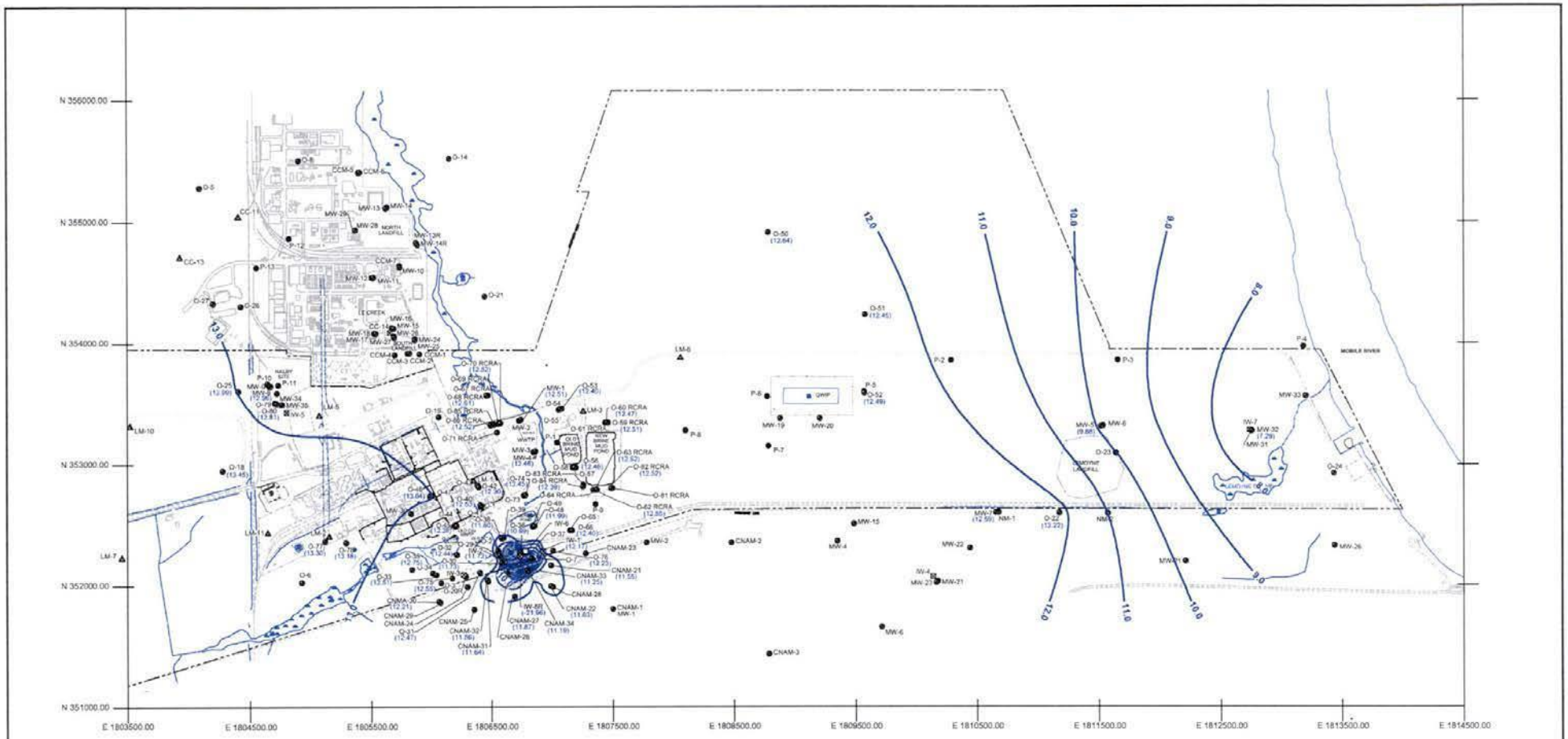
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: June2021-GW-Deep-NBMA.dwg Date:08/03/2021

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
24 JUNE 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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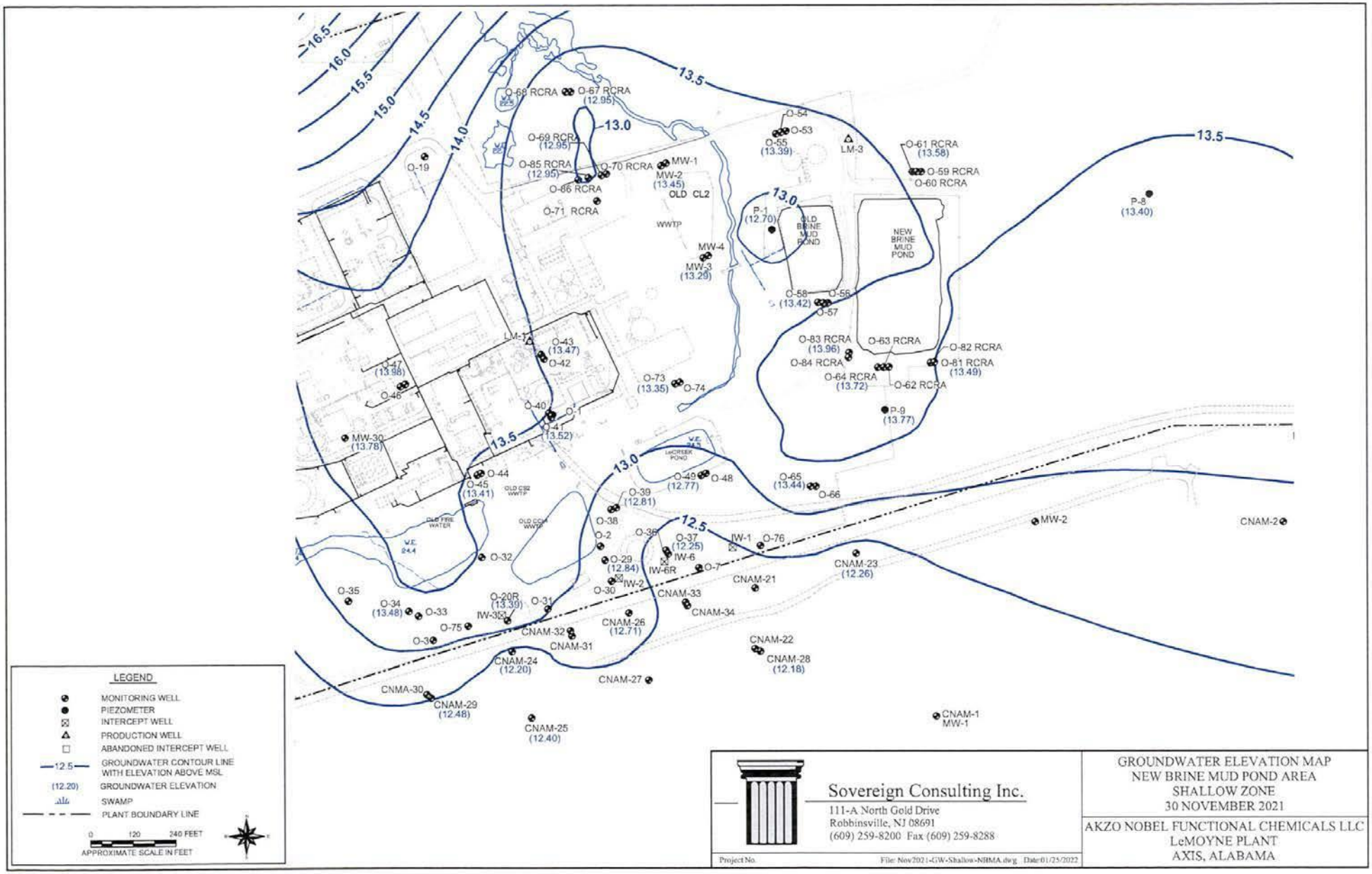
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: June2021-GW-Deep.dwg Date:08/02/2021

GROUNDWATER ELEVATION MAP
DEEP ZONE
24 JUNE 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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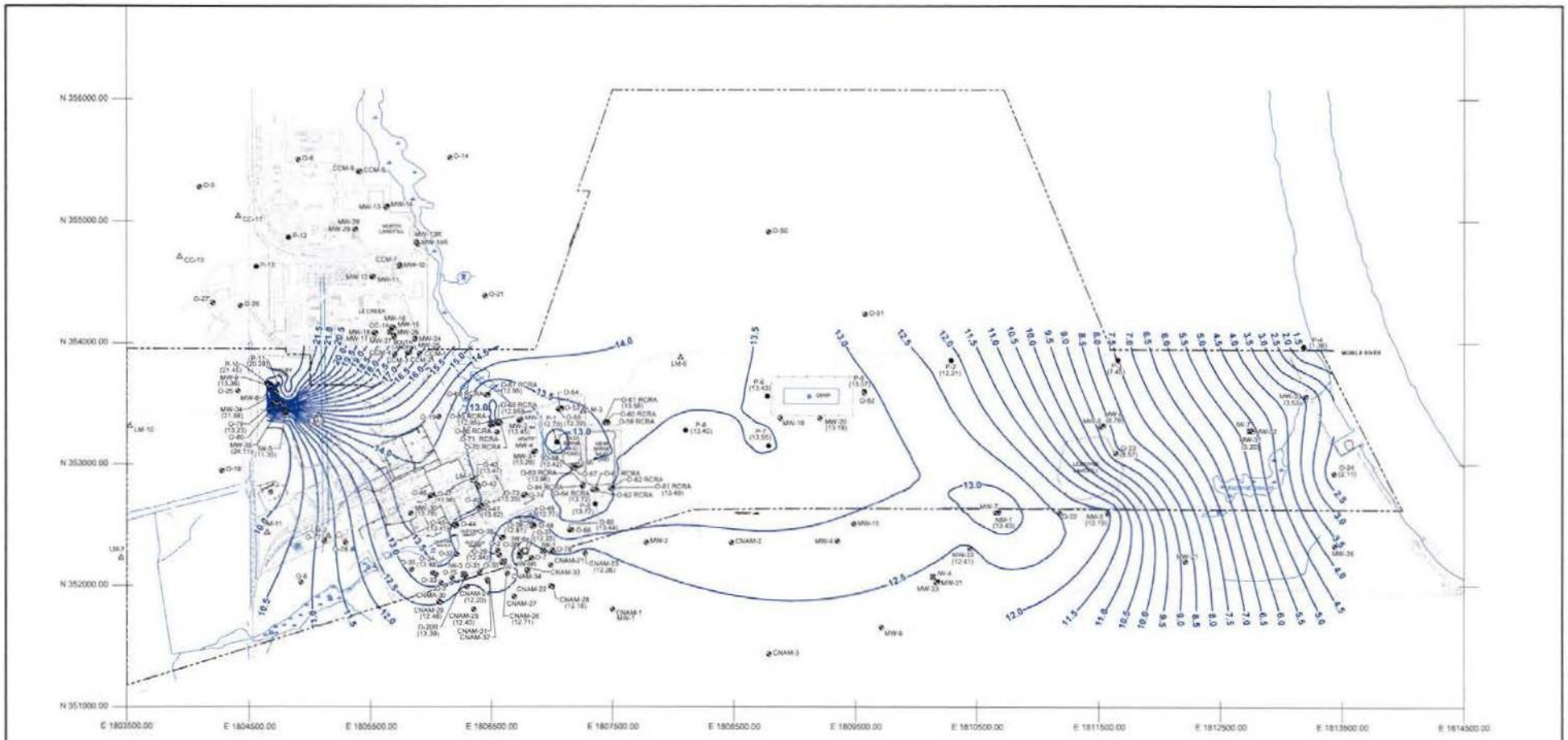
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: Nov2021-GW-Shallow-NBMA.dwg Date:01/25/2022

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
30 NOVEMBER 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 12.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (12.46) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET
APPROXIMATE SCALE IN FEET

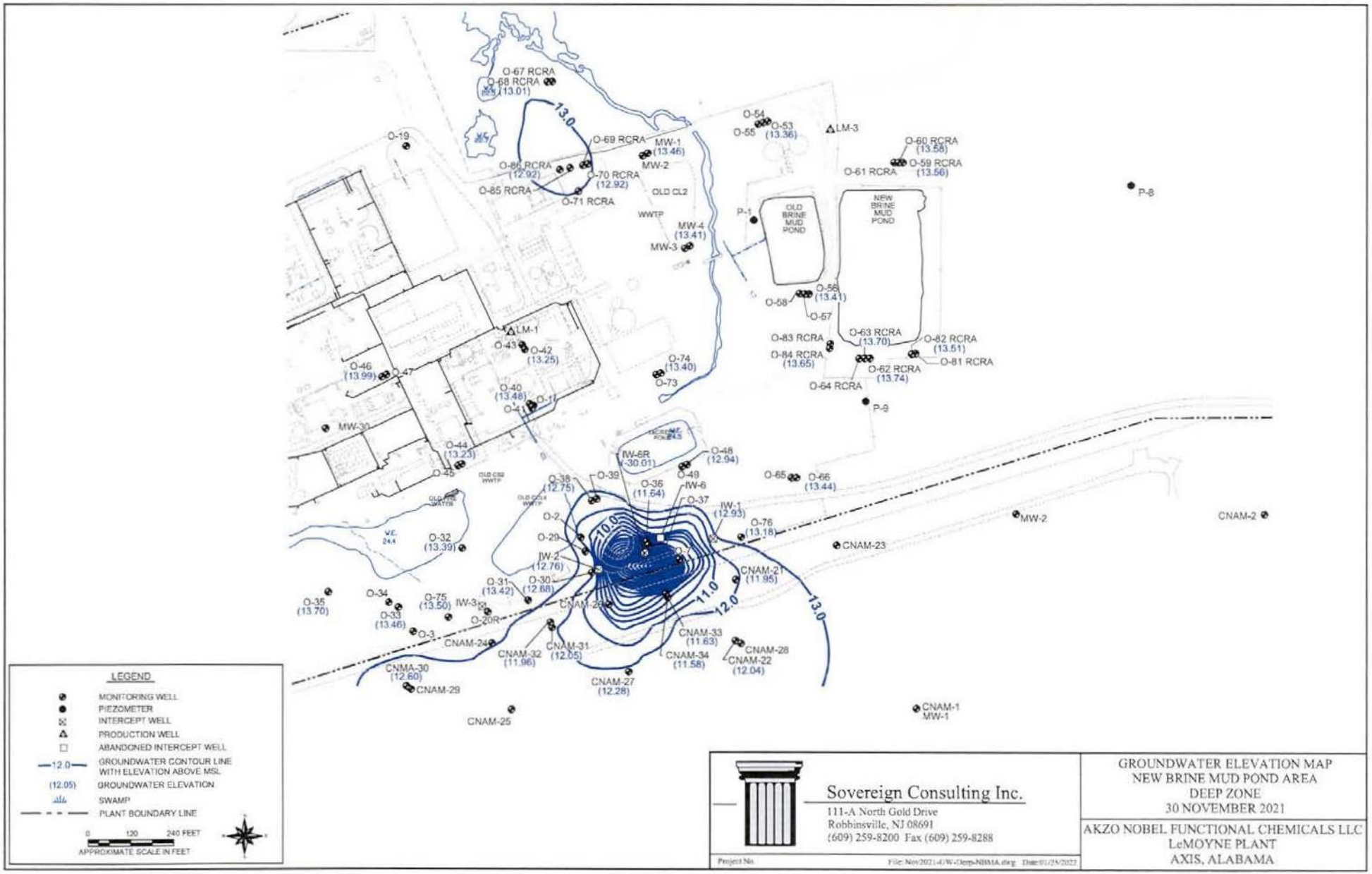
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: Nov2021-GW-Shallow.dwg Date:01/25/2022

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
30 NOVEMBER 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



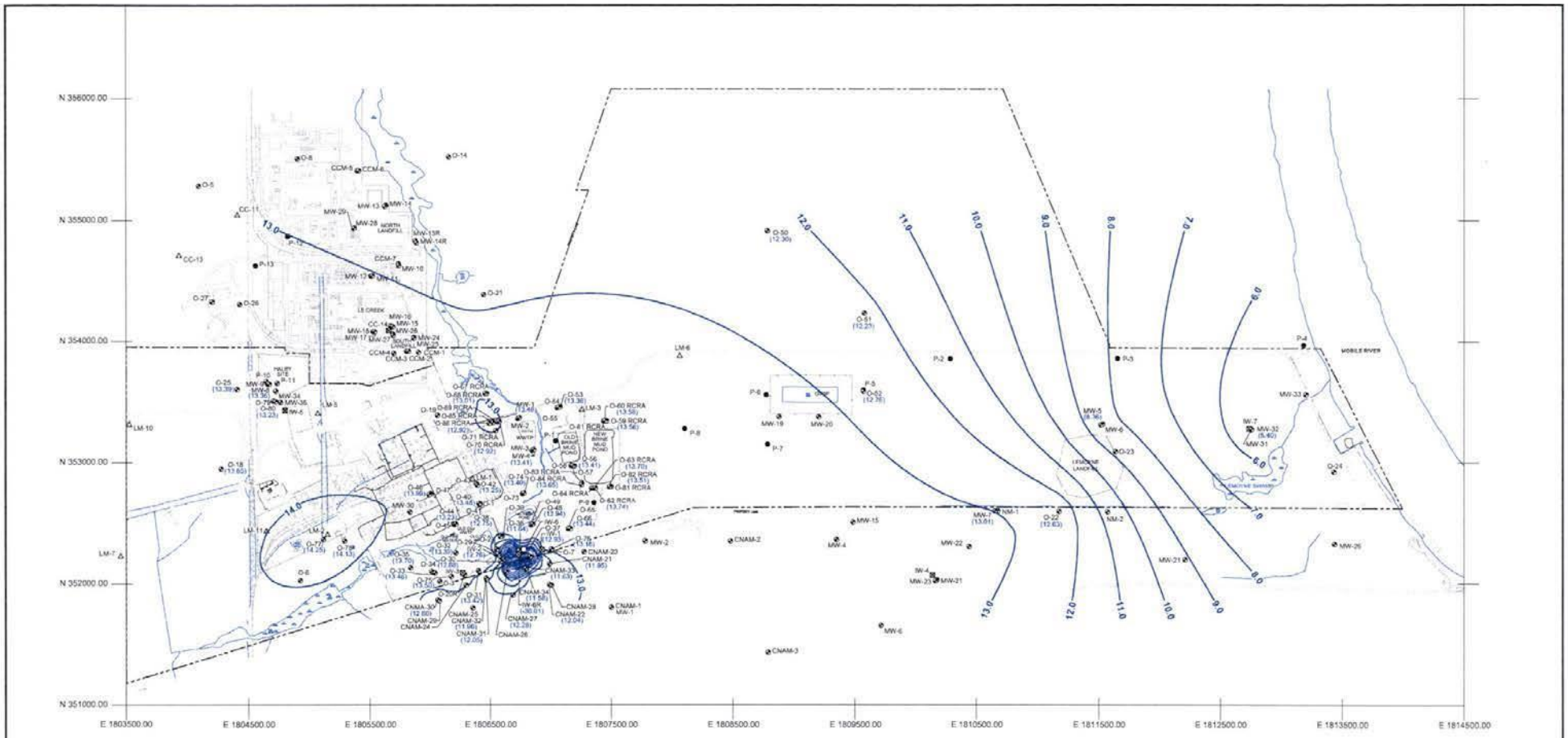
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: Nov2021-dGW-Deep-NBMA.dwg Date:01/25/2022

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
30 NOVEMBER 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 12.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (12.92) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: Nov2021-GW-Deep.dwg Date:01/25/2022

GROUNDWATER ELEVATION MAP
DEEP ZONE
30 NOVEMBER 2021

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

May 2021 Field Forms

Akzo Nobel Functional Chemicals LLC — O-59

LeMoyne Plant

RCRA Groundwater Monitor Well O-59 — Sampling / Inspection Log Sheet

Date: 5/20/21 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	117.16	119.70
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA Semi
Sampler's Name: B. Kittrell Date: 5/20/21
Company: Sovereign
Arrival Time: 0756 Departure Time: 1630
Conditions:
General Weather (recent rain, wind direction, etc.):
Cloudy East Wind 20-25
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 25.75
Depth to Bottom: 119.70

Pump Used: (Yes) / No
Depth of Pump: 28'
Began: 0900 (time)
Ended: 1004 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 192 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / (No)
Note any unusual events: _____

Sampling Equipment Information:
Pump Model # _____
Pump Serial # _____
Type Grundfos
Calibration None

pH Meter Model # 991301
pH Meter Serial # A04033
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial # _____
Type _____
Calibration _____

Field Measurement No. 1 0921
Water Temperature: 20.7 °C
pH: 5.71
Cond: 400 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 0942
Water Temperature: 20.6 °C
pH: 5.69
Cond: 390 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 1003
Water Temperature: 20.6 °C
pH: 5.69
Cond: 390 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.28
Screened Interval	-37.46/-57.46	73/93	75.24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA SEMI ANNUAL

Sampler's Name: B KITTRELL Date: 5/20/21
Company: SOVEREIGN

Arrival Time: 0755 Departure Time: 1630
Conditions:
General Weather (recent rain, wind direction, etc.):
SUNNY 77 E WIND 20 25
Standing Water around Well: NONE

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 25.40
Depth to Bottom: 98.28

Pump Used: Yes / No
Depth of Pump: 27'
Began: 0910 (time)
Ended: 0956 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 138 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: NONE

Sampling Equipment Information:
Pump Model #
Pump Serial #
Type GRUNDFOS
Calibration NONE

pH Meter Model # 991301
pH Meter Serial # A04033
Type HANNA
Calibration 120%

Cond Meter Model # SAME
Cond Meter Serial #
Type
Calibration

Pump Information:

Field Measurement No. 1 0925
Water Temperature: 21.2 ° C
pH: 5.00
Cond: 220 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2 0940
Water Temperature: 21.1 ° C
pH: 4.99
Cond: 220 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3 0955
Water Temperature: 21.1 ° C
pH: 4.99
Cond: 220 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 37.79

Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	68	70.08
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B. Kittrell Date: 5/20/21

Company: Sovereign

Arrival Time: 0755 Departure Time: 1630

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 77° E 20-25

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 25.40

Depth to Bottom: 70.08

Pump Used: (Yes) / No

Depth of Pump: 28'

Began: 1015 (time)

Ended: 1031 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration None

pH Meter Model # 991301

pH Meter Serial # A04037

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1 1025

Water Temperature: 20.9 °C

pH: 4.29

Cond: 235 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 1035

Water Temperature: 20.7 °C

pH: 4.31

Cond: 240 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 1045

Water Temperature: 20.6 °C

pH: 4.32

Cond: 240 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.04

Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	115	116.65
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other: _____

Concrete Pad: Cracks: Yes/(No) Describe: _____

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe: _____

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B Kittrell Date: 5/20/21

Company: Severn Trent

Arrival Time: 0755 Departure Time: 1630

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 88° E 20-25

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.65

Depth to Bottom: 116.65

Pump Used: Yes / No

Depth of Pump: 29'

Began: 1215 (time)

Ended: 1316 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration None

pH Meter Model # 991301

pH Meter Serial # A04023

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1 1235

Water Temperature: 20.2 °C

pH: 4.98

Cond: 230 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 1255

Water Temperature: 20.3 °C

pH: 5.00

Cond: 235 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 1315

Water Temperature: 20.3 °C

pH: 4.94

Cond: 235 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.27

Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	90	92.29
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes / No

Any indication of having been contacted by vehicle? Yes / No

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B. Kittrell Date: 5/20/21

Company: Sovereign

Arrival Time: 0755 Departure Time: 1630

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 85° F 20-25

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.85

Depth to Bottom: 92.29

Pump Used: Yes / No

Depth of Pump: 25'

Began: 1320 (time)

Ended: 1406 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 138 gal/liter

Bailer Used: Yes / No

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial #

Type Grundfos

Calibration None

pH Meter Model # 991301

pH Meter Serial # A04033

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

Field Measurement No. 1 1335

Water Temperature: 21.3 ° C

pH: 4.70

Cond: 130 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 1350

Water Temperature: 20.9 ° C

pH: 4.65

Cond: 125 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 1405

Water Temperature: 20.8 ° C

pH: 4.63

Cond: 125 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	75	77.14
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes/No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B Kittell Date: 5/20/21
Company: Sovereign

Arrival Time: 0755 Departure Time: 1630
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 83° E 20-25
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 22.43
Depth to Bottom: 77.14

Pump Used: Yes / No
Depth of Pump: 25'
Began: 1225 (time)
Ended: 1301 (time)
Pumping Rate: ~~1.6~~ 3 (gpm/lph)
Total Volume Purged: ~~1.6~~ 10 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model # _____
Pump Serial # _____
Type Grundfos
Calibration None

pH Meter Model # 991301
pH Meter Serial # 404033
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial # _____
Type _____
Calibration _____

Pump Information:

Field Measurement No. 1 1237
Water Temperature: 20.8 °C
pH: 4.26
Cond: 80 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2 1249
Water Temperature: 20.4 °C
pH: 4.22
Cond: 80 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3 1301
Water Temperature: 20.4 °C
pH: 4.20
Cond: 80 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	68
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B Kittell Date: 5/20/21

Company: Sovereign

Arrival Time: 0755 Departure Time: 1630

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 83° E 20-25

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.02

Depth to Bottom: 68.00

Pump Used: Yes / No

Depth of Pump: 25'

Began: 1425 (time)

Ended: 1455 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # H04033

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1 1435

Water Temperature: 19.4 ° C

pH: 4.94

Cond: 150 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2 1445

Water Temperature: 19.8 ° C

pH: 4.90

Cond: 145 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3 1455

Water Temperature: 19.8 ° C

pH: 4.89

Cond: 145 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	115	117.60
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA SEMI ANNUAL

Sampler's Name: B. KITTRELL Date: 5/20/21

Company: SOUTHERN

Arrival Time: 0755 Departure Time: 1630

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 85° E 20 25

Standing Water around Well: NONE

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.10

Depth to Bottom: 117.60

Pump Used: Yes / No

Depth of Pump: 25'

Began: 1415 (time)

Ended: 1516 (time)

Pumping Rate: 1.83 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: NONE

Sampling Equipment Information:

Pump Model #

Pump Serial #

Type GRUNDFOS

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # A04033

Type HANNA

Calibration 100%

Cond Meter Model # SAME

Cond Meter Serial #

Type

Calibration

Pump Information:

Field Measurement No. 1 1435

Water Temperature: 19.6 °C

pH: 5.30

Cond: 260 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2 1455

Water Temperature: 19.5 °C

pH: 5.29

Cond: 255 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3 1515

Water Temperature: 19.5 °C

pH: 5.25

Cond: 255 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.90
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: B Kittrell Date: 5/20/21

Company: Savergion

Arrival Time: 0755 Departure Time: 1630

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 83° E 20-25

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.37

Depth to Bottom: 67.90

Pump Used: Yes / No

Depth of Pump: 25'

Began: 1105 (time)

Ended: 1136 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # A04433

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1 1115

Water Temperature: 22.1 ° C

pH: 5.20

Cond: 160 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2 1125

Water Temperature: 21.1 ° C

pH: 5.18

Cond: 160 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3 1135

Water Temperature: 21.0 ° C

pH: 5.15

Cond: 160 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84

Sampling / Inspection Log Sheet

Date: 5-20-21 Signed: Brian Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.00
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B. Kittell Date: 5/20/21

Company: Severn Trent

Arrival Time: 0755 Departure Time: 1630

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 80° E 20-25

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.00

Depth to Bottom: 118.00

Pump Used: Yes / No

Depth of Pump: 27'

Began: 1055 (time)

Ended: 1156 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # AD4033

Type Hanna

Calibration 10070

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1 1115

Water Temperature: 14.9 ° C

pH: 5.25

Cond: 250 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2 1135

Water Temperature: 14.8 ° C

pH: 5.23

Cond: 250 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3 1155

Water Temperature: 14.8 ° C

pH: 5.20

Cond: 250 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

November 2021 Field Forms

Akzo Nobel Functional Chemicals LLC — O-59

LeMoyne Plant

RCRA Groundwater Monitor Well O-59 — Sampling / Inspection Log Sheet

Date: 11/2/21 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	117.16	119.70
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked ( )
Casing: Cracked Yes/No Other: _____
Concrete Pad: Cracks: Yes/No Describe: _____
Protective Posts: In position Yes/No
Any indication of having been contacted by vehicle? Yes / No
Describe: _____

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: B Kittrell Date: 11/2/21
Company: _____
Arrival Time: 0845 Departure Time: 1615
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 58°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 25.34
Depth to Bottom: 119.69

Pump Used: Yes / No
Depth of Pump: _____
Began: 1005 (time)
Ended: 1108 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 189 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / No
Note any unusual events: /

Sampling Equipment Information:
Pump Model # _____
Pump Serial # _____
Type GRUNDFOS
Calibration None

pH Meter Model # 991301
pH Meter Serial # 28282
Type HANNA
Calibration 100%

Cond Meter Model # SAME
Cond Meter Serial # _____
Type _____
Calibration _____

1025
Field Measurement No. 1
Water Temperature: 21.2 °C
pH: 5.69
Cond: 430 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1045
Field Measurement No. 2
Water Temperature: 21.5 °C
pH: 5.63
Cond: 432 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1105
Field Measurement No. 3
Water Temperature: 21.4 °C
pH: 5.59
Cond: 420 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc **O-60**

LeMoyne Plant

RCRA Groundwater Monitor Well O-60 Sampling / Inspection Log Sheet

Date: 11/2/21 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.28
Screened Interval	-37.46/-57.46	73/93	75.24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked ( )
Casing: Cracked Yes/No Other:
Concrete Pad: Cracks: Yes/No Describe:
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA SEMI-ANNUAL
Sampler's Name: B. KITTRELL Date: 11/2/21
Company: SAVERFLOW
Arrival Time: 0845 Departure Time: 1615
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 65°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 24.95
Depth to Bottom: 98.28

Pump Used: Yes / No
Depth of Pump: 26'
Began: 1128 (time)
Ended: 1216 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 144 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model #
Pump Serial #
Type GRUNDFOS
Calibration NA

pH Meter Model # 991301
pH Meter Serial # 28282
Type HANNA
Calibration 100%

Cond Meter Model # SAME
Cond Meter Serial #
Type
Calibration

Pump Information:

1144
Field Measurement No. 1
Water Temperature: 21.6 C
pH: 4.32
Cond: 230 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1200
Field Measurement No. 2
Water Temperature: 21.7 °C
pH: 4.63
Cond: 220 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1216
Field Measurement No. 3
Water Temperature: 21.4 C
pH: 4.64
Cond: 230 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61

Sampling / Inspection Log Sheet

Date: 11/2/21 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 37.79

Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	68	70.08
Screened Interval	-21.69/-31.69	57/67	59.48/69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: B. Kittell Date: 11 / 2 / 21

Company: Sovereign

Arrival Time: 0845 Departure Time: 1615

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 73°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.95

Depth to Bottom: 70.08

Pump Used: Yes / No

Depth of Pump: 26'

Began: 1245 (time)

Ended: 1315 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial #

Type

Calibration

pH Meter Model # 991301

pH Meter Serial # 28282

Type HANNA

Calibration 10010

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1255

Field Measurement No. 1

Water Temperature: 21.6 °C

pH: 4.32

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1305

Field Measurement No. 2

Water Temperature: 21.4 °C

pH: 4.30

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1315

Field Measurement No. 3

Water Temperature: 21.3 °C

pH: 4.30

Cond: 240 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62 — Sampling / Inspection Log Sheet

Date: 11/2/21 Signed: B Mitchell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.04
Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	115	116.65
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other: _____
Concrete Pad: Cracks: Yes/No Describe: _____
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe: _____

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: B Mitchell Date: 11/3/21
Company: Sovereign
Arrival Time: 0930 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.): Sunny 65°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 22.12
Depth to Bottom: 116.65

Pump Used: Yes / No
Depth of Pump: 24
Began: 1000 (time)
Ended: 1101 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 183 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model # _____
Pump Serial # _____
Type _____
Calibration _____

pH Meter Model # 991301
pH Meter Serial # 28282
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial # _____
Type _____
Calibration _____

Pump Information:

1020
Field Measurement No. 1
Water Temperature: 20.3 °C
pH: 4.95
Cond: 240 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1040
Field Measurement No. 2
Water Temperature: 20.5 °C
pH: 4.99
Cond: 240 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1100
Field Measurement No. 3
Water Temperature: 20.4 °C
pH: 4.97
Cond: 240 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63

Sampling / Inspection Log Sheet

Date: 11/3/21 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	90	92.29
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other:
Concrete Pad: Cracks: Yes/No Describe:
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: B. Kittrell Date: 11 / 3 / 21
Company: Sovereign
Arrival Time: 0930 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.): Sunny 65°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 22.30
Depth to Bottom: 92.30

Pump Used: Yes / No
Depth of Pump: 24'
Began: 1110 (time)
Ended: 1154 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 138 gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model #
Pump Serial #
Type Grundfos
Calibration N/A

pH Meter Model # 991301
pH Meter Serial # 28282
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial #
Type
Calibration

Pump Information:

1125

Field Measurement No. 1
Water Temperature: 21.1 °C
pH: 4.66
Cond: 120 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1140

Field Measurement No. 2
Water Temperature: 21.0 °C
pH: 4.59
Cond: 120 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1155

Field Measurement No. 3
Water Temperature: 20.7 °C
pH: 4.58
Cond: 130 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64 — Sampling / Inspection Log Sheet

Date: 11/3/21 Signed: [signature]

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	75	77.14
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes /(No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi-Annual
Sampler's Name: D. Kittell Date: 11/3/21
Company: Sovereign
Arrival Time: 0930 Departure Time: 1530
Conditions:
General Weather (recent rain, wind direction, etc.): Sunny 70°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 21.83
Depth to Bottom: 77.15

Pump Used: (Yes) / No
Depth of Pump: 24'
Began: 1202 (time)
Ended: 1241 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 111 gal/liter

Bailer Used: Yes /(No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes /(No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model #
Pump Serial #
Type Grundfos
Calibration N/A

pH Meter Model # 991301
pH Meter Serial # 28282
Type Hanna
Calibration 100%

Cond Meter Model # Same
Cond Meter Serial #
Type
Calibration

Pump Information:

1214
Field Measurement No. 1
Water Temperature: 20.7 ° C
pH: 4.24
Cond: 90 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1226
Field Measurement No. 2
Water Temperature: 20.3 ° C
pH: 4.19
Cond: 80 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1240
Field Measurement No. 3
Water Temperature: 20.3 ° C
pH: 4.16
Cond: 80 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 11/2/21 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	68
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B Kittrell Date: 11/2/21

Company: Sovereign

Arrival Time: 0845 Departure Time: 1530

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 75°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.87

Depth to Bottom: 68.00

Pump Used: (Yes) / No

Depth of Pump:

Began: 1340 (time)

Ended: 1411 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial #

Type

Calibration

pH Meter Model # 991301

pH Meter Serial # 25252

Type Hanna

Calibration 120%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1350

Field Measurement No. 1

Water Temperature: 20.3 °C

pH: 4.90

Cond: 130 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1400

Field Measurement No. 2

Water Temperature: 20.1 °C

pH: 4.89

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1410

Field Measurement No. 3

Water Temperature: 20.1 °C

pH: 4.84

Cond: 140 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82 — Sampling / Inspection Log Sheet

Date: 11/2/21 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	115	117.60
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B. Kittrell Date: 11/2/21

Company: Sovereign

Arrival Time: 0845 Departure Time: @1600 1530

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 75°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.80

Depth to Bottom: 117.60

Pump Used: (Yes) / No

Depth of Pump: 24'

Began: 1425 (time)

Ended: 1526 (time)

Pumping Rate: .3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # 28282

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

1445

Field Measurement No. 1

Water Temperature: 19.8 °C

pH: 5.27

Cond: 230 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1505

Field Measurement No. 2

Water Temperature: 19.6 °C

pH: 5.20

Cond: 250 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1525

Field Measurement No. 3

Water Temperature: 19.6 °C

pH: 5.15

Cond: 250 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83 — Sampling / Inspection Log Sheet

Date: 11/3/21 Signed: B Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.90
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B Kittell Date: 11 / 3 / 21

Company: Savage Labs

Arrival Time: 0930 Departure Time: 1530

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 75°

Standing Water around Well:

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.82

Depth to Bottom: 67.90

Pump Used: Yes / No

Depth of Pump: 24'

Began: 1400 (time)

Ended: 1430 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 90 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial #

Type

Calibration

pH Meter Model # 991301

pH Meter Serial # 28282

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1410

Field Measurement No. 1

Water Temperature: 21.6 °C

pH: 5.14

Cond: 170 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1420

Field Measurement No. 2

Water Temperature: 21.5 °C

pH: 5.12

Cond: 170 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1430

Field Measurement No. 3

Water Temperature: 21.4 °C

pH: 5.13

Cond: 170 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84 — Sampling / Inspection Log Sheet

Date: 11/3/21 Signed: B. Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab/Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.00
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi-Annual

Sampler's Name: B. Kittrell Date: 11/3/21

Company: Severn Trent

Arrival Time: 0930 Departure Time:

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 75°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.40

Depth to Bottom: 118.00

Pump Used: Yes / No

Depth of Pump: 25'

Began: 1250 (time)

Ended: 1351 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial #

Type Grundfos

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # 28252

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1310

Field Measurement No. 1

Water Temperature: 20.2° C

pH: 5.31

Cond: 260 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1330

Field Measurement No. 2

Water Temperature: 20.3° C

pH: 5.21

Cond: 262 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1350

Field Measurement No. 3

Water Temperature: 20.4° C

pH: 5.20

Cond: 260 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

May 2021 Analytical Results

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

Laboratory Job ID: 400-203745-1
Client Project/Site: AKZO-Semiannual Hg

For:
Nouryon Functional Chemicals, LLC
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
5/26/2021 9:35:22 AM

Taylor Bruzzio, Project Manager I
(850)471-6226
Taylor.Bruzzio@Eurofinset.com

..... LINKS .....

Review your project results through TotalAccess

Have a Question? Ask The Expert

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www.eurofinsus.com/Env

The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 400-203745-1

Laboratory: Eurofins TestAmerica, Pensacola

Narrative

Job Narrative
400-203745-1

Comments
No additional comments.

Receipt
The samples were received on 5/21/2021 4:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.2° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: O-59
Date Collected: 05/20/21 10:04
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-1
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:00	05/25/21 16:21	1

Client Sample ID: O-59 (EQUIPMENT BLANK)
Date Collected: 05/20/21 10:08
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-2
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:00	05/25/21 16:23	1

Client Sample ID: O-60
Date Collected: 05/20/21 09:56
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-3
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:00	05/25/21 16:25	1

Client Sample ID: O-60 (EQUIPMENT BLANK)
Date Collected: 05/20/21 10:00
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-4
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:00	05/25/21 16:26	1

Client Sample ID: O-61
Date Collected: 05/20/21 10:31
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-5
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:40	1

Client Sample ID: O-61 (EQUIPMENT BLANK)
Date Collected: 05/20/21 10:35
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-6
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:41	1

Client Sample ID: O-62
Date Collected: 05/20/21 13:16
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-7
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:43	1

Client Sample ID: O-62 (EQUIPMENT BLANK) — **Lab Sample ID: 400-203745-8**
Date Collected: 05/20/21 13:20 — **Matrix: Water**
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:45	1

Client Sample ID: O-63 — **Lab Sample ID: 400-203745-9**
Date Collected: 05/20/21 14:06 — **Matrix: Water**
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:47	1

Client Sample ID: O-63 (EQUIPMENT BLANK) — **Lab Sample ID: 400-203745-10**
Date Collected: 05/20/21 14:10 — **Matrix: Water**
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:49	1

Client Sample ID: O-64 — **Lab Sample ID: 400-203745-11**
Date Collected: 05/20/21 13:01 — **Matrix: Water**
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:51	1

Client Sample ID: O-64 (EQUIPMENT BLANK) — **Lab Sample ID: 400-203745-12**
Date Collected: 05/20/21 13:05 — **Matrix: Water**
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:04	1

Client Sample ID: O-81 — **Lab Sample ID: 400-203745-13**
Date Collected: 05/20/21 14:55 — **Matrix: Water**
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:06	1

Client Sample ID: O-81 (EQUIPMENT BLANK) — **Lab Sample ID: 400-203745-14**
Date Collected: 05/20/21 14:59 — **Matrix: Water**
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:08	1

Client Sample ID: O-82
Lab Sample ID: 400-203745-15
Date Collected: 05/20/21 15:16
Matrix: Water
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:10	1

Client Sample ID: O-82 (EQUIPMENT BLANK)
Lab Sample ID: 400-203745-16
Date Collected: 05/20/21 15:20
Matrix: Water
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:11	1

Client Sample ID: O-83
Lab Sample ID: 400-203745-17
Date Collected: 05/20/21 11:36
Matrix: Water
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:13	1

Client Sample ID: O-83 (EQUIPMENT BLANK)
Lab Sample ID: 400-203745-18
Date Collected: 05/20/21 11:40
Matrix: Water
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:15	1

Client Sample ID: O-84
Lab Sample ID: 400-203745-19
Date Collected: 05/20/21 11:56
Matrix: Water
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:17	1

Client Sample ID: O-84 (EQUIPMENT BLANK)
Lab Sample ID: 400-203745-20
Date Collected: 05/20/21 12:00
Matrix: Water
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:19	1

Client Sample ID: FIELD BLANK #1
Lab Sample ID: 400-203745-21
Date Collected: 05/20/21 12:30
Matrix: Water
Date Received: 05/21/21 16:00

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:25	1

Client: Nouryon Functional Chemicals, LLC
Project/Site: AKZO-Semiannual Hg

Job ID: 400-203745-1

Client Sample ID: FIELD SPIKE
Date Collected: 05/20/21 12:33
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-22
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 17:26	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-533094/14-A
Matrix: Water
Analysis Batch: 533240

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 533094

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 08:59	05/25/21 15:38	1

Lab Sample ID: LCS 400-533094/15-A
Matrix: Water
Analysis Batch: 533240

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 533094

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000992		mg/L		99	80 - 120

Lab Sample ID: MB 400-533096/14-A
Matrix: Water
Analysis Batch: 533240

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 533096

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/25/21 09:13	05/25/21 16:32	1

Lab Sample ID: LCS 400-533096/15-A
Matrix: Water
Analysis Batch: 533240

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 533096

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000990		mg/L		98	80 - 120

Lab Sample ID: 400-203745-11 MS
Matrix: Water
Analysis Batch: 533240

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 533096

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00197		mg/L		98	80 - 120

Lab Sample ID: 400-203745-11 MSD
Matrix: Water
Analysis Batch: 533240

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 533096

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00208		mg/L		103	80 - 120	5	20

Lab Sample ID: 400-203745-11 DU
Matrix: Water
Analysis Batch: 533240

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 533096

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Mercury	<0.00020		<0.00020		mg/L		NC	20

Client Sample ID: O-59

Lab Sample ID: 400-203745-1

Date Collected: 05/20/21 10:04

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533094	05/25/21 09:00	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:21	NET	TAL PEN

Client Sample ID: O-59 (EQUIPMENT BLANK)

Lab Sample ID: 400-203745-2

Date Collected: 05/20/21 10:08

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533094	05/25/21 09:00	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:23	NET	TAL PEN

Client Sample ID: O-60

Lab Sample ID: 400-203745-3

Date Collected: 05/20/21 09:56

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533094	05/25/21 09:00	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:25	NET	TAL PEN

Client Sample ID: O-60 (EQUIPMENT BLANK)

Lab Sample ID: 400-203745-4

Date Collected: 05/20/21 10:00

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533094	05/25/21 09:00	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:26	NET	TAL PEN

Client Sample ID: O-61

Lab Sample ID: 400-203745-5

Date Collected: 05/20/21 10:31

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:40	NET	TAL PEN

Client Sample ID: O-61 (EQUIPMENT BLANK)

Lab Sample ID: 400-203745-6

Date Collected: 05/20/21 10:35

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:41	NET	TAL PEN

Client Sample ID: O-62
Date Collected: 05/20/21 13:16
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:43	NET	TAL PEN

Client Sample ID: O-62 (EQUIPMENT BLANK)
Date Collected: 05/20/21 13:20
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:45	NET	TAL PEN

Client Sample ID: O-63
Date Collected: 05/20/21 14:06
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:47	NET	TAL PEN

Client Sample ID: O-63 (EQUIPMENT BLANK)
Date Collected: 05/20/21 14:10
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:49	NET	TAL PEN

Client Sample ID: O-64
Date Collected: 05/20/21 13:01
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 16:51	NET	TAL PEN

Client Sample ID: O-64 (EQUIPMENT BLANK)
Date Collected: 05/20/21 13:05
Date Received: 05/21/21 16:00

Lab Sample ID: 400-203745-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:04	NET	TAL PEN

Client Sample ID: O-81

Lab Sample ID: 400-203745-13

Date Collected: 05/20/21 14:55

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:06	NET	TAL PEN

Client Sample ID: O-81 (EQUIPMENT BLANK)

Lab Sample ID: 400-203745-14

Date Collected: 05/20/21 14:59

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:08	NET	TAL PEN

Client Sample ID: O-82

Lab Sample ID: 400-203745-15

Date Collected: 05/20/21 15:16

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:10	NET	TAL PEN

Client Sample ID: O-82 (EQUIPMENT BLANK)

Lab Sample ID: 400-203745-16

Date Collected: 05/20/21 15:20

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:11	NET	TAL PEN

Client Sample ID: O-83

Lab Sample ID: 400-203745-17

Date Collected: 05/20/21 11:36

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:13	NET	TAL PEN

Client Sample ID: O-83 (EQUIPMENT BLANK)

Lab Sample ID: 400-203745-18

Date Collected: 05/20/21 11:40

Matrix: Water

Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:15	NET	TAL PEN

Client Sample ID: O-84 — **Lab Sample ID: 400-203745-19**
Date Collected: 05/20/21 11:56 — **Matrix: Water**
Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:17	NET	TAL PEN

Client Sample ID: O-84 (EQUIPMENT BLANK) — **Lab Sample ID: 400-203745-20**
Date Collected: 05/20/21 12:00 — **Matrix: Water**
Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:19	NET	TAL PEN

Client Sample ID: FIELD BLANK #1 — **Lab Sample ID: 400-203745-21**
Date Collected: 05/20/21 12:30 — **Matrix: Water**
Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:25	NET	TAL PEN

Client Sample ID: FIELD SPIKE — **Lab Sample ID: 400-203745-22**
Date Collected: 05/20/21 12:33 — **Matrix: Water**
Date Received: 05/21/21 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			533096	05/25/21 09:13	NET	TAL PEN
Total/NA	Analysis	7470A		1	533240	05/25/21 17:26	NET	TAL PEN

Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

400-203745 COC

eurofins | Environment Testing America

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-102963-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com	State of Origin:	Page: Page 1 of 5
Company: Akzo Nobel	PWSID:			Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:	Analysis Requested	Preservation Codes:
City: Axis	TAT Requested (days):		A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No		
Phone:	PO #: 4100001642		
Email: sylvia.williams@akzonobel.com	WO #:		Other:
Project Name: AKZO - Semiannual Hg	Project #: 40003052		
Site:	SSOW#:		

TEST AMERICA INC. 700 - MOBILE Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
		Preservation Code:					D		
O-59	5-20-21	1004	G	Water			✓		
O-59 (Equipment Blank)		1008		Water					
O-60		0956		Water					
O-60 (Equipment Blank)		1000		Water					
O-61		1031		Water					
O-61 (Equipment Blank)		1035		Water					
O-62		1316		Water					
O-62 (Equipment Blank)		1320		Water					
O-63		1406		Water					
O-63 (Equipment Blank)		1410		Water					
O-64	5-20-21	1301	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	5-20-21 1600	Surfacing		5-20-21 1600	TA
2	M. Rodgett	5/21/21 1415	Company		5/21/21 1415	TA
3		5/21/21 1600	TA	Garry R Avery	5-21-21 1600	ETA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.2°C, ID7

Ver: 11/01/2020

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5/26/2021

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

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Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-102963-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com	State of Origin:	Page: Page 2 of 5
Company: Akzo Nobel	PWSID:			Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No			
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

TEST AMERICA INC.
700 - MOBILE

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	D	X	
O-64 (Equipment Blank)	5-20-21	1305		Water			✓		
O-81		1455		Water					
O-81 (Equipment Blank)		1459		Water					
O-82		1516		Water					
O-82 (Equipment Blank)		1520		Water					
O-83		1136		Water					
O-83 (Equipment Blank)		1140		Water					
O-84		1156		Water					
O-84 (Equipment Blank)		1200		Water					
Duplicate O-64		1301		Water					
Field Blank #1	5-20-21	1230		Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	5-20-21 1600			5-20-21 1600	TA
2	M. Padgett	5/21/21 1415			5/21/21 1415	TA
3		5/21/21 1600	TA	Kathy Lane	5-21-21 1600	EVA

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-102963-21846.3
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com	State of Origin:	Page: Page 3 of 5
Company: Akzo Nobel	PWSID:			Job #:

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No
Phone:	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification — TEST AMERICA INC. 700 - MOBILE	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
~~Field Blank #2~~				Water					
MS 0.64	5-20-21		1301	Water			✓		
MSD 0.64	5-20-21		1301	Water			✓		
Field Spike	5-20-21		1233	Water			✓		
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Brian Kittrell	Date/Time: 5-20-21 1600	Company	Received by:	Date/Time: 5-20-21 1600	Company
Relinquished by: M. Pridgett	Date/Time: 5/21/21 1415	Company	Received by:	Date/Time: 5/21/21 1415	Company TA
Relinquished by:	Date/Time: 5/21/21 1600	Company TA	Received by: Kathy Lane	Date/Time: 5-21-21 1600	Company EIA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

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5/26/2021

November 2021 Analytical Results

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ANALYTICAL REPORT

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

Laboratory Job ID: 400-210802-1
Client Project/Site: Semiannual Hg

For:
Nouryon Functional Chemicals, LLC
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
11/9/2021 4:28:05 PM

Taylor Bruzzio, Project Manager I
(850)471-6226
Taylor.Bruzzio@Eurofinset.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 400-210802-1

Laboratory: Eurofins TestAmerica, Pensacola

Narrative

Job Narrative
400-210802-1

Comments
No additional comments.

Receipt
The samples were received on 11/5/2021 3:45 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.4° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: O-59
Lab Sample ID: 400-210802-1
Date Collected: 11/02/21 11:06
Matrix: Water
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:07	1

Client Sample ID: O-59 EQUIPMENT BLANK
Lab Sample ID: 400-210802-2
Date Collected: 11/02/21 11:10
Matrix: Water
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:09	1

Client Sample ID: O-60
Lab Sample ID: 400-210802-3
Date Collected: 11/02/21 12:16
Matrix: Water
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:11	1

Client Sample ID: O-60 EQUIPMENT BLANK
Lab Sample ID: 400-210802-4
Date Collected: 11/02/21 12:20
Matrix: Water
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:13	1

Client Sample ID: O-61
Lab Sample ID: 400-210802-5
Date Collected: 11/02/21 13:16
Matrix: Water
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:15	1

Client Sample ID: O-61 EQUIPMENT BLANK
Lab Sample ID: 400-210802-6
Date Collected: 11/02/21 13:20
Matrix: Water
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:16	1

Client Sample ID: O-62
Lab Sample ID: 400-210802-7
Date Collected: 11/03/21 11:01
Matrix: Water
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:18	1

Client Sample ID: O-62 EQUIPMENT BLANK

Lab Sample ID: 400-210802-8
Matrix: Water
Date Collected: 11/03/21 11:05
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:20	1

Client Sample ID: O-63

Lab Sample ID: 400-210802-9
Matrix: Water
Date Collected: 11/03/21 11:56
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:22	1

Client Sample ID: O-63 EQUIPMENT BLANK

Lab Sample ID: 400-210802-10
Matrix: Water
Date Collected: 11/03/21 12:00
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:24	1

Client Sample ID: O-64

Lab Sample ID: 400-210802-11
Matrix: Water
Date Collected: 11/03/21 12:41
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:29	1

Client Sample ID: O-64 EQUIPMENT BLANK

Lab Sample ID: 400-210802-12
Matrix: Water
Date Collected: 11/03/21 12:45
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:37	1

Client Sample ID: O-81

Lab Sample ID: 400-210802-13
Matrix: Water
Date Collected: 11/02/21 14:10
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:39	1

Client Sample ID: O-81 EQUIPMENT BLANK

Lab Sample ID: 400-210802-14
Matrix: Water
Date Collected: 11/02/21 14:14
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:41	1

Client Sample ID: O-82

Lab Sample ID: 400-210802-15
Matrix: Water
Date Collected: 11/02/21 15:26
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:43	1

Client Sample ID: O-82 EQUIPMENT BLANK

Lab Sample ID: 400-210802-16
Matrix: Water
Date Collected: 11/02/21 15:30
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:45	1

Client Sample ID: O-83

Lab Sample ID: 400-210802-17
Matrix: Water
Date Collected: 11/03/21 14:30
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:46	1

Client Sample ID: O-83 EQUIPMENT BLANK

Lab Sample ID: 400-210802-18
Matrix: Water
Date Collected: 11/03/21 14:34
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:52	1

Client Sample ID: O-84

Lab Sample ID: 400-210802-19
Matrix: Water
Date Collected: 11/03/21 13:51
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:54	1

Client Sample ID: O-84 EQUIPMENT BLANK

Lab Sample ID: 400-210802-20
Matrix: Water
Date Collected: 11/03/21 13:55
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 14:56	1

Client Sample ID: DUPLICATE - O-64

Lab Sample ID: 400-210802-21
Matrix: Water
Date Collected: 11/03/21 12:41
Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:54	11/09/21 13:15	1

Client Sample ID: FIELD BLANK #1

Lab Sample ID: 400-210802-22

Date Collected: 11/02/21 13:05

Matrix: Water

Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:54	11/09/21 13:26	1

Client Sample ID: FIELD BLANK #2

Lab Sample ID: 400-210802-23

Date Collected: 11/03/21 09:45

Matrix: Water

Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:54	11/09/21 13:28	1

Client Sample ID: FIELD SPIKE

Lab Sample ID: 400-210802-24

Date Collected: 11/02/21 13:00

Matrix: Water

Date Received: 11/05/21 15:45

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:54	11/09/21 13:30	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-554936/14-A
Matrix: Water
Analysis Batch: 555177

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 554936

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:44	11/09/21 13:59	1

Lab Sample ID: LCS 400-554936/15-A
Matrix: Water
Analysis Batch: 555177

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 554936

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000928		mg/L		92	80 - 120

Lab Sample ID: 400-210802-11 MS
Matrix: Water
Analysis Batch: 555177

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 554936

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00192		mg/L		95	80 - 120

Lab Sample ID: 400-210802-11 MSD
Matrix: Water
Analysis Batch: 555177

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 554936

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00194		mg/L		97	80 - 120	1	20

Lab Sample ID: MB 400-554937/14-A
Matrix: Water
Analysis Batch: 555177

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 554937

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/08/21 09:54	11/09/21 13:11	1

Lab Sample ID: LCS 400-554937/15-A
Matrix: Water
Analysis Batch: 555177

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 554937

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00101	0.000963		mg/L		96	80 - 120

Lab Sample ID: 400-210802-21 MS
Matrix: Water
Analysis Batch: 555177

Client Sample ID: DUPLICATE - O-64
Prep Type: Total/NA
Prep Batch: 554937

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.00020		0.00201	0.00189		mg/L		94	80 - 120

Lab Sample ID: 400-210802-21 MSD
Matrix: Water
Analysis Batch: 555177

Client Sample ID: DUPLICATE - O-64
Prep Type: Total/NA
Prep Batch: 554937

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00191		mg/L		95	80 - 120	1	20

Client Sample ID: O-59

Lab Sample ID: 400-210802-1
Matrix: Water
Date Collected: 11/02/21 11:06
Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:07	NET	TAL PEN

Client Sample ID: O-59 EQUIPMENT BLANK

Lab Sample ID: 400-210802-2
Matrix: Water
Date Collected: 11/02/21 11:10
Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:09	NET	TAL PEN

Client Sample ID: O-60

Lab Sample ID: 400-210802-3
Matrix: Water
Date Collected: 11/02/21 12:16
Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:11	NET	TAL PEN

Client Sample ID: O-60 EQUIPMENT BLANK

Lab Sample ID: 400-210802-4
Matrix: Water
Date Collected: 11/02/21 12:20
Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:13	NET	TAL PEN

Client Sample ID: O-61

Lab Sample ID: 400-210802-5
Matrix: Water
Date Collected: 11/02/21 13:16
Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:15	NET	TAL PEN

Client Sample ID: O-61 EQUIPMENT BLANK

Lab Sample ID: 400-210802-6
Matrix: Water
Date Collected: 11/02/21 13:20
Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:16	NET	TAL PEN

Client Sample ID: O-62

Lab Sample ID: 400-210802-7

Date Collected: 11/03/21 11:01

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:18	NET	TAL PEN

Client Sample ID: O-62 EQUIPMENT BLANK

Lab Sample ID: 400-210802-8

Date Collected: 11/03/21 11:05

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:20	NET	TAL PEN

Client Sample ID: O-63

Lab Sample ID: 400-210802-9

Date Collected: 11/03/21 11:56

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:22	NET	TAL PEN

Client Sample ID: O-63 EQUIPMENT BLANK

Lab Sample ID: 400-210802-10

Date Collected: 11/03/21 12:00

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:24	NET	TAL PEN

Client Sample ID: O-64

Lab Sample ID: 400-210802-11

Date Collected: 11/03/21 12:41

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:29	NET	TAL PEN

Client Sample ID: O-64 EQUIPMENT BLANK

Lab Sample ID: 400-210802-12

Date Collected: 11/03/21 12:45

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:37	NET	TAL PEN

Client Sample ID: O-81

Lab Sample ID: 400-210802-13

Date Collected: 11/02/21 14:10

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:39	NET	TAL PEN

Client Sample ID: O-81 EQUIPMENT BLANK

Lab Sample ID: 400-210802-14

Date Collected: 11/02/21 14:14

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:41	NET	TAL PEN

Client Sample ID: O-82

Lab Sample ID: 400-210802-15

Date Collected: 11/02/21 15:26

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:43	NET	TAL PEN

Client Sample ID: O-82 EQUIPMENT BLANK

Lab Sample ID: 400-210802-16

Date Collected: 11/02/21 15:30

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:45	NET	TAL PEN

Client Sample ID: O-83

Lab Sample ID: 400-210802-17

Date Collected: 11/03/21 14:30

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:46	NET	TAL PEN

Client Sample ID: O-83 EQUIPMENT BLANK

Lab Sample ID: 400-210802-18

Date Collected: 11/03/21 14:34

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:52	NET	TAL PEN

Client Sample ID: O-84

Lab Sample ID: 400-210802-19

Date Collected: 11/03/21 13:51

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:54	NET	TAL PEN

Client Sample ID: O-84 EQUIPMENT BLANK

Lab Sample ID: 400-210802-20

Date Collected: 11/03/21 13:55

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554936	11/08/21 09:44	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 14:56	NET	TAL PEN

Client Sample ID: DUPLICATE - O-64

Lab Sample ID: 400-210802-21

Date Collected: 11/03/21 12:41

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554937	11/08/21 09:54	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 13:15	NET	TAL PEN

Client Sample ID: FIELD BLANK #1

Lab Sample ID: 400-210802-22

Date Collected: 11/02/21 13:05

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554937	11/08/21 09:54	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 13:26	NET	TAL PEN

Client Sample ID: FIELD BLANK #2

Lab Sample ID: 400-210802-23

Date Collected: 11/03/21 09:45

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554937	11/08/21 09:54	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 13:28	NET	TAL PEN

Client Sample ID: FIELD SPIKE

Lab Sample ID: 400-210802-24

Date Collected: 11/02/21 13:00

Matrix: Water

Date Received: 11/05/21 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			554937	11/08/21 09:54	NET	TAL PEN
Total/NA	Analysis	7470A		1	555177	11/09/21 13:30	NET	TAL PEN

Laboratory References:

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins Environment Testing America

400-210802 COC

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	COC No: 400-105777-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-541-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com	Page: Page 1 of 5
Company: Akzo Nobel	PWSID:	Analysis Requested	Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify), Other
City: Axis	TAT Requested (days):		
State, Zip: AL, 36505	Compliance Project: ∆ Yes ∆ No		
Phone:	PO #: 4100001642		
Email: sylvia.williams@akzonobel.com	WO #:		
Project Name: AKZO - Semiannual Hg	Project #: 40003052		
Site: TEST AMERICA INC. 700 - MOBILE	SSOW#:		

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	74704 - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	D	X	
O-59	11-2-21	1106	G	Water			✓		
O-59 (Equipment Blank)		1110		Water					
O-60		1214		Water					
O-60 (Equipment Blank)		1220		Water					
O-61		1316		Water					
O-61 (Equipment Blank)	11-2-21	1320		Water					
O-62	11-3-21	1101		Water					
O-62 (Equipment Blank)		1105		Water					
O-63		1156		Water					
O-63 (Equipment Blank)		1200		Water					
O-64	11-3-21	1241	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	11/4/21 1530		M Podgett	11/4/21 1530	
2	M Podgett	11/5/21 1410			11/5/21 1410	
3		11/5/21 1545		Kathy Raven	11-5-21 1545	EA

Custody Seals Intact: ∆ Yes ∆ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 1.4°C IR8

Ver: 06/08/2021

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-105777-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com	State of Origin:	Page: Page 2 of 5
Company: Akzo Nobel	PWSID:	Analysis Requested		Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No			
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			Other:

TEST AMERICA INC.
700 - MOBILE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	11-3-21	1245	G	Water			✓		
O-81	11-2-21	1410		Water					
O-81 (Equipment Blank)		1414		Water					
O-82		1526		Water					
O-82 (Equipment Blank)	11-2-21	1530		Water					
O-83	11-3-21	1430		Water					
O-83 (Equipment Blank)		1434		Water					
O-84		1351		Water					
O-84 (Equipment Blank)		1355		Water					
Duplicate - O-64	11-3 21	1241		Water			✓		
Field Blank #1	11-2-21	1305	G	Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by	Date:	Time:	Method of Shipment

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	11-4-21 1530		M Podgett	11/4/21 1530	
2	M. Podgett	11/5/21 1410			11/5/21 1410	TA
3		11/5/21 1545	TA	Kathy Raney	11.5.21 1545	EMA

Custody Seals Intact: Δ Yes Δ No | Custody Seal No:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

11/9/2021

Eurofins TestAmerica, Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-105777-21846.3
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@Eurofinset.com	State of Origin:	Page: Page 3 of 5
Company: Akzo Nobel	PWSID:	Analysis Requested		Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505	Compliance Project: ∆ Yes ∆ No			
Phone:	PO #: 4100001642			Other:
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

TEST AMERICA INC.
700 - MOBILE

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Solid, Oil, Tissue, Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	11-3-21	0945		Water					
MS D-64	11-3-21	1241		Water					
MSD D-64	11-3-21	1241		Water					
Field Spike	11-2-21	1300		Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	11/4/21 1530			11/4/21 1530	
2		11/5/21 1410			11/5/21 1410	TA
3		11/5/21 1545	TA		11-5-21 1545	EN

Custody Seals Intact: ∆ Yes ∆ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

LeMoyne Site
13440 Highway 43 North
Axis Al 36505

Tel: 251-675-1310

Nouryon

April 28, 2023

Received
MAY 03 2023
Land Division

Chief Austin R. Pierce
Alabama Department of Environmental Management
Engineering Services Section
Industrial Hazardous Waste Branch
Land Division
1400 Coliseum Blvd
Montgomery, Alabama 36110-2059

Re: Nouryon Functional Chemicals LLC, LeMoyne Facility in Axis, Al
EPA ID Number: ALD 008161176

Dear Chief Pierce,

Please find enclosed the revised copies of the 2022A and 2022B groundwater monitoring reports for sampling conducted at the LeMoyne site, including groundwater flow calculations and potentiometric map. The results and the statistical evaluation of the data collected indicate that there was no significant increase of total mercury during this sampling period.

The groundwater flow velocity was calculated as 1.70 to 2.34 ft./day during the 2022A event and 1.80 to 2.47 ft./day for the 2022B event. Flow direction continues to be South in the area of the New Brine Mud Pond. If any additional information is required, please contact Renee Johnston at (251) 679-4315.

Sincerely

S. Renee Johnston

S. Renee Johnston

HSE Advisor

CC: Charmaine Roche , ADEM Land Division

2022 Groundwater Monitoring Report

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2022 Groundwater Monitoring Report Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Michael Mitchell
Plant Manager

5/1/23
Date

Table I

Total Mercury (unfiltered)
Analysis Result Summary (Test America of Mobile, AL)

May 2022

Well Number	Gradient	Well Data				
		1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

*Method: Mercury 7470 A

Table II
Statistical Evaluation of Data Using ANOVA**

Reference: Statistical Analysis of Variance
Procedure: The Downgradient well analysis are compared to the corresponding upgradient well with approximately the same screened internal depth

May 2022

Well Number	Gradient	Well Data					Comparison Data		
		1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L

** The computation of ANOVA is not possible as there is no variability of the data.

Table III

Total Mercury (unfiltered)
Analysis Result Summary (Test America of Mobile, AL)

November 2022

Well Number	Gradient	Well Data				
		1	2	3	4	AVG.
59	Up	0.2*	0.2*	0.2*	0.2*	0.2*
60	Up	0.2*	0.2*	0.2*	0.2*	0.2*
61	Up	0.2*	0.2*	0.2*	0.2*	0.2*
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*

*Method: Mercury 7470 A

Table IV
Statistical Evaluation of Data Using ANOVA**

Reference: Statistical Analysis of Variance

Procedure: The Downgradient well analysis are compared to the corresponding upgradient well with approximately the same screened internal depth

November 2022

Well Number	Gradient	Well Data					Comparison Data		
		1	2	3	4	AVG.	AVG.	VAR.	VAR./N
62	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
63	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
64	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
81	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
82	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
83	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0
84	DOWN	0.2*	0.2*	0.2*	0.2*	0.2*	0.2*	0	0

* The data for the parameter of Hg consists of all nondetects. The detection limit is 0.2 ug/L

** The computation of ANOVA is not possible as there is no variability of the data.

TABLE V
GROUNDWATER LEVEL DETERMINATION
Elevations taken May, 2022 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	25.15	12.98	119.70	
060	37.78	24.79	12.99	98.28	
061	37.79	24.79	13.00	70.08	
062	35.04	22.00	13.04	116.65	
063	35.27	22.24	13.03	92.29	
064	34.86	21.80	13.06	77.14	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	22.40	13.16	68.00	
082	35.52	22.45	13.07	117.60	
083	36.02	22.73	13.29	67.90	
084	36.31	23.33	12.98	118.00	

TABLE VI
Groundwater Flow Velocity

2022A

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.15	0.607	2.16	2.98
Mid	060 to 063	519.00	2.55	0.491	1.75	2.41
Shallow	061 to 064	519.00	2.99	0.576	2.05	2.82
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.06	0.388	1.38	1.90
Deep	059 to 082	519.00	2.70	0.520	1.85	2.55
Deep	059 to 084	556.00	1.82	0.327	1.17	1.60
		AVG	**2.50**	**0.48**	**1.70**	**2.34**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

TABLE VII

GROUNDWATER LEVEL DETERMINATION

Elevations taken November, 2022 by Sovereign

Well Number	Elevation: Top of Casing (ft)	Static Water Level (ft)	Water Level Determination (ft)	Well Depth Determination (ft)	
059	38.13	26.09	12.04	119.70	
060	37.78	25.70	12.08	98.28	
061	37.79	25.70	12.09	70.08	
062	35.04	22.75	12.29	116.65	
063	35.27	22.94	12.33	92.29	
064	34.86	22.48	12.38	77.14	
067				NA	Water Elevation Only
068				NA	Water Elevation Only
081	35.56	23.23	12.33	68.00	
082	35.52	23.28	12.24	117.60	
083	36.02	23.60	12.42	67.90	
084	36.31	24.10	12.21	118.00	

TABLE VIII

Groundwater Flow Velocity

2022B

Screen Set	Well Coordinates (at same screen set)	Distance (ft)	Water Level (ft)	Hydraulic Gradient %	Velocity at 800 GPD ft/day	Velocity at 1100 GPD ft/day
Deep	059 to 062	519.00	3.34	0.644	2.29	3.15
Mid	060 to 063	519.00	2.76	0.532	1.90	2.61
Shallow	061 to 064	519.00	3.22	0.620	2.21	3.04
Shallow	061 to 081	513.00	2.23	0.435	1.55	2.13
Shallow	061 to 083	531.00	2.10	0.395	1.41	1.94
Deep	059 to 082	519.00	2.81	0.541	1.93	2.65
Deep	059 to 084	556.00	1.99	0.358	1.28	1.75
		AVG	**2.64**	**0.50**	**1.80**	**2.47**

Direction of groundwater flow is South

Velocity = (Hydraulic conductivity * Slope of the hydraulic gradient)/Porosity

38882

Hydraulic Conductivity = 800 gpd/ft2 on the upper part of the aquifer

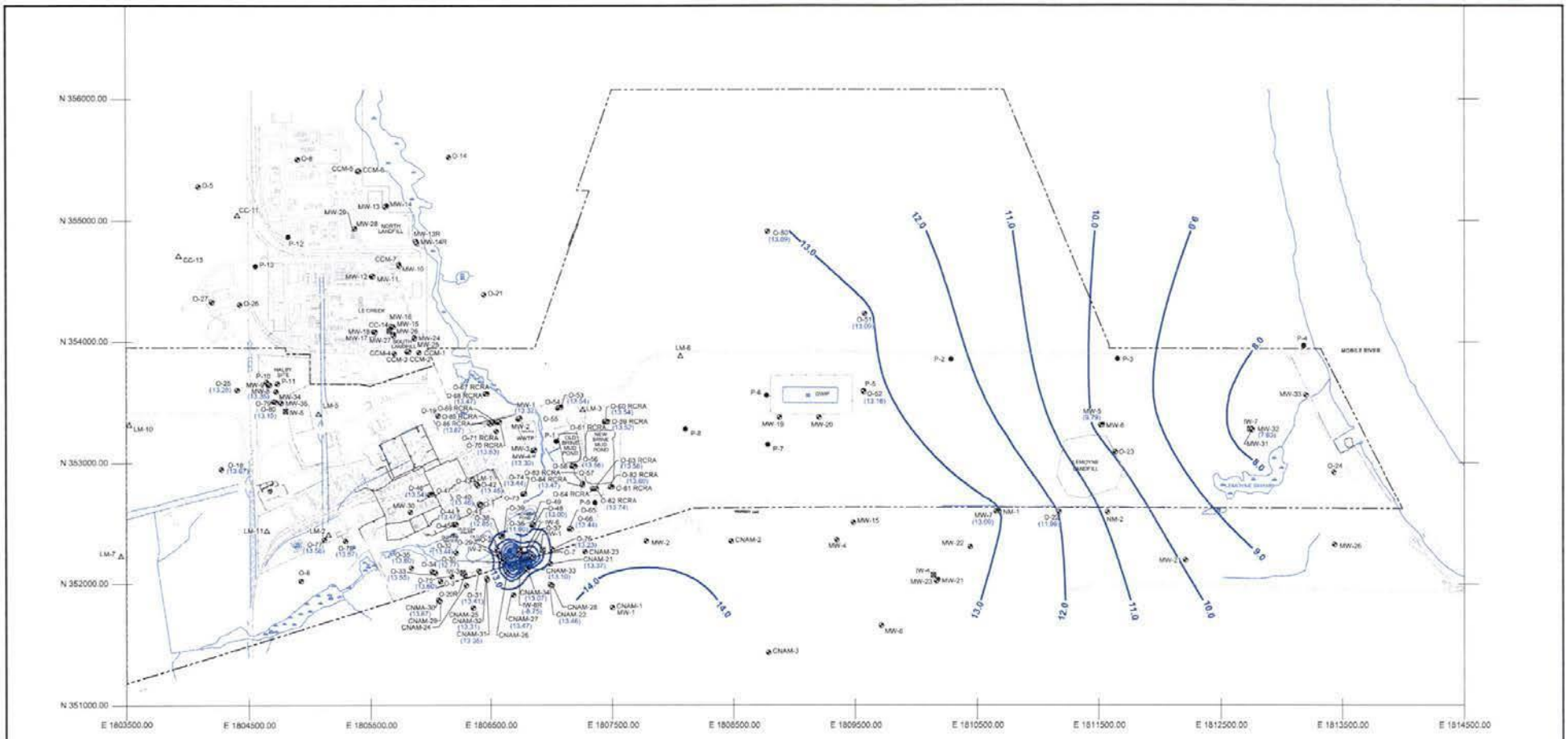
DATE	Jan	Feb	Mar	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.02	0.02	0.00	0.00	0.00	0.00	1.05	0.11	0.00	0.00	0.00	0.00
2	0.43	0.77	0.00	0.00	0.00	1.03	0.66	1.97	0.00	0.00	0.00	*
3	0.00	1.63	0.00	0.00	0.00	0.00	0.22	0.55	0.00	0.00	0.00	0.17
4	0.00	0.00	0.00	0.13	0.00	0.00	1.02	0.00	0.02	0.00	0.00	0.00
5	0.00	0.00	0.00	1.31	0.59	0.00	2.30	0.21	0.01	0.00	0.71	0.00
6	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
7	0.00	0.00	1.29	0.00	0.00	0.01	0.00	0.01	0.45	0.00	0.00	0.01
8	0.00	0.01	0.65	0.00	0.00	0.00	0.00	2.32	0.17	0.00	0.00	0.00
9	1.20	0.01	0.03	0.00	0.00	0.00	1.33	0.03	0.00	0.00	0.00	0.01
10	0.00	0.00	0.03	0.00	0.00	0.39	0.09	0.36	0.00	0.00	0.00	0.00
11	0.00	0.00	0.36	0.05	0.00	0.00	0.78	0.01	0.01	0.00	0.00	0.15
12	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.11	0.02	0.00
13	0.00	0.04	0.00	0.93	0.37	0.00	0.00	0.03	0.00	0.00	0.00	0.32
14	0.00	0.00	0.01	0.02	0.02	0.01	0.23	0.00	0.00	0.00	0.62	0.61
15	0.42	0.00	1.10	0.01	0.67	0.09	0.01	0.00	0.00	0.00	0.02	0.00
16	0.00	0.02	0.00	0.63	0.00	0.00	0.00	1.14	0.00	0.00	0.02	0.00
17	0.00	0.36	0.89	1.26	0.00	0.00	0.00	1.26	0.00	0.01	0.00	0.01
18	0.00	0.01	0.07	0.00	0.00	0.00	0.00	1.31	0.00	0.00	0.00	0.00
19	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.00	0.00	0.10	1.13
20	0.04	0.00	0.00	0.00	0.00	0.07	0.04	0.04	0.00	0.00	0.00	0.38
21	0.01	0.00	0.00	0.00	0.00	0.00	0.10	1.12	0.00	0.00	0.00	0.02
22	0.00	0.00	0.65	0.00	0.35	0.00	0.04	0.20	0.00	0.00	0.00	0.00
23	0.00	0.00	0.01	0.00	1.19	0.00	0.00	0.38	0.00	0.00	0.00	0.00
24	0.29	0.01	0.00	0.00	1.98	0.00	0.00	0.68	0.00	0.00	1.01	0.00
25	0.02	0.00	0.00	0.00	2.04	1.38	0.06	0.27	0.03	0.13	0.01	0.00
26	0.00	0.00	0.00	0.00	0.25	0.06	0.10	0.01	0.00	0.00	1.11	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.01	0.00	0.00
29	0.00	-	0.00	0.00	0.00	0.06	0.00	0.00	0.00	2.45	1.22	0.00
30	0.00	-	1.37	0.03	0.00	0.72	0.62	0.09	0.00	0.00	0.00	1.45
31	0.00	-	0.00	-	0.00	-	0.00	0.00	-	0.00	-	0.00
Total	2.78	2.90	6.46	4.37	7.46	3.87	8.82	12.92	0.69	2.71	4.85	4.26

Total Rainfall for 2022 62.09 inches

*** gauge did not record, but no rain. PO power outtage**

^ gauge was not legible

Groundwater Elevation Map



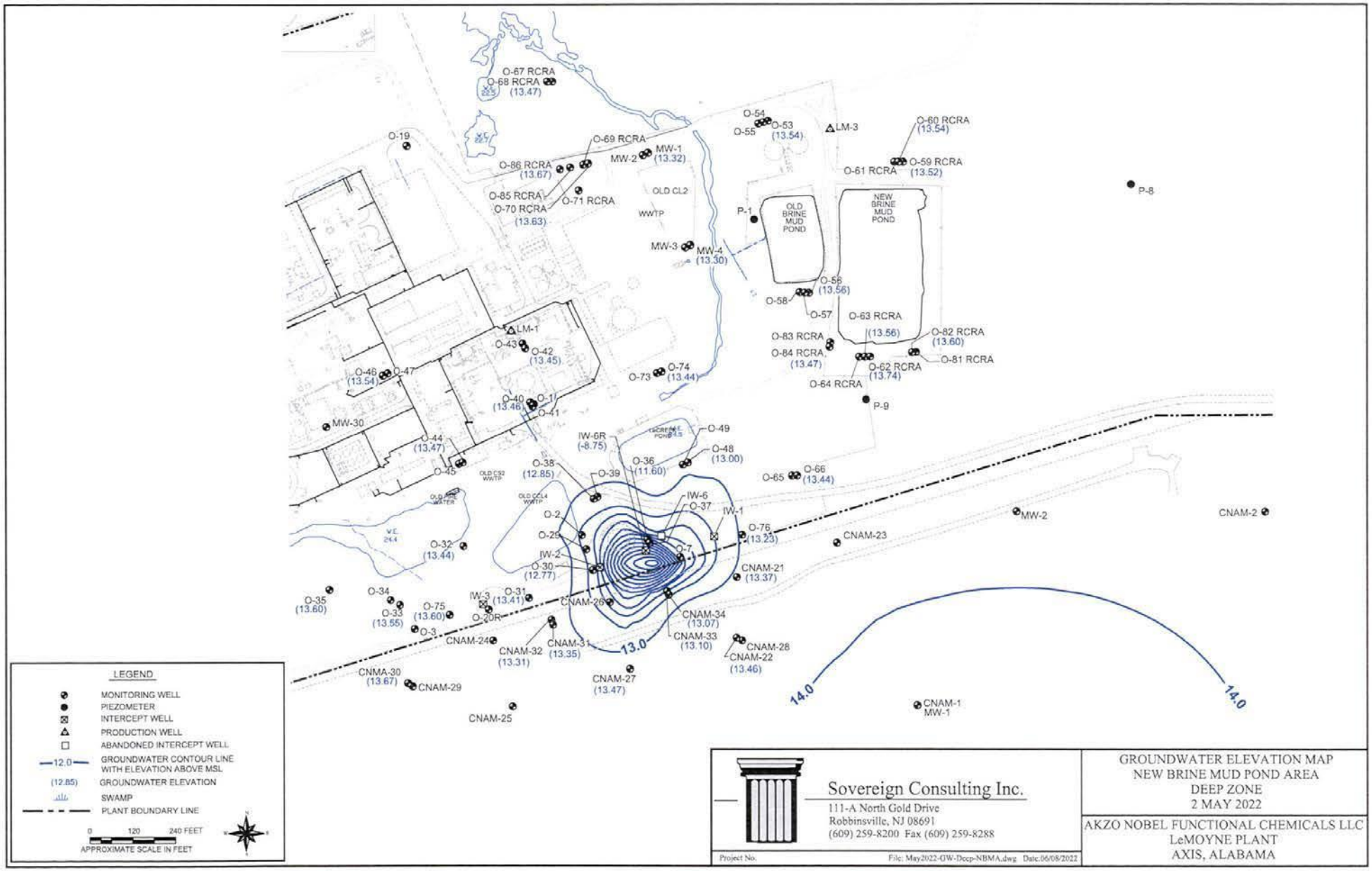
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: May2022-GW-Deep.dwg Date:06/08/2022

GROUNDWATER ELEVATION MAP
DEEP ZONE
2 MAY 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 12.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (12.85) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

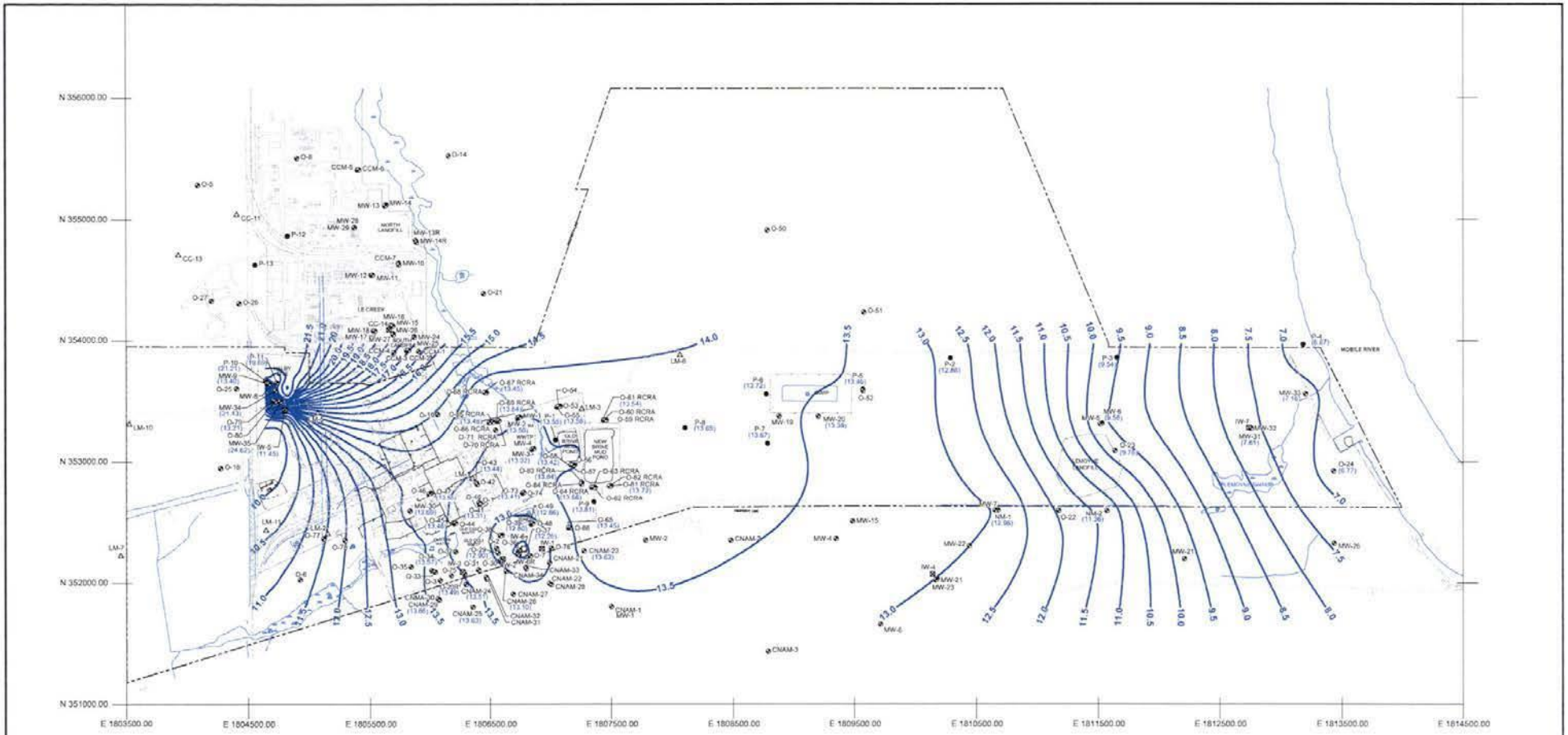
0 120 240 FEET
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. File: May2022-GW-Deep-NBMA.dwg Date:06/08/2022

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
2 MAY 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 12.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (12.86) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET
APPROXIMATE SCALE IN FEET

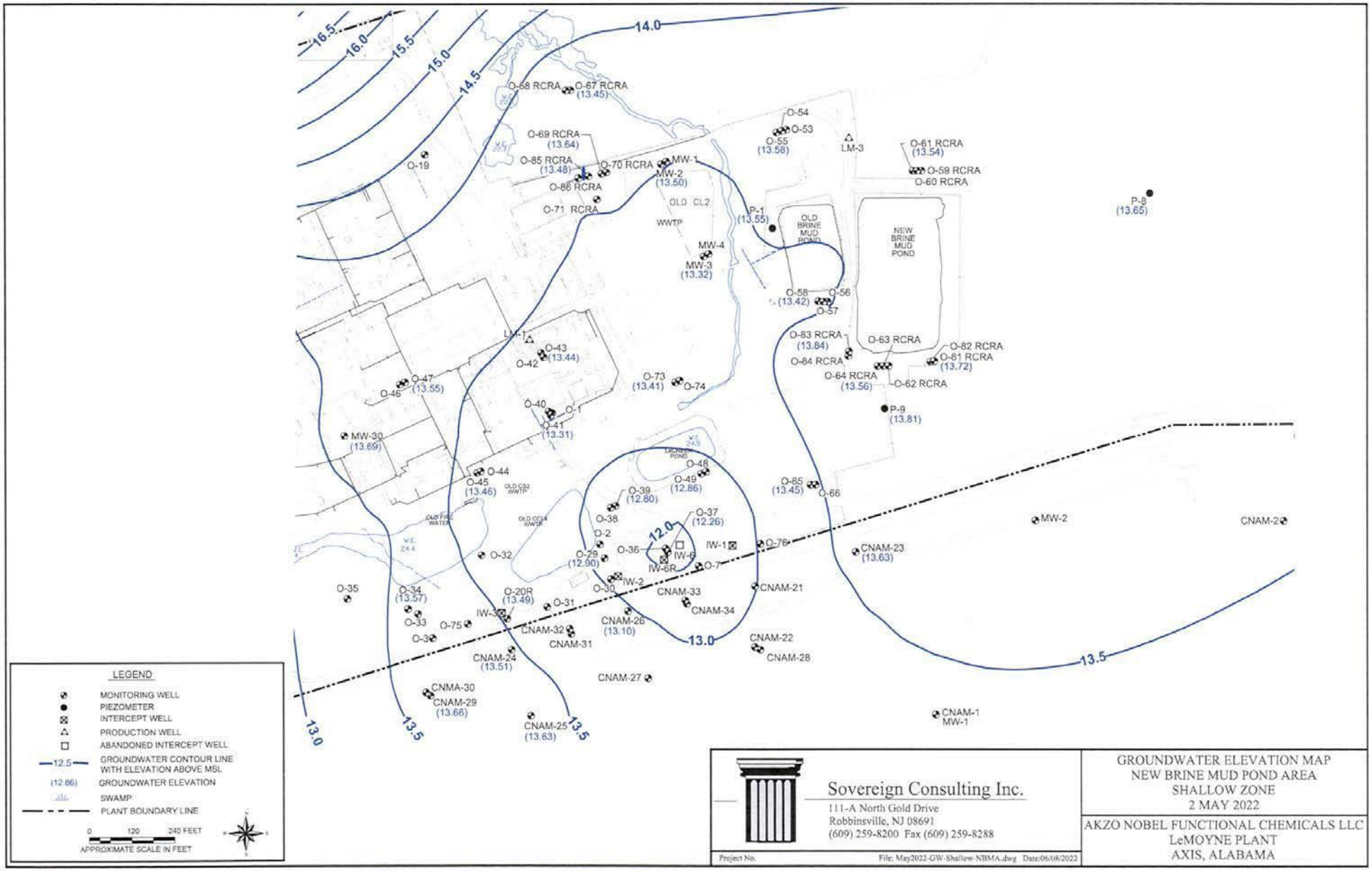
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: May2022-GW-Shallow.dwg Date:06/08/2022

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
2 MAY 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

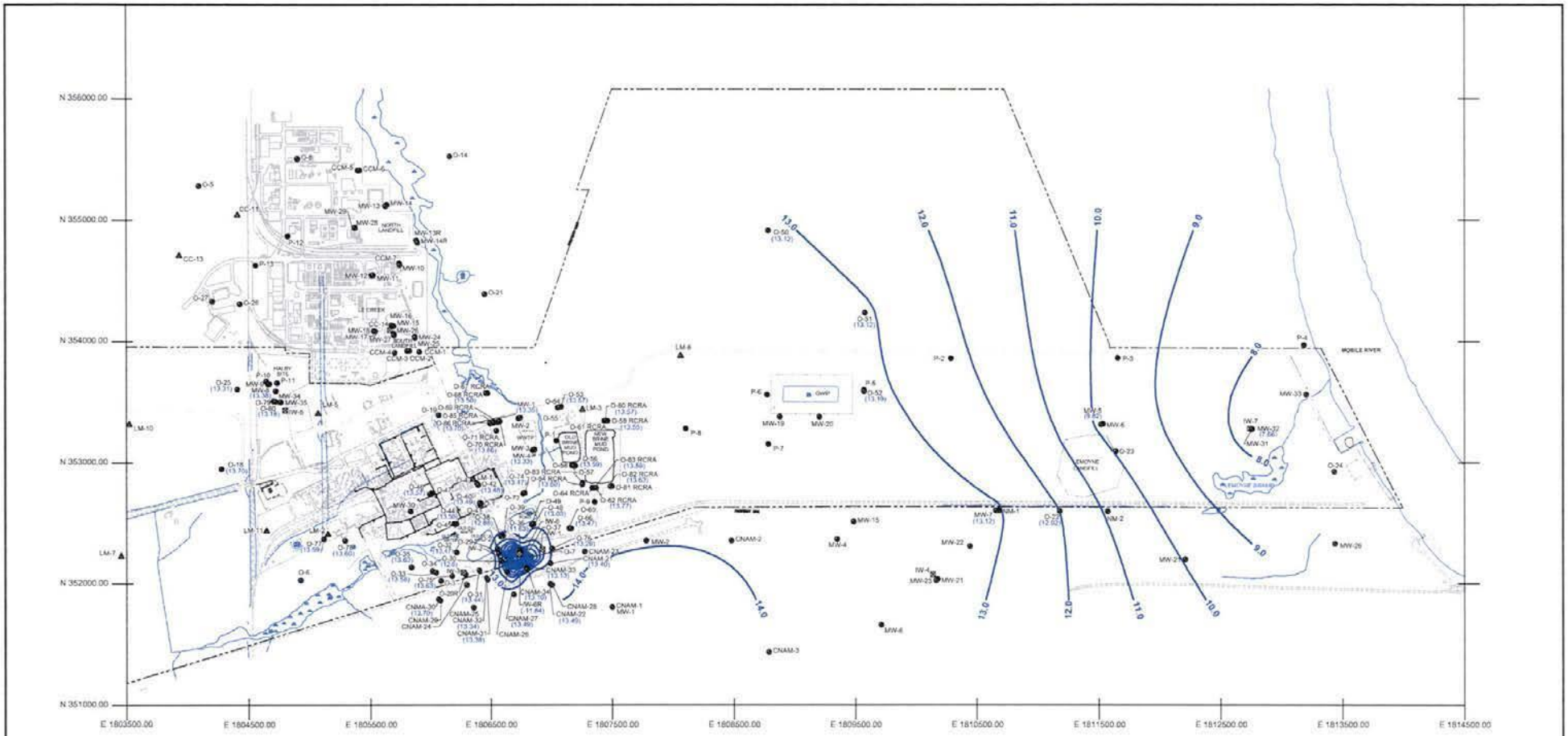


Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. File: May2022-GW-Shallow-NBMA.dwg Date:06/08/2022

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
2 MAY 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 12.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (13.70) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

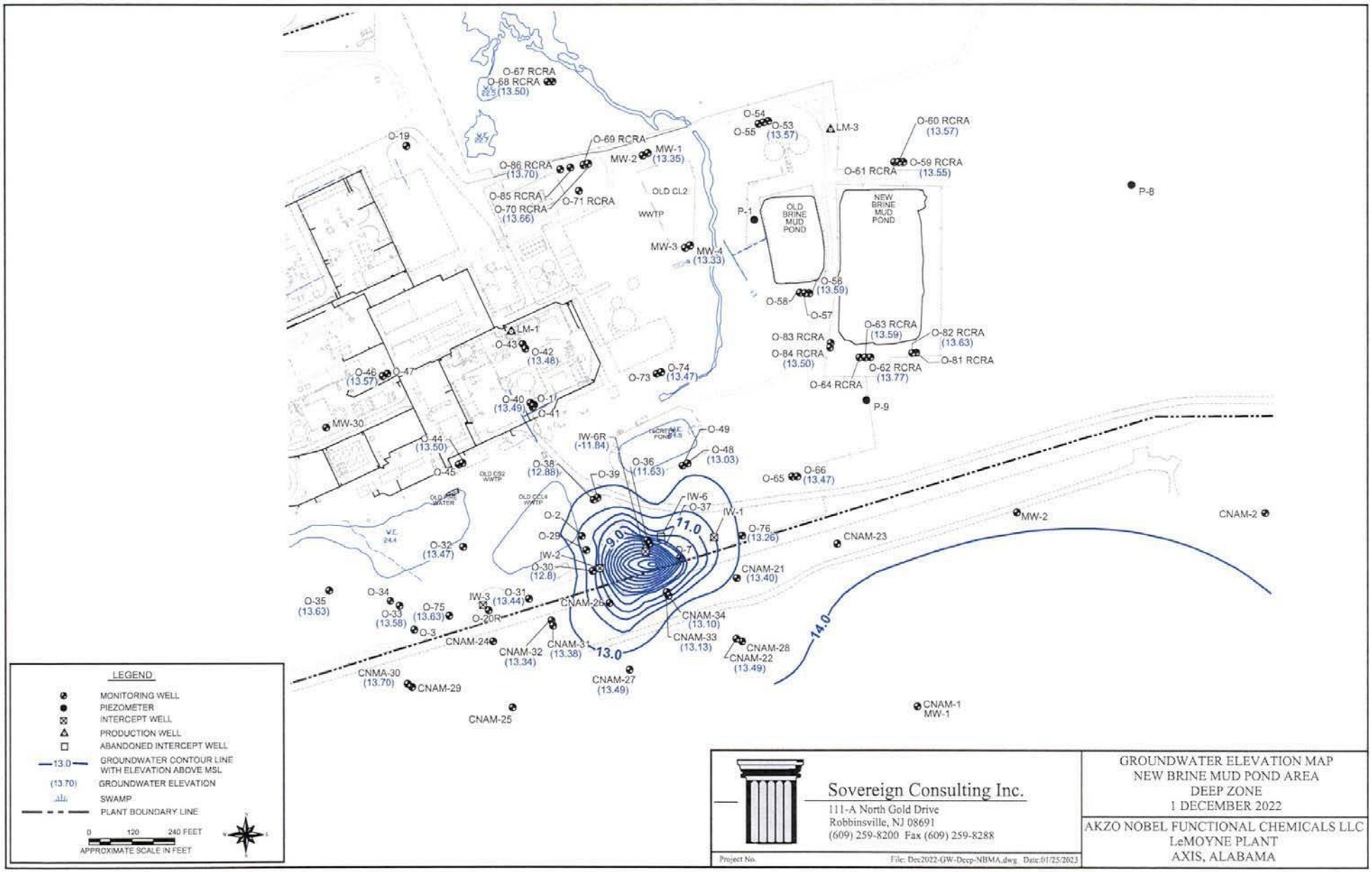
0 400 800 FEET
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. File: Dec2022-GW-Deep.dwg Date:01/24/2023

GROUNDWATER ELEVATION MAP
DEEP ZONE
1 DECEMBER 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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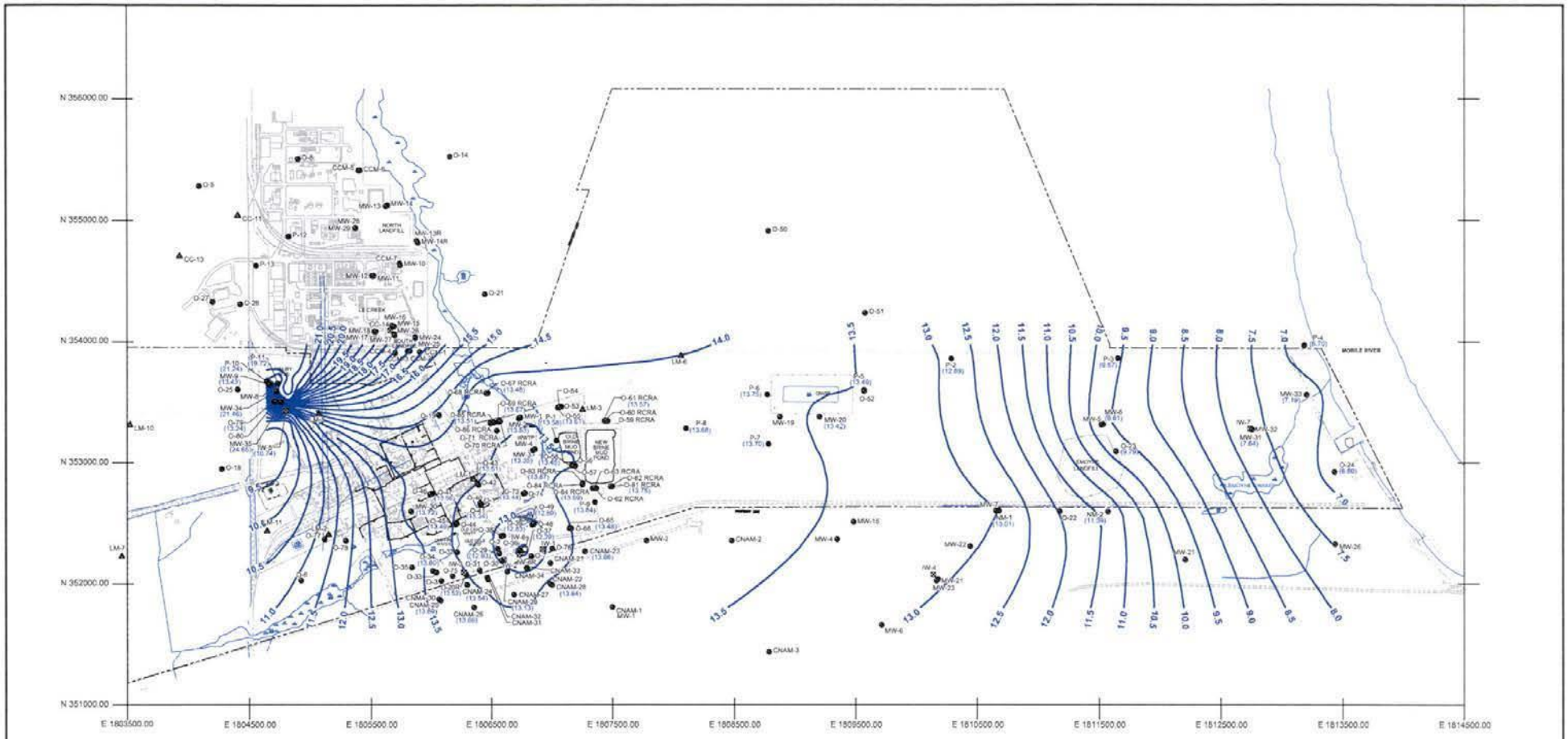
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: Dec2022-GW-Deep-NBMA.dwg Date:01/25/2023

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
DEEP ZONE
1 DECEMBER 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 12.0 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (13.60) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 400 800 FEET
APPROXIMATE SCALE IN FEET

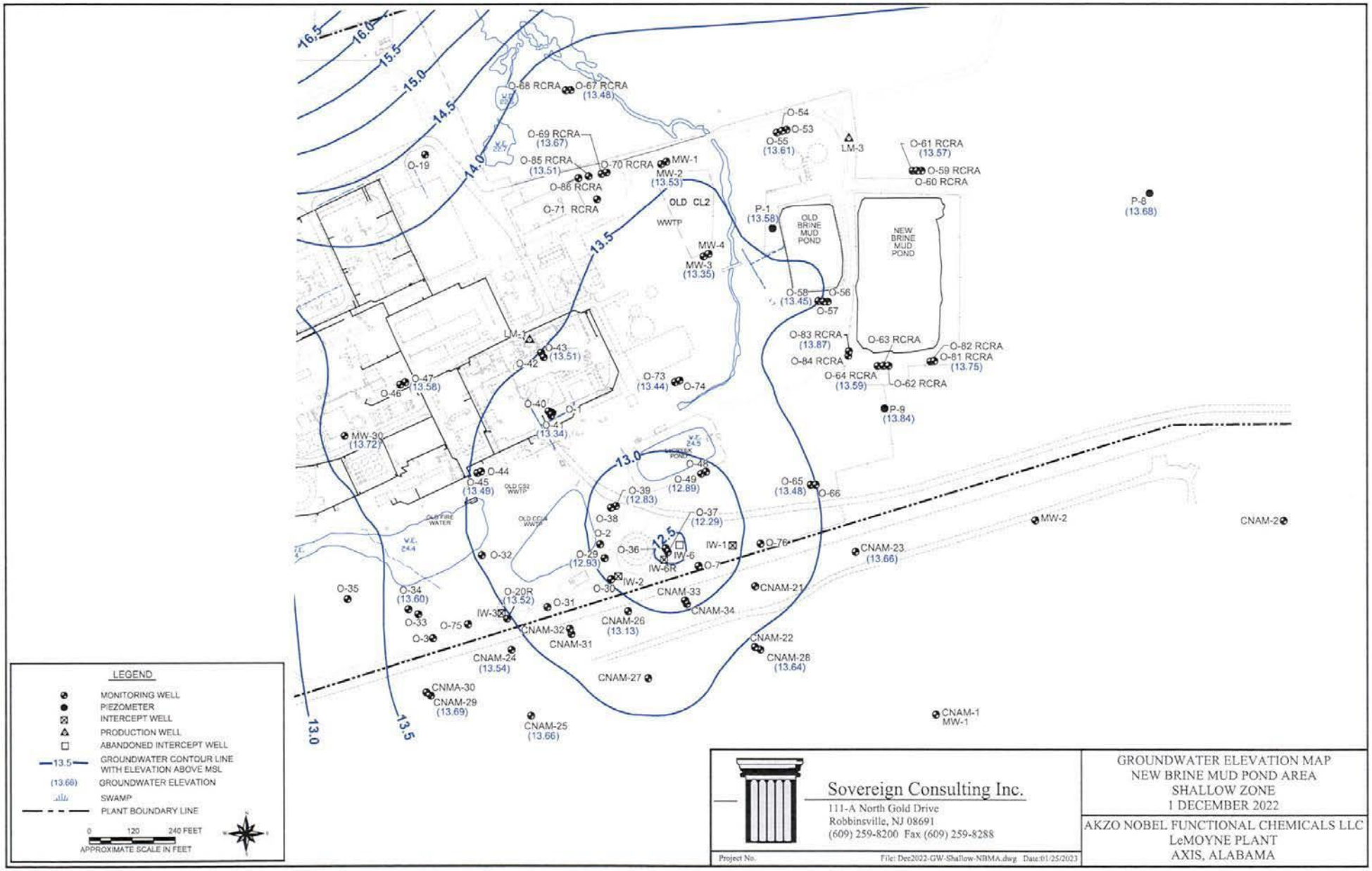
Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No.

File: Dec2022-GW-Shallow.dwg Date:01/23/2023

GROUNDWATER ELEVATION MAP
SHALLOW ZONE
1 DECEMBER 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



LEGEND

- MONITORING WELL
- PIEZOMETER
- INTERCEPT WELL
- PRODUCTION WELL
- ABANDONED INTERCEPT WELL
- 13.5 — GROUNDWATER CONTOUR LINE WITH ELEVATION ABOVE MSL
- (13.60) GROUNDWATER ELEVATION
- SWAMP
- PLANT BOUNDARY LINE

0 120 240 FEET
APPROXIMATE SCALE IN FEET

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, NJ 08691
(609) 259-8200 Fax (609) 259-8288

Project No. File: Dec2022-GW-Shallow-NBMA.dwg Date:01/25/2023

GROUNDWATER ELEVATION MAP
NEW BRINE MUD POND AREA
SHALLOW ZONE
1 DECEMBER 2022

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

May 2022 Field Forms

Akzo Nobel Functional Chemicals LLC — O-59

LeMoyne Plant

RCRA Groundwater Monitor Well O-59 — Sampling / Inspection Log Sheet

Date: 3/4/22 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond SEP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	117.16	119.70
Screened Interval	-71.41/-81.41	107-117	109.54-119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) n/a departure locked (✓)
Casing: Cracked Yes/(No) Other: _____
Concrete Pad: Cracks: Yes/(No) Describe: _____
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe: _____

Samples:
Purpose of Sampling: RCRA Semi Annual
Sampler's Name: B Kittrell Date: 3 / 4 / 22
Company: Sovereign
Arrival Time: 0800 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Cloudy 84°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 35.15
Depth to Bottom: 119.70

Pump Used: (Yes) / No
Depth of Pump: 28'
Began: 0957 (time)
Ended: 1600 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 184 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # _____
Pump Serial # _____
Type GRUNDFOS
Calibration N/A
pH Meter Model # 991301
pH Meter Serial # 41767
Type HANNA
Calibration 10:10
Cond Meter Model # SAME
Cond Meter Serial # _____
Type _____
Calibration _____

1017
Field Measurement No. 1
Water Temperature: 22.4 °C
pH: 5.93
Cond: 363 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1037
Field Measurement No. 2
Water Temperature: 22.3 °C
pH: 5.05
Cond: 365 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1057
Field Measurement No. 3
Water Temperature: 22.3 °C
pH: 5.67
Cond: 363 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60 — Sampling / Inspection Log Sheet

Date: 5/4/22 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.28
Screened Interval	-37.46 -57.46	73.93	75.24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi
Sampler's Name: B Kittrell Date: 5 / 4 / 22
Company: Sojitz16w
Arrival Time: 0800 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.): Cloudy 84°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 24.79
Depth to Bottom: 98.28

Pump Used: (Yes) / No
Depth of Pump: 27'
Began: 1110 (time)
Ended: 1200 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 150 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # _____
Pump Serial # _____
Type Grundfos
Calibration N/A

pH Meter Model # 991301
pH Meter Serial # 41767
Type Hanna
Calibration 10070

Cond Meter Model # Sonde
Cond Meter Serial # _____
Type _____
Calibration _____

Pump Information:

1126

Field Measurement No. 1
Water Temperature: 20.9 °C
pH: 4.28
Cond: 145 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2
Water Temperature: 20.8 °C
pH: 4.24
Cond: 146 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3
Water Temperature: 20.7 °C
pH: 4.24
Cond: 146 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61 — Sampling / Inspection Log Sheet

Date: 5/4/22 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.79
Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	68	70.08
Screened Interval	-21.69/-31.69	57.67	59.48 69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi
Sampler's Name: B. Kittrell Date: 5 / 4 / 22
Company: Science Ctr
Arrival Time: 0800 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Cloudy 84°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 24.79
Depth to Bottom: 70.08

Pump Used: (Yes) / No
Depth of Pump: 27'
Began: 1120 (time)
Ended: 1151 (time)
Pumping Rate: 9 (gpm/lph)
Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: ____ (gal/liter)
# of Bails Removed: ____
Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model #
Pump Serial #
Type Grundfos
Calibration N/A
pH Meter Model # 99/301
pH Meter Serial # 4/767
Type Hanna
Calibration 100%
Cond Meter Model # Same
Cond Meter Serial #
Type
Calibration
Pump Information:

Field Measurement No. 1
Water Temperature: 21.0 °C
pH: 4.09
Cond: 222 µmhos cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 2
Water Temperature: 21.0 °C
pH: 4.08
Cond: 223 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Field Measurement No. 3
Water Temperature: 21.0 °C
pH: 4.09
Cond: 224 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62

Sampling / Inspection Log Sheet

Date: 5/5/22 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.04

Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	115	116.65
Screened Interval	-70.83/-80.83	104/114	105.87/115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other: _____

Concrete Pad: Cracks: Yes/(No) Describe: _____

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe: _____

Samples:

Purpose of Sampling: RCRA SEMI

Sampler's Name: B KITTRELL Date: 5 / 5 / 22

Company: SCIENTECH

Arrival Time: 0805 Departure Time: 1315

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 62°

Standing Water around Well: NONE

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.00

Depth to Bottom: 116.65

Pump Used: (Yes) / No

Depth of Pump: 25

Began: 0755 (time)

Ended: 0856 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: NONE

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type GRUNDFOS

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # 41767

Type HANNA

Calibration 10070

Cond Meter Model # SAME

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1

Water Temperature: 19.4 °C

pH: 5.30

Cond: 240 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2

Water Temperature: 19.9 °C

pH: 5.35

Cond: 244 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3

Water Temperature: 20.0 °C

pH: 5.33

Cond: 241 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63 — Sampling / Inspection Log Sheet

Date: 5/5/22 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond SEP-202
Installed: 3/81 Diameter: 4" 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	90	92.29
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA SEMI
Sampler's Name: B. KITTRELL Date: 5 / 5 / 22
Company: SOVEREIGN
Arrival Time: 0705 Departure Time: 1315
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 62°
Standing Water around Well: NONE

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 92.24
Depth to Bottom: 92.24

Pump Used: (Yes)/ No
Depth of Pump: 85
Began: 0701 (time)
Ended: 0947 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: _____ gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: NONE

Sampling Equipment Information:
Pump Model # _____
Pump Serial # _____
Type GRUNDFOS
Calibration N/A

pH Meter Model # 991301
pH Meter Serial # 41767
Type HANNA
Calibration 10070

Cond Meter Model # SAME
Cond Meter Serial # _____
Type _____
Calibration _____
Pump Information:

Field Measurement No. 1
Water Temperature: 20.1 °C
pH: 4.43
Cond: 154 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2
Water Temperature: 20.1 °C
pH: 4.45
Cond: 155 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3
Water Temperature: 20.1 °C
pH: 4.45
Cond: 156 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

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LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64

Sampling / Inspection Log Sheet

Date: 5/5/22 Signed: B Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3-81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	75	77.14
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: B Kittrell Date: 5 / 5 / 22
Company: Sovereign

Arrival Time: 0705 Departure Time: 1315
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 62°
Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 21.80
Depth to Bottom: 77.14

Pump Used: (Yes) / No
Depth of Pump: 22'
Began: 0953 (time)
Ended: 1024 (time)
Pumping Rate: 3 (gpm/lph)
Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: ____ (gal/liter)
# of Bails Removed: ____
Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:

Pump Model # ____
Pump Serial # ____
Type Grundfos
Calibration N/A

pH Meter Model # 991301
pH Meter Serial # 41767
Type Hanna
Calibration 100/0

Cond Meter Model # Same
Cond Meter Serial # ____
Type ____
Calibration ____

Pump Information:

Field Measurement No. 1 (1003)
Water Temperature: 20.3° C
pH: 4.40
Cond: 104 µmhos cm
Other Parameters: ____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 2 (1013)
Water Temperature: 20.2° C
pH: 4.42
Cond: 106 µmhos/cm
Other Parameters: ____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Field Measurement No. 3 (1023)
Water Temperature: 20.2 C
pH: 4.47
Cond: 105 µmhos/cm
Other Parameters: ____
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 5-4-22 Signed: Brian Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	68
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi

Sampler's Name: B. Kittrell Date: 5 / 4 / 22

Company: Solexco

Arrival Time: 0300 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Cloudy 64°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.40

Depth to Bottom: 68.00

Pump Used: (Yes) / No,

Depth of Pump: 25

Began: 1246 (time)

Ended: 1317 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration N/A

pH Meter Model # 291301

pH Meter Serial # 41467

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1

Water Temperature: 19.7 °C

pH: 5.06

Cond: 228 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2

Water Temperature: 19.8 °C

pH: 5.10

Cond: 227 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3

Water Temperature: 19.9 °C

pH: 5.69

Cond: 224 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82

Sampling / Inspection Log Sheet

Date: 5/4/22 Signed: B. Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" – 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	115	117.60
Screened Interval	-64.6 -79.6	97.5 112.5	100.12 115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes / No

Any indication of having been contacted by vehicle? Yes / No

Describe:

Samples:

Purpose of Sampling: RCRA Semi

Sampler's Name: B Kittrell Date: 5/4/22

Company: Sherlegh

Arrival Time: 0800 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Cloudy 84°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.45'

Depth to Bottom: 117.60

Pump Used: Yes / No

Depth of Pump: 25'

Began: 1325 (time)

Ended: 1336 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 189 gal/liter

Bailer Used: Yes / No

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # 41767

Type Hanna

Calibration 10070

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

Field Measurement No. 1

Water Temperature: 20.0 °C

pH: 4.44

Cond: 110 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 2

Water Temperature: 19.9 °C

pH: 4.64

Cond: 111 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Field Measurement No. 3

Water Temperature: 20.0 °C

pH: 4.59

Cond: 112 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

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LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83

Sampling / Inspection Log Sheet

Date: 5/5/22 Signed: B. Kittrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.90
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes / (No) Other:

Concrete Pad: Cracks: Yes / (No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi Annual

Sampler's Name: B. Kittrell Date: 5 / 5 / 22

Company: Sovereign

Arrival Time: 0705 Departure Time: 1315

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 62°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.73

Depth to Bottom: 67.90

Pump Used: (Yes) / No

Depth of Pump: 24'

Began: 1157 (time)

Ended: 1228 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 93 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # _____

Type Grundfos

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # 41767

Type Hanna

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

1207

Field Measurement No. 1

Water Temperature: 21.7 °C

pH: 4.61

Cond: 160 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1217

Field Measurement No. 2

Water Temperature: 21.3 °C

pH: 4.55

Cond: 154 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1227

Field Measurement No. 3

Water Temperature: 21.3 °C

pH: 4.45

Cond: 155 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

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LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84 — Sampling / Inspection Log Sheet

Date: 5/5/22 Signed: Brian Kuttell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.00
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi. Annual

Sampler's Name: B. KUTTRELL Date: 5/5/22

Company: SOVEREIGN

Arrival Time: 0705 Departure Time: 1315

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 62°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.33

Depth to Bottom: 118.00

Pump Used: (Yes) / No

Depth of Pump: 25'

Began: 1050 (time)

Ended: 1151 (time)

Pumping Rate: 3 (gpm/lph)

Total Volume Purged: 183 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial #

Type GRUNDFOS

Calibration N/A

pH Meter Model # 991301

pH Meter Serial # 41767

Type HANNA

Calibration 100%

Cond Meter Model # SAME

Cond Meter Serial #

Type

Calibration

Pump Information:

1110

Field Measurement No. 1

Water Temperature: 20.5° C

pH: 5.44

Cond: 226 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1130

Field Measurement No. 2

Water Temperature: 20.4° C

pH: 5.43

Cond: 219 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1150

Field Measurement No. 3

Water Temperature: 20.5° C

pH: 5.45

Cond: 219 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

November 2022 Field Forms

Akzo Nobel Functional Chemicals LLC

LeMoyne Plant

O-59

RCRA Groundwater Monitor Well O-59

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: Brian Kittell

Well Information: Upgradient of New Brine Mud Pond SEP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 38.13
Top of Slab/Grade: 35.59

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	38.13	NA	0
Total Depth	-87.41	117.16	119.70
Screened Interval	-71.41/-81.41	107/117	109.54/119.54

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/No Other: _____
Concrete Pad: Cracks: Yes/No Describe: _____
Protective Posts: In position Yes / No
Any indication of having been contacted by vehicle? Yes / No
Describe: _____

Samples:
Purpose of Sampling: RCRA SEMI
Sampler's Name: B Kittell Date: 11/17/22
Company: Severn Trent
Arrival Time: 0700 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Cloudy 42
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 26.09
Depth to Bottom: 119.70

Pump Used: Yes / No
Depth of Pump: 110
Began: 0820 (time)
Ended: 0836 (time)
Pumping Rate: 1 (gpm/lph)
Total Volume Purged: _____ gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter
Did Well pump/bail dry: Yes / No
Note any unusual events: None

Sampling Equipment Information:
Pump Model # _____
Pump Serial # 28012
Type Geo Pump
Calibration None

pH Meter Model # _____
pH Meter Serial # 37379
Type YSI
Calibration 10010

Cond Meter Model # Same
Cond Meter Serial # _____
Type _____
Calibration _____

0825
Field Measurement No. 1
Water Temperature: 19.4 °C
pH: 5.43
Cond: 294 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0830
Field Measurement No. 2
Water Temperature: 19.4 °C
pH: 5.41
Cond: 293 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0835
Field Measurement No. 3
Water Temperature: 19.4 °C
pH: 5.44
Cond: _____ µmhos/cm
Other Parameters: 291
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

SD 0834
FB @ 0838

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-60

RCRA Groundwater Monitor Well O-60

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond SEP-202
Installed: 3/81 Diameter: 4" - 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 37.78
Top of Slab/Grade: 35.54

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.78	NA	0
Total Depth	-60.46	96	98.28
Screened Interval	-37.46/-57.46	73/93	75.24/95.24

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA SEMI
Sampler's Name: B Kittrell Date: 11/17/22
Company: Schlumberger
Arrival Time: 0700 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 46°
Standing Water around Well: None

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 35.70
Depth to Bottom: 98.28

Pump Used: (Yes) / No
Depth of Pump: 80
Began: 0850 (time)
Ended: 0906 (time)
Pumping Rate: 1 (gpm/lph)
Total Volume Purged: _____ gal/liter

Bailer Used: Yes / No
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: _____

Sampling Equipment Information:
Pump Model # _____
Pump Serial # 28012
Type Geo Pump
Calibration None

pH Meter Model # _____
pH Meter Serial # 37379
Type YSI
Calibration 100%

Cond Meter Model # None
Cond Meter Serial # _____
Type _____
Calibration _____

Pump Information:

0855

Field Measurement No. 1
Water Temperature: 18.6 °C
pH: 4.60
Cond: 144 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0900

Field Measurement No. 2
Water Temperature: 18.4 °C
pH: 4.59
Cond: 149 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0905

Field Measurement No. 3
Water Temperature: 18.6 °C
pH: 4.60
Cond: 147 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-61

RCRA Groundwater Monitor Well O-61

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: Brian Kittrell

Well Information: Upgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 37.79

Top of Slab/Grade: 35.31

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	37.79	NA	0
Total Depth	-34.69	68	70.08
Screened Interval	-21.69/-31.69	57.67	59.48 69.48

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi

Sampler's Name: B Kittrell Date: 11/17/22

Company: Shaw

Arrival Time: 0700 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 47°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 25.70

Depth to Bottom: 70.08

Pump Used: (Yes) / No

Depth of Pump: 65

Began: 0920 (time)

Ended: 0936 (time)

Pumping Rate: 1 (gpm/lph)

Total Volume Purged: 16 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial # 28012

Type GED Pump

Calibration None

pH Meter Model #

pH Meter Serial # 37379

Type YSI

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

0925

Field Measurement No. 1

Water Temperature: 17.7 °C

pH: 4.43

Cond: 223 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0930

Field Measurement No. 2

Water Temperature: 18.0 °C

pH: 4.42

Cond: 222 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

0935

Field Measurement No. 3

Water Temperature: 18.4 °C

pH: 4.36

Cond: 224 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-62

RCRA Groundwater Monitor Well O-62

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.04

Top of Slab/Grade: 33.17

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.04	NA	0
Total Depth	-86.83	115	116.65
Screened Interval	-70.83/-80.83	104:114	105.87:115.87

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other: _____

Concrete Pad: Cracks: Yes/(No) Describe: _____

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe: _____

Samples:

Purpose of Sampling: RCRA Semi

Sampler's Name: B Kittrell Date: 11 / 17 / 22

Company: Sovereign

Arrival Time: 0700 Departure Time: 1400

Conditions:

General Weather (recent rain, wind direction, etc.): Sunny 52°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 22.75

Depth to Bottom: 116.65

Pump Used: (Yes) / No

Depth of Pump: 110

Began: 1211 (time)

Ended: 1227 (time)

Pumping Rate: _____ (gpm/lph)

Total Volume Purged: _____ gal/liter

Bailer Used: Yes / (No)

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # 28012

Type Geo Pump

Calibration N/A

pH Meter Model # _____

pH Meter Serial # 37379

Type YSI

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

1216

Field Measurement No. 1

Water Temperature: 18.7 °C

pH: 5.46

Cond: 192 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1221

Field Measurement No. 2

Water Temperature: 19.2 °C

pH: 5.46

Cond: 192 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1226

Field Measurement No. 3

Water Temperature: 18.8 °C

pH: 5.46

Cond: 192 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-63

RCRA Groundwater Monitor Well O-63

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: Dan Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202
Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 35.27
Top of Slab/Grade: 33.28

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.27	NA	0
Total Depth	-59.72	90	92.29
Screened Interval	-46.72/-56.72	80/90	81.99/91.99

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*
Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:
Concrete Pad: Cracks: Yes/(No) Describe:
Protective Posts: In position (Yes)/ No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:
Purpose of Sampling: RCRA Semi
Sampler's Name: D Kittrell Date: 11/17/22
Company: Sovereign
Arrival Time: 0700 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Standing Water around Well:

Sampling Preparation:
Depths are from Measuring Point
Depth to Water: 92.94
Depth to Bottom: 92.29

Pump Used: (Yes)/ No
Depth of Pump: 85
Began: 1238 (time)
Ended: 1254 (time)
Pumping Rate: 1 (gpm/lph)
Total Volume Purged: 16 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: None

Sampling Equipment Information:
Pump Model # _____
Pump Serial # 28012
Type Geo Pump
Calibration n/a

pH Meter Model # _____
pH Meter Serial # 37379
Type YSI
Calibration 10&7

Cond Meter Model # Same
Cond Meter Serial # _____
Type _____
Calibration _____

Pump Information:

1243

Field Measurement No. 1
Water Temperature: 17.7 °C
pH: 4.64
Cond: 159 µmhos/cm
Other Parameters: 161
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1248

Field Measurement No. 2
Water Temperature: 17.1 °C
pH: 4.63
Cond: 159 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1253

Field Measurement No. 3
Water Temperature: 17.0 C
pH: 4.63
Cond: 160 µmhos/cm
Other Parameters: _____
General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-64

RCRA Groundwater Monitor Well O-64

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: Brian Kittrell

Well Information: Downgradient of New Brine Mud Pond 5EP-202

Installed: 3/81 Diameter: 4" = 0.65 gal/foot Casing Material: PVC
Measuring Point (MP): 34.86
Top of Slab/Grade: 32.84

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	34.86	NA	0
Total Depth	-43.16	75	77.14
Screened Interval	-31.16/-41.16	64/74	66.02/76.02

Inspection: *Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan*

Casing Cover: @ arrival locked (✓) @ departure locked (✓)
Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No
Any indication of having been contacted by vehicle? Yes / (No)
Describe:

Samples:

Purpose of Sampling: RCRA SEMI

Sampler's Name: B. KITTRELL Date: 11 / 17 / 22
Company: SOVEREIGN

Arrival Time: 0700 Departure Time: 1600
Conditions:
General Weather (recent rain, wind direction, etc.):
Sunny 52°
Standing Water around Well: NONE

Sampling Preparation:

Depths are from Measuring Point
Depth to Water: 22.48
Depth to Bottom: 77.14

Pump Used: (Yes) / No
Depth of Pump: 70
Began: 1303 (time)
Ended: 1314 (time)
Pumping Rate: 1 (gpm/lph)
Total Volume Purged: 16 gal/liter

Bailer Used: Yes / (No)
Bailer Volume: _____ (gal/liter)
# of Bails Removed: _____
Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / (No)
Note any unusual events: NONE

Sampling Equipment Information:
Pump Model #
Pump Serial # 27012
Type GEO Pump
Calibration N/A

pH Meter Model #
pH Meter Serial # 37374
Type YSI
Calibration 100%

Cond Meter Model # SAME
Cond Meter Serial #
Type
Calibration

Pump Information:

1308

Field Measurement No. 1
Water Temperature: 17.9 °C
pH: 4.89
Cond: 91 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1313

Field Measurement No. 2
Water Temperature: 17.4 °C
pH: 4.79
Cond: 90 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1318

Field Measurement No. 3
Water Temperature: 18.1 °C
pH: 4.78
Cond: 93 µmhos/cm
Other Parameters:
General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-81

RCRA Groundwater Monitor Well O-81

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: B Kittell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.56

Top of Slab/Grade: 33.02

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.56	NA	0
Total Depth	-31.98	65	68
Screened Interval	-14.48/-29.48	47.5/62.5	50/65

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/No Other:

Concrete Pad: Cracks: Yes/No Describe:

Protective Posts: In position Yes / No

Any indication of having been contacted by vehicle? Yes / No

Describe:

Samples:

Purpose of Sampling: RCRA Semi

Sampler's Name: B Kittell Date: 11/17/22

Company: Solvaion

Arrival Time: 0700 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 47°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.23

Depth to Bottom: 68.00

Pump Used: Yes / No

Depth of Pump: 50

Began: 0957 (time)

Ended: _____ (time)

Pumping Rate: 1 (gpm/lph)

Total Volume Purged: 16 gal/liter

Bailer Used: Yes / No

Bailer Volume: _____ (gal/liter)

# of Bails Removed: _____

Total Volume Purged _____ gal/liter

Did Well pump/bail dry: Yes / No

Note any unusual events: None

Sampling Equipment Information:

Pump Model # _____

Pump Serial # 28012

Type Geo Pump

Calibration None

pH Meter Model # _____

pH Meter Serial # 37379

Type YSI

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial # _____

Type _____

Calibration _____

Pump Information:

1002

Field Measurement No. 1

Water Temperature: 17.7 °C

pH: 4.95

Cond: 75 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1007

Field Measurement No. 2

Water Temperature: 18.2 °C

pH: 4.98

Cond: 79 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1012

Field Measurement No. 3

Water Temperature: 17.4 °C

pH: 4.95

Cond: 76 µmhos/cm

Other Parameters: _____

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-82

RCRA Groundwater Monitor Well O-82

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: B. Luttrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 35.52

Top of Slab/Grade: 32.9

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	35.52	NA	0
Total Depth	-87.1	115	117.60
Screened Interval	-64.6/-79.6	97.5/112.5	100.12/115.12

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: Routine Semi

Sampler's Name: B. Luttrell Date: 11 / 17 / 22

Company: Sasol

Arrival Time: 0700 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 45°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.26

Depth to Bottom: 117.60

Pump Used: Yes / No

Depth of Pump: 105

Began: 1020 (time)

Ended: 1056 (time)

Pumping Rate: 1 (gpm/lph)

Total Volume Purged: 16 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial # 28012

Type Geo Pro

Calibration None

pH Meter Model #

pH Meter Serial # 37379

Type YSI

Calibration 10/7/0

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1025

Field Measurement No. 1

Water Temperature: 18.6 °C

pH: 5.21

Cond: 176 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1030

Field Measurement No. 2

Water Temperature: 17.7 C

pH: 5.21

Cond: 176 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

1035

Field Measurement No. 3

Water Temperature: 18.6 °C

pH: 5.21

Cond: 177 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): Clear, No Odor

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-83

RCRA Groundwater Monitor Well O-83

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: Brian Littrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.02

Top of Slab/Grade: 33.2

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.02	NA	0
Total Depth	-31.8	65	67.90
Screened Interval	-14.3/-29.3	47.5/62.5	50.32/65.32

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi

Sampler's Name: B. LITTRELL Date: 11/17/22

Company: SOUTHERN

Arrival Time: 0700 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 52°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 23.60

Depth to Bottom: 67.90

Pump Used: Yes / No

Depth of Pump: 55

Began: 1141 (time)

Ended: 1157 (time)

Pumping Rate: 1 (gpm/lph)

Total Volume Purged: 16 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: ____ (gal/liter)

# of Bails Removed: ____

Total Volume Purged ____ gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial # 28017

Type GEO Pump

Calibration N/A

pH Meter Model #

pH Meter Serial # 37379

Type YSI

Calibration 100%

Cond Meter Model # SAME

Cond Meter Serial #

Type

Calibration

Pump Information:

1146

Field Measurement No. 1

Water Temperature: 19.2 °C

pH: 5.01

Cond: 154 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1151

Field Measurement No. 2

Water Temperature: 19.1 °C

pH: 5.00

Cond: 154 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

1156

Field Measurement No. 3

Water Temperature: 19.0 °C

pH: 4.93

Cond: 154 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, NO ODOR

Akzo Nobel Chemicals Inc

LeMoyne Plant

O-84

RCRA Groundwater Monitor Well O-84

Sampling / Inspection Log Sheet

Date: 11/17/22 Signed: B. Kattrell

Well Information:

Downgradient of New Brine Mud Pond

Installed: 2/87 Diameter: 4" = 0.65 gal/foot Casing Material: PVC

Measuring Point (MP): 36.31

Top of Slab Grade: 33.22

Elevations (in feet)	MSL	Below Grade	Below MP
Measuring Point Elevation	36.31	NA	0
Total Depth	-81.78	115	118.00
Screened Interval	-64.28/-79.28	97.5/112.5	100.59/115.59

Inspection:

Complete for every activity involving a Monitor Well, but no less than the frequency called for in the site's O&M Plan.

Casing Cover: @ arrival locked (✓) @ departure locked (✓)

Casing: Cracked Yes/(No) Other:

Concrete Pad: Cracks: Yes/(No) Describe:

Protective Posts: In position (Yes) / No

Any indication of having been contacted by vehicle? Yes / (No)

Describe:

Samples:

Purpose of Sampling: RCRA Semi

Sampler's Name: B. Kattrell Date: 11/17/22

Company: Jacobs

Arrival Time: 0700 Departure Time: 1600

Conditions:

General Weather (recent rain, wind direction, etc.):

Sunny 50°

Standing Water around Well: None

Sampling Preparation:

Depths are from Measuring Point

Depth to Water: 24.10

Depth to Bottom: 118.00

Pump Used: Yes / No

Depth of Pump:

Began: 1115 (time)

Ended: 1131 (time)

Pumping Rate: 1 (gpm/lph)

Total Volume Purged: 16 gal/liter

Bailer Used: Yes / (No)

Bailer Volume: (gal/liter)

# of Bails Removed:

Total Volume Purged gal/liter

Did Well pump/bail dry: Yes / (No)

Note any unusual events: None

Sampling Equipment Information:

Pump Model #

Pump Serial # 28012

Type GEO Pump

Calibration N/A

pH Meter Model #

pH Meter Serial # 37379

Type YSI

Calibration 100%

Cond Meter Model # Same

Cond Meter Serial #

Type

Calibration

Pump Information:

1120

Field Measurement No. 1

Water Temperature: 19.0 °C

pH: 5.82

Cond: 257 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1125

Field Measurement No. 2

Water Temperature: 18.8 °C

pH: 5.83

Cond: 246 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

1130

Field Measurement No. 3

Water Temperature: 19.9 °C

pH: 5.83

Cond: 246 µmhos/cm

Other Parameters:

General Description of Water (odor, color, turbidity, etc.): CLEAR, No Odor

May 2022 Analytical Results

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Tel: (850)474-1001

Laboratory Job ID: 400-219528-1
Client Project/Site: Semiannual Hg

For:
Nouryon Functional Chemicals, LLC
13440 Highway 43 North
Axis, Alabama 36505

Attn: Sylvia Williams

Authorized for release by:
5/11/2022 11:01:13 AM

Taylor Bruzzio, Project Manager I
(850)471-6226
Taylor.Bruzzio@et.eurofinsus.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 400-219528-1

Laboratory: Eurofins Pensacola

Narrative

Job Narrative
400-219528-1

Comments
No additional comments.

Receipt
The samples were received on 5/5/2022 4:20 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.0° C.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: O-59
Date Collected: 05/04/22 11:00
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-1
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:42	1

Client Sample ID: O-59 (EQUIPMENT BLANK)
Date Collected: 05/04/22 11:04
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-2
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:48	1

Client Sample ID: O-60
Date Collected: 05/04/22 12:00
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-3
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:49	1

Client Sample ID: O-60 (EQUIPMENT BLANK)
Date Collected: 05/04/22 12:04
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-4
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:51	1

Client Sample ID: O-61
Date Collected: 05/04/22 11:51
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-5
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:53	1

Client Sample ID: O-61 (EQUIPMENT BLANK)
Date Collected: 05/04/22 11:54
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-6
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:55	1

Client Sample ID: O-62
Date Collected: 05/05/22 08:56
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-7
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:57	1

Client Sample ID: O-62 (EQUIPMENT BLANK) — **Lab Sample ID: 400-219528-8**
Date Collected: 05/05/22 09:00 — **Matrix: Water**
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:59	1

Client Sample ID: O-63 — **Lab Sample ID: 400-219528-9**
Date Collected: 05/05/22 09:47 — **Matrix: Water**
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 12:01	1

Client Sample ID: O-63 (EQUIPMENT BLANK) — **Lab Sample ID: 400-219528-10**
Date Collected: 05/05/22 09:51 — **Matrix: Water**
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 12:02	1

Client Sample ID: O-64 — **Lab Sample ID: 400-219528-11**
Date Collected: 05/05/22 10:24 — **Matrix: Water**
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 12:04	1

Client Sample ID: O-64 (EQUIPMENT BLANK) — **Lab Sample ID: 400-219528-12**
Date Collected: 05/05/22 00:01 — **Matrix: Water**
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 12:16	1

Client Sample ID: O-81 — **Lab Sample ID: 400-219528-13**
Date Collected: 05/04/22 13:17 — **Matrix: Water**
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 12:17	1

Client Sample ID: O-81 (EQUIPMENT BLANK) — **Lab Sample ID: 400-219528-14**
Date Collected: 05/04/22 13:21 — **Matrix: Water**
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 12:19	1

Client Sample ID: O-82
Date Collected: 05/04/22 13:26
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-15
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:25	1

Client Sample ID: O-82 (EQUIPMENT BLANK)
Date Collected: 05/04/22 13:30
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-16
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:36	1

Client Sample ID: O-83
Date Collected: 05/05/22 12:28
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-17
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:38	1

Client Sample ID: O-83 (EQUIPMENT BLANK)
Date Collected: 05/05/22 12:32
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-18
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:40	1

Client Sample ID: O-84
Date Collected: 05/05/22 11:51
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-19
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:42	1

Client Sample ID: O-84 (EQUIPMENT BLANK)
Date Collected: 05/05/22 11:55
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-20
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:44	1

Client Sample ID: DUPLICATE
Date Collected: 05/05/22 10:24
Date Received: 05/05/22 16:20

Lab Sample ID: 400-219528-21
Matrix: Water

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:46	1

Client Sample ID: FIELD BLANK #1
Lab Sample ID: 400-219528-22
Date Collected: 05/04/22 09:53
Matrix: Water
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:47	1

Client Sample ID: FIELD BLANK #2
Lab Sample ID: 400-219528-23
Date Collected: 05/05/22 07:50
Matrix: Water
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:49	1

Client Sample ID: FIELD SPIKE
Lab Sample ID: 400-219528-24
Date Collected: 05/04/22 09:50
Matrix: Water
Date Received: 05/05/22 16:20

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:55	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-576905/14-A
Matrix: Water
Analysis Batch: 577105

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 576905

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 11:27	05/10/22 11:27	1

Lab Sample ID: LCS 400-576905/15-A
Matrix: Water
Analysis Batch: 577105

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 576905

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00101	0.00114		mg/L		113	80 - 120

Lab Sample ID: 400-219528-11 MS
Matrix: Water
Analysis Batch: 577105

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 576905

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.00020		0.00201	0.00206		mg/L		102	80 - 120

Lab Sample ID: 400-219528-11 MSD
Matrix: Water
Analysis Batch: 577105

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 576905

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00210		mg/L		104	80 - 120	2	20

Lab Sample ID: MB 400-576909/14-A
Matrix: Water
Analysis Batch: 577105

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 576909

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		05/09/22 12:12	05/10/22 12:21	1

Lab Sample ID: LCS 400-576909/15-A
Matrix: Water
Analysis Batch: 577105

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 576909

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00101	0.00110		mg/L		110	80 - 120

Lab Sample ID: 400-219528-15 MS
Matrix: Water
Analysis Batch: 577105

Client Sample ID: O-82
Prep Type: Total/NA
Prep Batch: 576909

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.00020		0.00201	0.00220		mg/L		109	80 - 120

Lab Sample ID: 400-219528-15 MSD
Matrix: Water
Analysis Batch: 577105

Client Sample ID: O-82
Prep Type: Total/NA
Prep Batch: 576909

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00223		mg/L		111	80 - 120	1	20

Client Sample ID: O-59 — **Lab Sample ID: 400-219528-1**
Date Collected: 05/04/22 11:00 — **Matrix: Water**
Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:42	NET	TAL PEN

Client Sample ID: O-59 (EQUIPMENT BLANK) — **Lab Sample ID: 400-219528-2**
Date Collected: 05/04/22 11:04 — **Matrix: Water**
Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:48	NET	TAL PEN

Client Sample ID: O-60 — **Lab Sample ID: 400-219528-3**
Date Collected: 05/04/22 12:00 — **Matrix: Water**
Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:49	NET	TAL PEN

Client Sample ID: O-60 (EQUIPMENT BLANK) — **Lab Sample ID: 400-219528-4**
Date Collected: 05/04/22 12:04 — **Matrix: Water**
Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:51	NET	TAL PEN

Client Sample ID: O-61 — **Lab Sample ID: 400-219528-5**
Date Collected: 05/04/22 11:51 — **Matrix: Water**
Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:53	NET	TAL PEN

Client Sample ID: O-61 (EQUIPMENT BLANK) — **Lab Sample ID: 400-219528-6**
Date Collected: 05/04/22 11:54 — **Matrix: Water**
Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:55	NET	TAL PEN

Client Sample ID: O-62

Lab Sample ID: 400-219528-7

Date Collected: 05/05/22 08:56

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:57	NET	TAL PEN

Client Sample ID: O-62 (EQUIPMENT BLANK)

Lab Sample ID: 400-219528-8

Date Collected: 05/05/22 09:00

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 11:59	NET	TAL PEN

Client Sample ID: O-63

Lab Sample ID: 400-219528-9

Date Collected: 05/05/22 09:47

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:01	NET	TAL PEN

Client Sample ID: O-63 (EQUIPMENT BLANK)

Lab Sample ID: 400-219528-10

Date Collected: 05/05/22 09:51

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:02	NET	TAL PEN

Client Sample ID: O-64

Lab Sample ID: 400-219528-11

Date Collected: 05/05/22 10:24

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:04	NET	TAL PEN

Client Sample ID: O-64 (EQUIPMENT BLANK)

Lab Sample ID: 400-219528-12

Date Collected: 05/05/22 00:01

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:16	NET	TAL PEN

Client Sample ID: O-81

Lab Sample ID: 400-219528-13

Date Collected: 05/04/22 13:17

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:17	NET	TAL PEN

Client Sample ID: O-81 (EQUIPMENT BLANK)

Lab Sample ID: 400-219528-14

Date Collected: 05/04/22 13:21

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576905	05/09/22 11:27	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:19	NET	TAL PEN

Client Sample ID: O-82

Lab Sample ID: 400-219528-15

Date Collected: 05/04/22 13:26

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:25	NET	TAL PEN

Client Sample ID: O-82 (EQUIPMENT BLANK)

Lab Sample ID: 400-219528-16

Date Collected: 05/04/22 13:30

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:36	NET	TAL PEN

Client Sample ID: O-83

Lab Sample ID: 400-219528-17

Date Collected: 05/05/22 12:28

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:38	NET	TAL PEN

Client Sample ID: O-83 (EQUIPMENT BLANK)

Lab Sample ID: 400-219528-18

Date Collected: 05/05/22 12:32

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:40	NET	TAL PEN

Client Sample ID: O-84

Lab Sample ID: 400-219528-19

Date Collected: 05/05/22 11:51

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:42	NET	TAL PEN

Client Sample ID: O-84 (EQUIPMENT BLANK)

Lab Sample ID: 400-219528-20

Date Collected: 05/05/22 11:55

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:44	NET	TAL PEN

Client Sample ID: DUPLICATE

Lab Sample ID: 400-219528-21

Date Collected: 05/05/22 10:24

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:46	NET	TAL PEN

Client Sample ID: FIELD BLANK #1

Lab Sample ID: 400-219528-22

Date Collected: 05/04/22 09:53

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:47	NET	TAL PEN

Client Sample ID: FIELD BLANK #2

Lab Sample ID: 400-219528-23

Date Collected: 05/05/22 07:50

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:49	NET	TAL PEN

Client Sample ID: FIELD SPIKE

Lab Sample ID: 400-219528-24

Date Collected: 05/04/22 09:50

Matrix: Water

Date Received: 05/05/22 16:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			576909	05/09/22 12:12	NET	TAL PEN
Total/NA	Analysis	7470A		1	577105	05/10/22 12:55	NET	TAL PEN

Laboratory References:

TAL PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Eurofins Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-110957-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@et.eurofinsus.com	State of Origin:	Page: Page 1 of 3
Company: Akzo Nobel	PWSID:	Analysis Requested		Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No			
Phone: 251-679-4315(Tel)	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			Other:

400-219528 COC

Sample Identification TEST AMERICA INC. 700 - MOBILE	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-59	5-4-22	1100	G	Water			1		
O-59 (Equipment Blank)		1104		Water					
O-60		1200		Water					
O-60 (Equipment Blank)		1204		Water					
O-61		1151		Water					
O-61 (Equipment Blank)	5/4/22	1154		Water					
O-62	5/5/22	0856		Water					
O-62 (Equipment Blank)		0900		Water					
O-63		0947		Water					
O-63 (Equipment Blank)		0951		Water					
O-64	5/5/22	1024	G	Water			1		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	5/5/22 1410	Southern		5-5-22 1410	
2		5.5.22 1430			5/5/22 1430	BEST
3		5/5/22 1620	BEST		5-5-22 1620	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 0.0°C IR9

Ver: 06/08/2021

Page 13 of 15

5/11/2022

Eurofins Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-110957-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@et.eurofinsus.com	State of Origin:	Page: Page 2 of 3
Company: Akzo Nobel	PWSID:			Job #:

Analysis Requested

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:		
City: Axis	TAT Requested (days):		
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No		
Phone: 251-679-4315(Tel)	PO #: 4100001642		
Email: sylvia.williams@akzonobel.com	WO #:		
Project Name: AKZO - Semiannual Hg	Project #: 40003052		
Site: TEST AMERICA INC. 700 - MOBILE	SSOW#:		

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	[illegible]/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	5-5-22		G	Water			✓		
O-81	5-4-22	1317		Water					
O-81 (Equipment Blank)		1321		Water					
O-82		1326		Water					
O-82 (Equipment Blank)	5-4-22	1330		Water					
O-83	5-5-22	1228		Water					
O-83 (Equipment Blank)		1232		Water					
O-84		1151		Water					
O-84 (Equipment Blank)		1155		Water					
Duplicate O-64	5-5-22	1024		Water					
Field Blank #1	5-4-22	0953	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	5/5/22 1410	SOUTHERN		5.5.22 1410	
2		5.5.22 1430			5/5/22 1430	TESTS
3		5/5/22 1620	TESTS		5-5-22 1620	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

5/11/2022

Eurofins Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-110957-21846.3
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@et.eurofinsus.com	State of Origin:	Page: Page 3 of 3
Company: Akzo Nobel	PWSID:			Job #:

Analysis Requested

Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:
City: Axis	TAT Requested (days):
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No
Phone: 251-679-4315(Tel)	PO #: 4100001642
Email: sylvia.williams@akzonobel.com	WO #:
Project Name: AKZO - Semiannual Hg	Project #: 40003052
Site:	SSOW#:

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

TEST AMERICA INC.
700 - MOBILE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Ww=water, Sw=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
Field Blank #2	5-5-22	0750	G	Water			✓		
MS	5-5-22	1024	↓	Water			↓		
MSD	5-5-22	1024	↓	Water			↓		
Field Spike	5-4-22	0950	G	Water			✓		
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brian Kittrell	5/5/22 1410	Southern		5 5 22 1410	
2		5 5 22 1430			5/5/22 1580	EDTS
3		5/5/22 1620	EDTS		5-5-22/1620	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

November 2022 Analytical Results

eurofins | Environment Testing

1 2 3 4 5 6 7

ANALYTICAL REPORT

PREPARED FOR

Attn: Angelia Simonton
Nouryon Functional Chemicals, LLC
13440 Highway 43 North
Axis, Alabama 36505

Generated 12/2/2022 4:29:43 PM

JOB DESCRIPTION

Semiannual Hg

JOB NUMBER

400-229271-1

Eurofins Pensacola
3355 McLemore Drive
Pensacola FL 32514

See page two for job notes and contact information.

my EOL

Eurofins Pensacola

Job Notes

The test results in this report meet all NELAP requirements for accredited parameters, unless otherwise noted, and relate only to the referenced samples. Pursuant to NELAP, this report may not be reproduced, except in full, without written approval from the laboratory. For questions please contact the Project Manager at the e-mail address listed on this page, or the telephone number at the bottom of the page. Eurofins Environment Testing Southeast LLC, Pensacola Certifications and Approvals: Alabama (40150), Arizona (AZ0710), Arkansas (88-0689), Florida (E81010), Illinois (200041), Iowa (367), Kansas (E-10253), Kentucky UST (53), Louisiana (30748), Maryland (233), Massachusetts (M-FL094), Michigan (9912), New Hampshire (250510), New Jersey (FL006), North Carolina (314), Oklahoma (9810), Pennsylvania (68-00467), Rhode Island (LAO00307), South Carolina (96026), Tennessee (TN02907), Texas (T104704286-10-2), Virginia (00008), Washington (C2043), West Virginia (136), USDA Foreign Soil Permit (P330-08-00006).

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization

Generated
12/2/2022 4:29:43 PM

Authorized for release by
Taylor Bruzzio, Project Manager I
Taylor.Bruzzio@et.eurofinsus.com
(850)471-6226

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 400-229271-1

Laboratory: Eurofins Pensacola

Narrative

Job Narrative
400-229271-1

Receipt

The samples were received on 11/18/2022 3:30 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 4.1°C

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Client Sample ID: O-59 — **Lab Sample ID: 400-229271-1**
Date Collected: 11/17/22 08:36 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:39	1

Client Sample ID: O-59 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-2**
Date Collected: 11/17/22 08:38 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:40	1

Client Sample ID: O-60 — **Lab Sample ID: 400-229271-3**
Date Collected: 11/17/22 09:06 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:41	1

Client Sample ID: O-60 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-4**
Date Collected: 11/17/22 09:08 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:43	1

Client Sample ID: O-61 — **Lab Sample ID: 400-229271-5**
Date Collected: 11/17/22 09:36 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:44	1

Client Sample ID: O-61 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-6**
Date Collected: 11/17/22 09:38 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:45	1

Client Sample ID: O-62 — **Lab Sample ID: 400-229271-7**
Date Collected: 11/17/22 12:27 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:46	1

Client Sample ID: O-62 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-8**
Date Collected: 11/17/22 12:29 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:47	1

Client Sample ID: O-63 — **Lab Sample ID: 400-229271-9**
Date Collected: 11/17/22 12:54 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.00027**		0.00020		mg/L		11/28/22 12:26	12/02/22 11:51	1

Client Sample ID: O-63 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-10**
Date Collected: 11/17/22 12:56 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:52	1

Client Sample ID: O-64 — **Lab Sample ID: 400-229271-11**
Date Collected: 11/17/22 13:19 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:54	1

Client Sample ID: O-64 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-12**
Date Collected: 11/17/22 13:21 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:58	1

Client Sample ID: O-81 — **Lab Sample ID: 400-229271-13**
Date Collected: 11/17/22 10:13 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 12:00	1

Client Sample ID: O-81 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-14**
Date Collected: 11/17/22 10:15 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 12:01	1

Client Sample ID: O-82 — **Lab Sample ID: 400-229271-15**
Date Collected: 11/17/22 10:36 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00023		0.00020		mg/L		11/28/22 12:26	12/02/22 12:02	1

Client Sample ID: O-82 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-16**
Date Collected: 11/17/22 10:38 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 12:06	1

Client Sample ID: O-83 — **Lab Sample ID: 400-229271-17**
Date Collected: 11/17/22 11:57 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 12:07	1

Client Sample ID: O-83 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-18**
Date Collected: 11/17/22 11:59 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 12:08	1

Client Sample ID: O-84 — **Lab Sample ID: 400-229271-19**
Date Collected: 11/17/22 11:31 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 12:09	1

Client Sample ID: O-84 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-20**
Date Collected: 11/17/22 11:33 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 12:10	1

Client Sample ID: DUPLICATE O-64 — **Lab Sample ID: 400-229271-21**
Date Collected: 11/17/22 13:19 — **Matrix: Water**
Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:28	12/02/22 13:00	1

Client Sample ID: FIELD BLANK #1 — **Lab Sample ID: 400-229271-22**

Date Collected: 11/17/22 07:30 — **Matrix: Water**

Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:28	12/02/22 13:04	1

Client Sample ID: FIELD SPIKE — **Lab Sample ID: 400-229271-23**

Date Collected: 11/17/22 07:35 — **Matrix: Water**

Date Received: 11/18/22 15:30

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:22	12/02/22 12:14	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 400-602528/14-A
Matrix: Water
Analysis Batch: 603275

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 602528

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:22	12/02/22 12:12	1

Lab Sample ID: LCS 400-602528/15-A
Matrix: Water
Analysis Batch: 603275

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 602528

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00101	0.00103		mg/L		102	80 - 120

Lab Sample ID: MB 400-602529/14-A
Matrix: Water
Analysis Batch: 603275

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 602529

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:26	12/02/22 11:37	1

Lab Sample ID: LCS 400-602529/15-A
Matrix: Water
Analysis Batch: 603275

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 602529

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00101	0.000960		mg/L		95	80 - 120

Lab Sample ID: 400-229271-11 MS
Matrix: Water
Analysis Batch: 603275

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 602529

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.00020		0.00201	0.00202		mg/L		100	80 - 120

Lab Sample ID: 400-229271-11 MSD
Matrix: Water
Analysis Batch: 603275

Client Sample ID: O-64
Prep Type: Total/NA
Prep Batch: 602529

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.00020		0.00201	0.00199		mg/L		99	80 - 120	1	20

Lab Sample ID: MB 400-602530/14-A
Matrix: Water
Analysis Batch: 603275

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 602530

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.00020		0.00020		mg/L		11/28/22 12:28	12/02/22 12:57	1

Lab Sample ID: LCS 400-602530/15-A
Matrix: Water
Analysis Batch: 603275

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 602530

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00101	0.000950		mg/L		94	80 - 120

Client Sample ID: O-59 — **Lab Sample ID: 400-229271-1**
Date Collected: 11/17/22 08:36 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:39

Client Sample ID: O-59 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-2**
Date Collected: 11/17/22 08:38 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:40

Client Sample ID: O-60 — **Lab Sample ID: 400-229271-3**
Date Collected: 11/17/22 09:06 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:41

Client Sample ID: O-60 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-4**
Date Collected: 11/17/22 09:08 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:43

Client Sample ID: O-61 — **Lab Sample ID: 400-229271-5**
Date Collected: 11/17/22 09:36 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:44

Client Sample ID: O-61 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-6**
Date Collected: 11/17/22 09:38 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:45

Client Sample ID: O-62 — **Lab Sample ID: 400-229271-7**
Date Collected: 11/17/22 12:27 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 ¹
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:46

Client Sample ID: O-62 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-8**
Date Collected: 11/17/22 12:29 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 ¹
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:47

Client Sample ID: O-63 — **Lab Sample ID: 400-229271-9**
Date Collected: 11/17/22 12:54 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 ¹
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:51

Client Sample ID: O-63 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-10**
Date Collected: 11/17/22 12:56 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 ¹
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:52

Client Sample ID: O-64 — **Lab Sample ID: 400-229271-11**
Date Collected: 11/17/22 13:19 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 ¹
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:54

Client Sample ID: O-64 (EQUIPMENT BLANK) — **Lab Sample ID: 400-229271-12**
Date Collected: 11/17/22 13:21 — **Matrix: Water**
Date Received: 11/18/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 ¹
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 11:58

Client Sample ID: O-81
Date Collected: 11/17/22 10:13
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:00

Client Sample ID: O-81 (EQUIPMENT BLANK)
Date Collected: 11/17/22 10:15
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-14
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:01

Client Sample ID: O-82
Date Collected: 11/17/22 10:36
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:02

Client Sample ID: O-82 (EQUIPMENT BLANK)
Date Collected: 11/17/22 10:38
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-16
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:06

Client Sample ID: O-83
Date Collected: 11/17/22 11:57
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-17
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:07

Client Sample ID: O-83 (EQUIPMENT BLANK)
Date Collected: 11/17/22 11:59
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:08

Client Sample ID: O-84
Date Collected: 11/17/22 11:31
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:09

Client Sample ID: O-84 (EQUIPMENT BLANK)
Date Collected: 11/17/22 11:33
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602529	NET	EET PEN	11/28/22 12:26 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:10

Client Sample ID: DUPLICATE O-64
Date Collected: 11/17/22 13:19
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-21
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602530	NET	EET PEN	11/28/22 12:28 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 13:00

Client Sample ID: FIELD BLANK #1
Date Collected: 11/17/22 07:30
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-22
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602530	NET	EET PEN	11/28/22 12:28 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 13:04

Client Sample ID: FIELD SPIKE
Date Collected: 11/17/22 07:35
Date Received: 11/18/22 15:30

Lab Sample ID: 400-229271-23
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			602528	NET	EET PEN	11/28/22 12:22 - 11/28/22 16:00 [1]
Total/NA	Analysis	7470A		1	603275	NET	EET PEN	12/02/22 12:14

[1] Completion dates and times are reported or not reported per method requirements or individual lab discretion.

Laboratory References:

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Eurofins Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: BRIAN LITTRELL	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-115240-21846.1
Client Contact: Ms. Sylvia Williams	Phone: 257-591-0601	E-Mail: Taylor.Bruzzio@et.eurofinsus.com	State of Origin:	Page: Page 1 of 5
Company: Akzo Nobel	PWSID:	Analysis Requested		Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify), Other:
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No			
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	D	X	
O-59	11/17/22	0836	G	Water			✓		
O-59 (Equipment Blank)		0833		Water					
O-60		0906		Water					
O-60 (Equipment Blank)		0903		Water					
O-61		0936		Water					
O-61 (Equipment Blank)		0938		Water					
O-62		1227		Water					
O-62 (Equipment Blank)		1229		Water					
O-63		1254		Water					
O-63 (Equipment Blank)		1256		Water					
O-64	11/17/22	1314	G	Water			✓		

400-229271 COC

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Brian Littrell	11/17/22 1500	Eurofins	M. Padgett	11/17/22 1500	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				11/18/22 1400	EPES
Relinquished by:	Date/Time: 11/18/22 1530	Company EPES	Received by:	Date/Time: 11-18-22 1538	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 4 - 1°C IR#1

Ver: 06/08/2021

Eurofins Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: Brian Kitterell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-115240-21846.2
Client Contact: Ms. Sylvia Williams	Phone: 337-591-0601	E-Mail: Taylor.Bruzzio@et.eurofinsus.com	State of Origin:	Page: Page 2 of 5
Company: Akzo Nobel	PWSID:			Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No			
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify), Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
O-64 (Equipment Blank)	11/17/22	1321	G	Water			✓		
O-81		1013		Water					
O-81 (Equipment Blank)		1015		Water					
O-82		1036		Water					
O-82 (Equipment Blank)		1038		Water					
O-83		1157		Water					
O-83 (Equipment Blank)		1159		Water					
O-84		1131		Water					
O-84 (Equipment Blank)		1133		Water					
Duplicate O-64		1319		Water					
Field Blank #1	11/17/22	0735	G	Water			✓		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Brian Kitterell	11/17/22 1500		M. Podgett	11/17/22 1500	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				11/18/22 1400	EAS
Relinquished by:	Date/Time: 11/18/22 1530	Company EAS	Received by:	Date/Time: 11-18-22 1530	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Eurofins Pensacola
3355 McLemore Drive
Pensacola, FL 32514
Phone: 850-474-1001 Fax: 850-478-2671

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler: Brian Kittrell	Lab PM: Bruzzio, Taylor M	Carrier Tracking No(s):	COC No: 400-115240-21846.3
Client Contact: Ms. Sylvia Williams	Phone: 251-591-0601	E-Mail: Taylor.Bruzzio@et.eurofinsus.com	State of Origin:	Page: Page 3 of 5
Company: Akzo Nobel	PWSID:			Job #:
Address: Akzo Nobel Functional Chemical 13440 Highway 43 North	Due Date Requested:			
City: Axis	TAT Requested (days):			
State, Zip: AL, 36505	Compliance Project: Δ Yes Δ No			
Phone:	PO #: 4100001642			
Email: sylvia.williams@akzonobel.com	WO #:			
Project Name: AKZO - Semiannual Hg	Project #: 40003052			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	7470A - Mercury	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	D	X	
Field Blank #2				Water					
MS 0.64	11-17-22	1314		Water			✓		
MSD 0.64	11-17-22	1319		Water			✓		
Field Spike	11-17-22	0735		Water			✓		
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					
				Water					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Brian Kittrell	11/17/22 1300		M. Padgett	11/17/22 1500	
2		Date/Time:	Company	Received by:	Date/Time: 11/18/22 1600	Company EES
3	Relinquished by:	Date/Time: 11/18/22 1530	Company EES	Received by:	Date/Time: 11-18-22 0530	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Appendix A-8

Solid Waste Management Units Information

Appendix A-8 List of SWMUs and AOCs with Descriptions

SWMU or AOC Number and Description
SWMU 1-Old Carbon Tetrachloride Wastewater Treatment Pond
SWMU 2-New Carbon Tetrachloride Plant Wastewater Treatment Pond
SWMU 3-Old Carbon Disulfide Plant Wastewater Treatment Pond
SWMU 4-Old Chlorine Plant Wastewater Treatment Pond
SWMU 5-Old Chlorine Plant Stormwater Treatment Pond
SWMU 6-Chlorine Plant North Check Pond
SWMU 7-Chlorine Plant South Check Pond
SWMU 8-Old Brine Mud Pond
SWMU 9-New Brine Mud Pond
SWMU 10-Sulfuric Acid WWP
SWMU 11-Groundwater Improvement Pond
SWMU 12-Old Firewater Pond
SWMU 13-Unnamed Tributary
SWMU 14-LeCreek Wastewater Treatment Pond
SWMU 15-LeCreek Outlet Effluent Treatment Tank
SWMU 16-LeCreek Inlet Effluent Treatment Tank
SWMU 17-Carbon Tetrachloride Plant Effluent Treater Pit
SWMU 18-Carbon Tetrachloride Plant Effluent Treater Tank A
SWMU 19-Carbon Tetrachloride Plant Effluent Treater Tank B
SWMU 20-Carbon Disulfide Plant Oil Retention Pit
SWMU 21-Carbon Disulfide Plant Still Bottoms Tank
SWMU 22-Chlorine Plant 640 Pit
SWMU 23-Chlorine Plant 645 Pit
SWMU 24- Chlorine Plant 650 Pit
SWMUs 25-28- Chlorine Plant Mercury System Wastewater Collection Tanks A-D
SWMU 29-Chlorine Plant Leaf Filters East
SWMU 30-Chlorine Plant Leaf Filters West
SWMU 31-Chlorine Plant Surge Tank A
SWMU 32-Chlorine Plant Surge Tank B
SWMU 33- Chlorine Plant Half-Million Gallon Storage Tank A
SWMU 34- Chlorine Plant Half-Million Gallon Storage Tank B
SWMU 35- Brine Mud Slurry Pit
SWMU 36- Brine Mud Slurry Tank

Appendix A-8 List of SWMUs and AOCs with Descriptions

SWMU or AOC Number and Description
SWMU 37- Brine Mud Holding Tank
SWMU 38- Brine Mud Treatment Tank
SWMU 39- Brine Mud Filter Building
SWMU 40- Sulfuric Acid Plant Neutralization Pit
SWMU 41-Sulfuric Acid Plant Neutralization Tank
SWMU 42- Crystex Plant Wastewater Pit
SWMU 43- Sulfur Chlorides Plant Wastewater Sump
SWMU 44- Vapam Plant Sump
SWMU 45- Fume Incinerator
SWMU 46- LeMoyne Landfill
SWMU 47- LeMoyne Swamp
SWMU 58- Main Hazardous Waste Storage Area
SWMU 59- Chlorine Plant Hazardous Waste Accumulation Area
SWMU 60- Vapam Plant Hazardous Waste Accumulation Area
SWMU 61-Crystex Plant Hazardous Waste Accumulation Area
SWMU 62-Former Laboratory Hazardous Waste Accumulation Area
SWMU 63- Former Paint Shop Hazardous Waste Accumulation Area
SWMU 64- Former Sulfuric Acid Plant Hazardous Waste Accumulation Area
SWMU 65- Old Grain Fumigant Drum Storage Area
SWMU 66- Crystex Plant Drum Storage Area
SWMU 67- Former Sulfuric Acid Plant Warehouse Drum Storage Area
SWMU 68- Scrubber Slowdown Distillate Drum
SWMU 69- Former Laboratory Solid Waste Accumulation Area
SWMU 70- Carbon Tetrachloride Plant Waste Accumulation Area
SWMU 71 - Former Sulfur Storage Area
SWMU 72- Parking Area Hazardous Waste Dumpsters
SWMU 73- Brine Mud Filter Building Hazardous Waste Dumpsters
SWMU 74- Solid Waste Dumpsters
SWMU 75--Sulfuric Acid Plant Demister
SWMU 76-Vapam Plant Scrubber A
SWMU 77- Vapam Plant Scrubber B
SWMU 78- Sulfur Chlorides Plant Railcar Loading/Unloading Scrubber
SWMU 79-Carbon Tetrachloride Plant Process Scrubber

Appendix A-8 List of SWMUs and AOCs with Descriptions

SWMU or AOC Number and Description
SWMU 80-Carbon Tetrachloride Plant Maintenance Scrubber
SWMU 81- Purafil Unit
SWMU 82 Mercury Cell House Sumps
SWMU 83- Chlorine Plant Check Ponds Carbon Adsorption Unit A
SWMU 84- Chlorine Plant Check Ponds Carbon Adsorption Unit B
SWMU 85- Chlorine Plant Check Ponds Carbon Adsorption Unit C
SWMU 86- Chlorine Plant Check Ponds Carbon Adsorption Unit D
SWMU 87- Chlorine Plant Check Ponds Carbon Adsorption Unit E
SWMU 88 - Chlorine Plant Cell House Carbon Adsorption Units A
SWMU 89- Chlorine Plant Cell House Carbon Adsorption Units B
SWMU 90- LeMoyne Swamp Sulfur Spill Area
SWMU 91-LeMoyne Landfill Sulfur Spill Area
SWMU 92-Carbon Tetrachloride Storage Tank C Moat
SWMU 93-Sulfur Pipeline
SWMU 94- Acid Pipeline to Courtaulds
SWMU 95- Used Equipment Storage Yard
SWMU 96-Scrap Vent Pipe Storage Area
SWMU 97-Old Carbon Disulfide Pond Debris Area
SWMU 98-LeMoyne Landfill Debris Area
SWMU 99-Main Maintenance Shop Pipe Storage Area
SWMU 100-Indoor Waste Oil Storage Area A
SWMU 101-Indoor Waste Oil Storage Area B
SWMU 102-Indoor Waste Oil Storage Area C
SWMU 103-Indoor Waste Oil Storage Area D
SWMU 104-Carbon Tetrachloride Plant Hazardous Waste Accumulation Area
SWMU 105-Vapam Plant Tanker Truck Loading Area (same as AOC J-4)
SWMU 106-Vapam Plant Collection Tank
SWMU 107-Vapam Plant Railcar Loading/Unloading Area (same as AOC I-5)
SWMU 108- Crystex® Plant Sewage Collection Pit
SWMU 109-Sulfuric Acid Pipeline
SWMU 110-Caustic Line Near Salt House
SWMU 111-Sulfuric Acid Plant Railcar Washing Station Collection Box
SWMU 112-Chlorine Plant Railcar Washing Station Collection Box

Appendix A-8 List of SWMUs and AOCs with Descriptions

SWMU or AOC Number and Description
SWMU 113-Sulfur Chlorides Plant Railcar Washing Station Collection Box
SWMU 114- Skimmed Waste Oil Collection Area A
SWMU 115- Skimmed Waste Oil Collection Area B
SWMU 116- Skimmed Waste Oil Collection Area C
SWMU 117- Crystex® Plant Paint Building Drains
SWMU 118- Crystex® Plant Cooling Tower Blowdown Area Drains
SWMU 119- Crystex® Plant Carbon Disulfide Decanter Area Drains
SWMU 120- Crystex® Plant Bagging Area Drains
SWMU 121- Crystex® Plant Miscellaneous Drains
SWMU 122- Crystex® Plant Sanitary Drains
SWMU 123-Vapam Plant Cooling Tower Blowdown Area Drains
SWMU 124-Vapam Plant Miscellaneous Drains
SWMU 125-Sulfur Chloride Plant Miscellaneous Drains
SWMU 126-Sulfuric Acid Plant Final Product Storage Area Drains
SWMU 127-Sulfuric Acid Plant Cooling Tower Blowdown Area Drains
SWMU 128-Sulfuric Acid Plant Miscellaneous Drains
SWMU 129-Carbon Disulfide Plant Purification Area Drains
SWMU 130-Carbon Disulfide Plant Miscellaneous Drains
SWMU 131-Carbon Tetrachloride Plant Sulfur Recovery Area Drains
SWMU 132-Carbon Tetrachloride Plant Flume System Area Drains
SWMU 133-Carbon Tetrachloride Plant Purification Area Drains
SWMU 134-Carbon Tetrachloride Plant Miscellaneous Drains
SWMU 135-Chlorine Plant Neutralizer Area Drains
SWMU 136-Chlorine Plant Miscellaneous Drains
SWMU 138 A- Stormwater and Other Process Drain Pipes SA-Trench A
SWMU 138 B- Stormwater and Other Process Drain Pipes SA-Trench B
SWMU 138 C- Stormwater and Other Process Drain Pipes SA-Trench C
SWMU 138 D- Stormwater and Other Process Drain Pipes-SAWP
SWMU 138 E- Stormwater and Other Process Drain Pipes UT
SWMU 139-Chlorine Plant Brine Mud Dumpster Area
SWMU140-Cold Creek Swamp
SWMU 141-Main Maintenance Shop Asbestos Gaskets and Aerosol Can Collection Drum
SWMU 142 A--Acid Shop Parts Cleaner

Appendix A-8 List of SWMUs and AOCs with Descriptions

SWMU or AOC Number and Description
SWMU 142 B--Main Shop Parts Cleaner
SWMU 142 C- Crystex® Shop Parts Cleaner
SWMU 142 D-- Chlorine Shop Parts Cleaner
SWMU 143-Current Paint Shop Satellite Accumulation Area
SWMU 144- Crystex® Dust Collection System Baghouse
SWMU 145 -Used Battery Storage Area
SWMU 146-Carbon Disulfide Pump Pad Release
SWMU 147- MCA Plant Trash Compactor
SWMU 148-Sulfur Chlorides Area Scrubber Wastewater Sump
SWMU 149-Carbon Disulfide Isocontainer Loading Area
SWMU 150- Groundwater Intercept Wells (7) and Ancillary Piping
SWMU 151-Current Laboratory Satellite Accumulation Area
SWMU 152 A and B-Sulfuric Acid Temporary Neutralization Tank and Roll-off Box Areas
SWMU 153-D009 Roll off Storage Area
SWMU 154-Used Bulb Storage Area
SWMU 155-Carbon Disulfide Railcar Blowoff Tank Wastewater Sump
SWMU 156- Crystex® Vacuum System Baghouse
SWMU 157- < 90 Day Hazardous Waste Storage Area
AOC A-Carbon Disulfide Transfer Tanks Area
AOC B-Former Halby Plant Demolition
AOC C-Carbon Tetrachloride Plant Demolition
AOC D-Chlorine Plant Demolition
AOC E-Paint Shop Spill Area
AOC F-Painting Area East
AOC F-Painting Area West
AOC G- Underground Storage Tanks (1-3)
AOC H-New Firewater Pond
AOC I-1) Railcar Loading/Unloading Area sulfuric acid
AOC I-2) Railcar Loading/Unloading Area carbon disulfide, sulfur chlorides, and carbon tetrachloride
AOC I-3) Railcar Loading/Unloading Area Caustic and chlorine,
AOC I-4) Railcar Loading/Unloading Area Crystex®
AOC I-5) Railcar Loading/Unloading Area Vapam (same as SWMU 107)
AOC J-1) Sulfuric acid tanker truck loading/unloading area

Appendix A-8 List of SWMUs and AOCs with Descriptions

SWMU or AOC Number and Description
AOC J-2) Carbon tetrachloride tanker truck loading/unloading area
AOC J-3) Sulfur Tanker Truck Unloading Area (also AOC N)
AOC J-4) Vapam tanker truck loading/unloading area (also SWMU 105)
AOC J-5) Carbon disulfide tanker truck loading/unloading area
AOC K-Former Dock Loading/Unloading Area
AOC L-Former Drum Loading/Unloading Area
AOC M-Carbon Disulfide Vertical Storage Tank #4 Area
AOC N-Sulfur Tanker Truck Unloading Areas Same as AOC J-3)

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
SWMU 1	OLD CARBON TETRACHLORIDE PLANT WASTEWATER TREATMENT POND
SWMU 2	NEW CARBON TETRACHLORIDE PLANT WASTEWATER TREATMENT POND
SWMU 3	OLD CARBON DISULFIDE PLANT WASTEWATER TREATMENT POND
SWMU 4	OLD CHLORINE PLANT WASTEWATER TREATMENT POND
SWMU 5	OLD CHLORINE PLANT STORMWATER TREATMENT POND
SWMU 8	OLD BRINE MUD POND
SWMU 9	NEW BRINE MUD POND
SWMU 10	SULFURIC ACID PLANT WASTEWATER POND
SWMU 12	OLD FIREWATER POND
SWMU 13	UNNAMED TRIBUTARY
SWMU 14	LeCREEK WASTEWATER TREATMENT POND
SWMU 15	LeCREEK OUTLET EFFLUENT TREATMENT TANK
SWMU 16	LeCREEK INLET EFFLUENT TREATMENT TANK
SWMU 17	CARBON TETRACHLORIDE PLANT EFFLUENT TREATER PIT
SWMU 18	CARBON TETRACHLORIDE PLANT EFFLUENT TREATER TANK A
SWMU 19	CARBON TETRACHLORIDE PLANT EFFLUENT TREATER TANK B
SWMU 20	CARBON DISULFIDE PLANT OIL RETENTION PIT
SWMU 21	CARBON DISULFIDE PLANT STILL BOTTOMS TANK
SWMU 40	SULFURIC ACID PLANT NEUTRALIZATION PIT
SWMU 41	SULFURIC ACID PLANT NEUTRALIZATION TANK
SWMU 42	CRYSTEX® PLANT WASTEWATER PIT
SWMU 43	SULFUR CHLORIDES PLANT WASTEWATER SUMP
SWMU 44	VAPAM PLANT SUMP
SWMU 45	FUME INCINERATOR
SWMU 48	FORMER HALBY PLANT TREATMENT POND
SWMUs 49-53	FORMER HALBY PLANT SUMPS A-E
SWMU 54	FORMER HALBY PLANT UNDERGROUND TANK
SWMU 55	FORMER HALBY PLANT UNDERGROUND TANK
SWMU 56	FORMER HALBY PLANT OPEN TRENCH
SWMU 57	FORMER HALBY PLANT SEPTIC TANK AND ASSOCIATED DRAINAGE FIELD
SWMU 58	MAIN HAZARDOUS WASTE STORAGE AREA
SWMU 60	VAPAM PLANT HAZARDOUS WASTE ACCUMULATION AREA
SWMU 61	CRYSTEX® PLANT HAZARDOUS WASTE ACCUMULATION AREA
SWMU 62	FORMER LAB HAZARDOUS WASTE ACCUMULATION AREA
SWMU 63	FORMER PAINT SHOP HAZARDOUS WASTE ACCUMULATION AREA
SWMU 64	FORMER SULFURIC ACID PLANT HAZARDOUS WASTE ACCUMULATION AREA
SWMU 65	OLD GRAIN FUMIGANT DRUM STORAGE AREA
SWMU 66	CRYSTEX® PLANT DRUM STORAGE AREA
SWMU 67	FORMER SULFURIC ACID PLANT WAREHOUSE DRUM STORAGE AREA
SWMU 68	SCRUBBER BLOWDOWN DISTILLATE DRUM
SWMU 69	FORMER LABORATORY SOLID WASTE ACCUMULATION AREA
SWMU 70	CARBON TETRACHLORIDE PLANT WASTE ACCUMULATION AREA
SWMU 71	FORMER SULFUR STORAGE AREA
SWMU 72	PARKING AREA HAZARDOUS WASTE DUMPSTERS
SWMU 74	SOLID WASTE DUMPSTERS
74-A)	NEAR SULFUR CHLORIDE/CARBON DISULFIDE AREA
74-B)	GENERAL PLANT USE
74-C)	MAINTENANCE SHOP METALS
74-D)	CRYSTEX DUMPSTER
74-E)	MCA PLANT DUMPSTER
SWMU 75	SULFURIC ACID PLANT DEMISTER
SWMUs 76-77	VAPAM PLANT SCRUBBERS A AND B
SWMU 78	SULFUR CHLORIDES PLANT RAILCAR LOADING/UNLOADING SCRUBBER
SWMU 79	CARBON TETRACHLORIDE PLANT PROCESS SCRUBBER
SWMU 80	CARBON TETRACHLORIDE PLANT MAINTENANCE SCRUBBER
SWMU 92	CARBON TETRACHLORIDE STORAGE TANK C MOAT
SWMU 93	SULFUR PIPELINE
SWMU 94	ACID PIPELINE TO COURTAULDS
SWMU 95	USED EQUIPMENT STORAGE YARD
SWMU 96	SCRAP VENT PIPE STORAGE AREA
SWMU 97	OLD CARBON DISULFIDE POND DEBRIS AREA
SWMU 99	MAIN MAINTENANCE SHOP PIPE STORAGE AREA
SWMU 101	INDOOR WASTE OIL STORAGE AREA B
SWMU 102	INDOOR WASTE OIL STORAGE AREA C
SWMU 103	INDOOR WASTE OIL STORAGE AREA D
SWMU 104	CARBON TETRACHLORIDE PLANT HAZARDOUS WASTE ACCUMULATION AREA
SWMU 105	VAPAM PLANT TANKER TRUCK LOADING AREA (SAME AS AOC J-4)
SWMU 106	VAPAM PLANT COLLECTION TANK
SWMU 107	VAPAM PLANT TANKER TRUCK LOADING AREA (SAME AS AOC I-5)
SWMU 108	CRYSTEX® PLANT SEWAGE COLLECTION PIT
SWMU 109	SULFURIC ACID PIPELINE
SWMU 110	CAUSTIC LINE NEAR SALT HOUSE
SWMU 111	SULFURIC ACID PLANT RAILCAR WASHING STATION COLLECTION BOX
SWMU 112	CHLORINE PLANT RAILCAR WASHING STATION COLLECTION BOX
SWMU 113	SULFUR CHLORIDES PLANT RAIL CAR WASHING STATION COLLECTION BOX
SWMU 115	SKIMMED WASTE OIL COLLECTION AREA B
SWMU 116	SKIMMED WASTE OIL COLLECTION AREA C
SWMU 122	CRYSTEX® PLANT SANITARY DRAINS
SWMU 129	CARBON DISULFIDE PLANT PURIFICATION AREA DRAINS
SWMU 130	CARBON DISULFIDE PLANT MISCELLANEOUS DRAINS
SWMU 131	CARBON TETRACHLORIDE PLANT SULFUR RECOVERY AREA DRAINS
SWMU 138	STORMWATER AND OTHER PROCESS DRAIN PIPES
138-A)	SA TRENCH A
138-B)	SA TRENCH B
138-C)	SA TRENCH C
138-D)	SAWP (JUST EAST OF SWMU 10)
138-E)	UT (BETWEEN SEGMENTS OF SWMU 13)
SWMU 140	COLD CREEK SWAMP
SWMU 141	MAIN MAINTENANCE SHOP ASBESTOS GASKETS AND AEROSOL CAN COLLECTION DRUMS
142-A)	ACID SHOP PARTS CLEANER
142-B)	MAIN SHOP PARTS CLEANER
142-C)	CRYSTEX® SHOP PARTS CLEANER
SWMU 143	CURRENT PAINT SHOP SATELLITE ACCUMULATION AREA
SWMU 144	CRYSTEX® DUST COLLECTION SYSTEM BAGHOUSE
SWMU 145	USED BATTERY STORAGE AREA
SWMU 146	CARBON DISULFIDE PUMP PAD RELEASE
SWMU 147	MCA PLANT TRASH COMPACTOR
SWMU 148	SULFUR CHLORIDES AREA SCRUBBER WASTEWATER SUMP
SWMU 149	CARBON DISULFIDE ISOCONTAINER LOADING AREA
SWMU 150	GROUNDWATER INTERCEPT WELLS (7) AND ANCILLARY PIPING
150-A)	IW 1
150-B)	IW 2
150-C)	IW 3
150-E)	IW 5
150-F)	IW 6 AND IW 6R
SWMU 151	CURRENT LABORATORY SATELLITE ACCUMULATION AREA
SWMUs 152-A AND 152-B	SULFURIC ACID TEMPORARY NEUTRALIZATION TANK AND ROLL OFF BOX AREAS
SWMU 155	CARBON DISULFIDE RAILCAR BLOWOFF WASTEWATER SUMP
SWMU 156	CRYSTEX® VACUUM SYSTEM BAGHOUSE
SWMU 157	<90 DAY HAZARDOUS WASTE STORAGE AREA
AOC A	CARBON DISULFIDE TRANSFER TANKS AREA
AOC B	FORMER HALBY PLANT DEMOLITION
AOC C	CARBON TETRACHLORIDE PLANT DEMOLITION
AOC D	CHLORINE PLANT DEMOLITION
AOC E	PAINT SHOP SPILL AREA
AOC F	PAINTING AREAS
AOC-F-1)	EAST (JUST NORTHEAST OF SWMU 2)
AOC-F-2)	WEST (JUST SOUTH OF SWMU 95)
AOC G	UNDERGROUND STORAGE TANKS
AOC-G-1)	NORTH OF THE CARBON TETRACHLORIDE STORAGE TANKS A AND B
AOC-G-2)	WEST OF THE UPPER MAINTENANCE SHOP
AOC-G-3)	LOCATED IN THE CARBON DISULFIDE PLANT, POSSIBLY NEAR THE METHANE PURIFICATION UNIT
AOC H	NEW FIREWATER POND

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN, CONT.
AOC I	RAILCAR LOADING/UNLOADING AREAS
AOC-I-1)	SULFURIC ACID
AOC-I-2)	CARBON DISULFIDE, SULFUR CHLORIDES, AND CARBON TETRACHLORIDE
AOC-I-3)	CAUSTIC AND CHLORINE
AOC-I-4)	CRYSTEX®
AOC-I-5)	VAPAM (SAME AS SWMU 107)
AOC J	TANKER TRUCK LOADING/UNLOADING AREAS
AOC-J-1)	SULFURIC ACID TANKER TRUCK LOADING/UNLOADING AREA
AOC-J-2)	CARBON TETRACHLORIDE
AOC-J-3)	SULFUR TANKER TRUCK UNLOADING AREA (ALSO AOC N)
AOC-J-4)	VAPAM (ALSO SWMU 105)
AOC-J-5)	CARBON DISULFIDE LOADING/UNLOADING AREA
AOC L	FORMER DRUM LOADING/UNLOADING AREA
AOC M	CARBON DISULFIDE VERTICAL STORAGE TANK #4 AREA
AOC N	SULFUR TANKER TRUCK UNLOADING AREA (SAME AS AOC J-3)

LEGEND

- OUTFALL
- SOLID WASTE MANAGEMENT UNIT
- BUILDING
- RAILROAD
- SURFACE WATER FEATURE
- CRYSTEX SANITARY DRAIN LINE
- PROPERTY LINE
- FENCE

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   RCRA = RESOURCE CONSERVATION AND RECOVERY ACT
3. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET
4. BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY, ACCESSED 8/1/2024

(R-10/23/2024)

0 160 320 480 640
GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

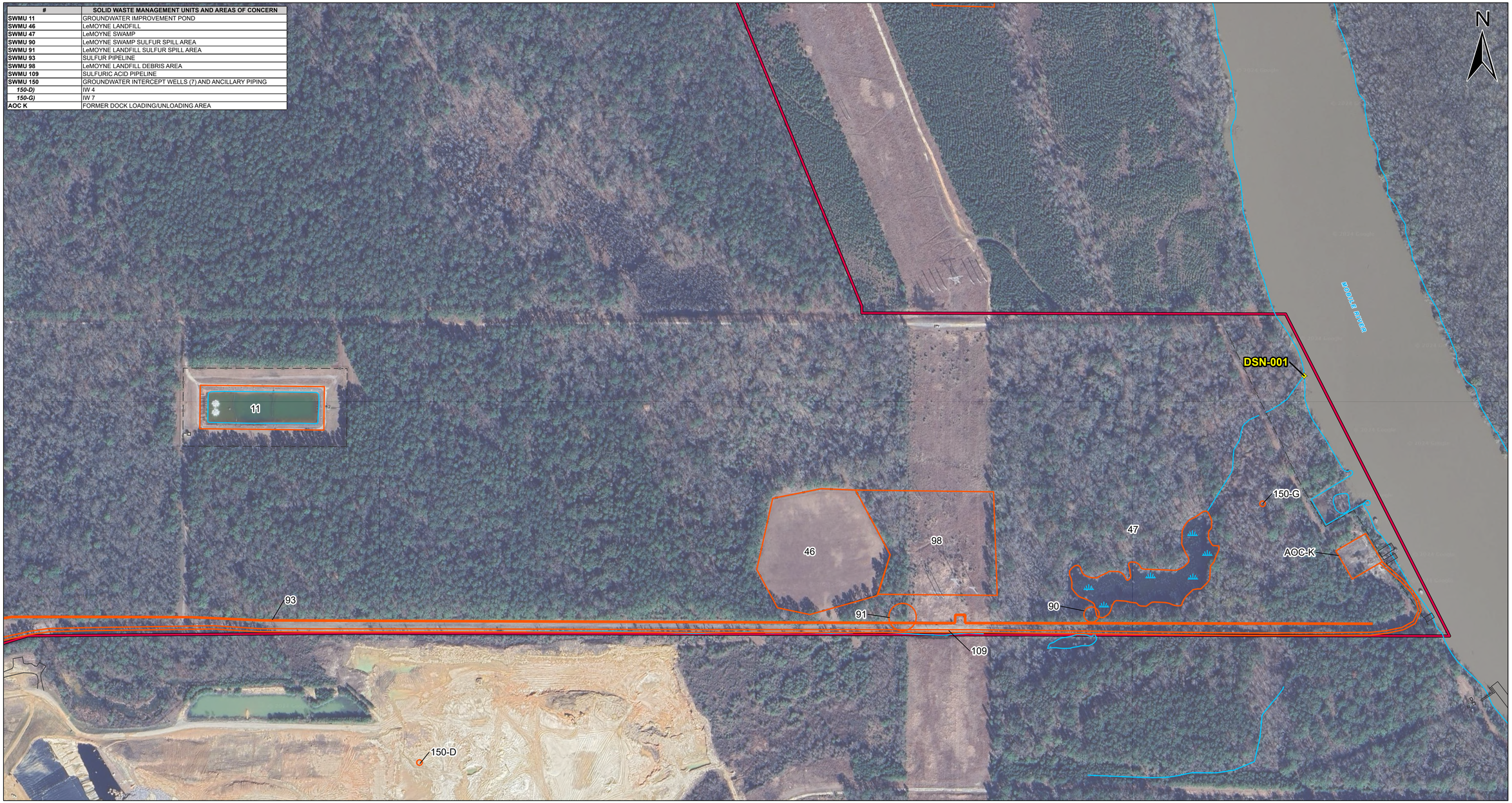
SOLID WASTE MANAGEMENT UNIT LOCATIONS - SITE WEST

ARCADIS

FIGURE
2-1A

Path: T:_ENV\Nouryon\LeMoynePlant_ALL\Pro_Figures\PIN Response\PIN_Response_2023 aprx\F2-1A_SWMU_LOCATIONS_WEST_34x22 Last Saved By: ACarlone 8/1/2024

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
SWMU 11	GROUNDWATER IMPROVEMENT POND
SWMU 46	LeMOYNE LANDFILL
SWMU 47	LeMOYNE SWAMP
SWMU 90	LeMOYNE SWAMP SULFUR SPILL AREA
SWMU 91	LeMOYNE LANDFILL SULFUR SPILL AREA
SWMU 93	SULFUR PIPELINE
SWMU 98	LeMOYNE LANDFILL DEBRIS AREA
SWMU 109	SULFURIC ACID PIPELINE
SWMU 150	GROUNDWATER INTERCEPT WELLS (7) AND ANCILLARY PIPING
150-D)	IW 4
150-G)	IW 7
AOC K	FORMER DOCK LOADING/UNLOADING AREA



LEGEND

- OUTFALL
- SOLID WASTE MANAGEMENT UNIT
- BUILDING
- RAILROAD
- SURFACE WATER FEATURE
- PROPERTY LINE
- FENCE

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   RCRA = RESOURCE CONSERVATION AND RECOVERY ACT
3. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET
4. BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY, ACCESSED 5/14/2024

(R-10/23/2024)

0 200 400 600 800
GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

SOLID WASTE MANAGEMENT UNIT LOCATIONS - SITE EAST

ARCADIS

FIGURE
2-1B

Path: T:_ENV\Nouryon\LeMoynePlant_ALI\Pro_Figures\PIN Response\PIN_Response_2023 aprx\F2-1B_SWMU_LOCATIONS_EAST_34x22 Last Saved By: ACarlone 5/14/2024

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
SWMU 140	COLD CREEK SWAMP

140

DSN-001
DSN-002
DSN-003
DSN-004
DSN-005
DSN-006
DSN-007
DSN-008
DSN-009
DSN-010
DSN-011

MOBILE RIVER

N

LEGEND

- SOLID WASTE MANAGEMENT UNIT
- BUILDING
- RAILROAD
- SURFACE WATER FEATURE
- PROPERTY LINE
- FENCE

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   RCRA = RESOURCE CONSERVATION AND RECOVERY ACT
3. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET
4. BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY, ACCESSED 4/22/2024

(R-10/23/2024)

0 750 1,500 2,250 3,000

GRAPHIC SCALE IN FEET

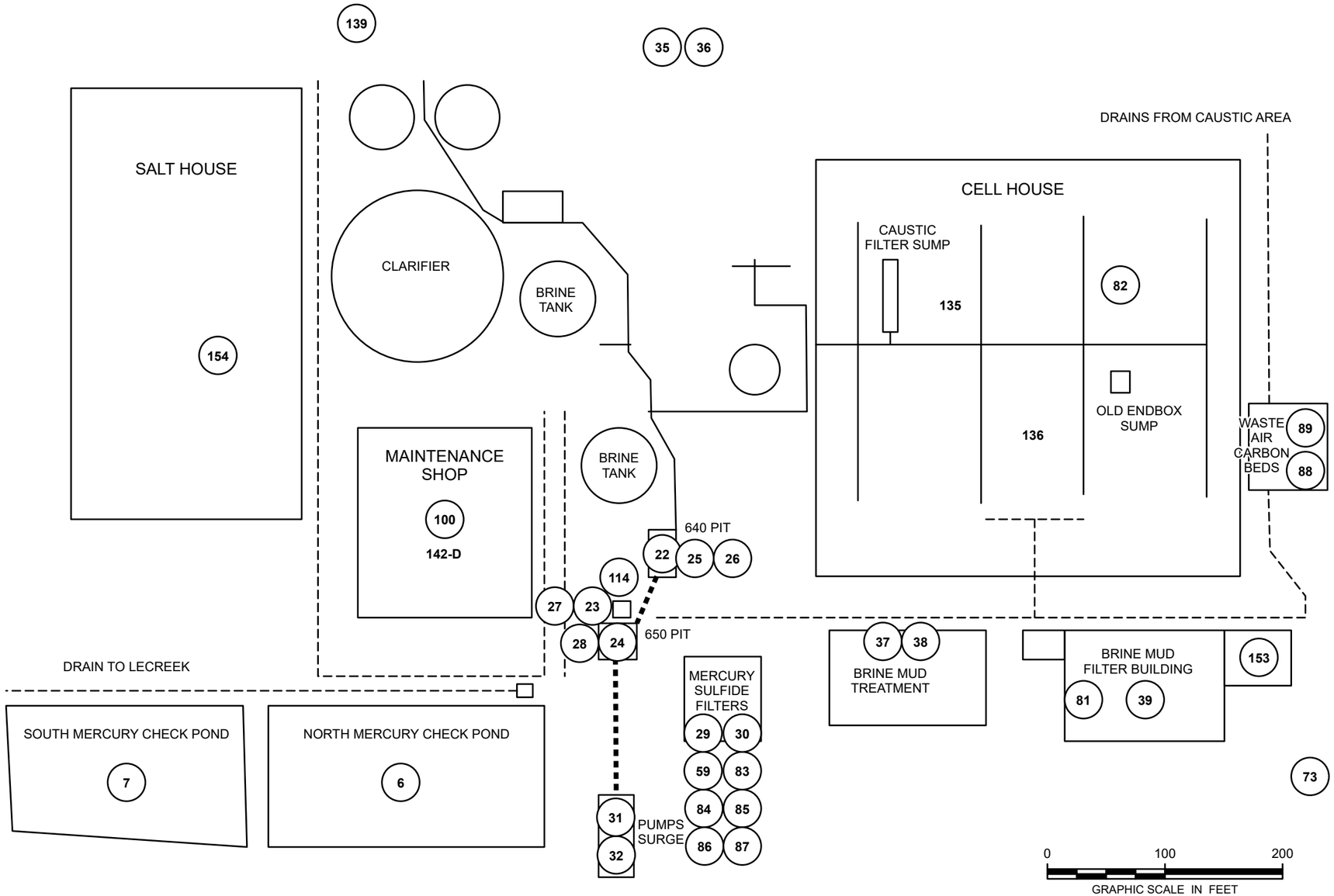
NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

SOLID WASTE MANAGEMENT UNIT LOCATIONS - SITE NORTH

ARCADIS

FIGURE
2-1C

Path: T:_ENV\Nouryon\LeMoynePlant_ALPro_Figures\PIN Response\PIN_Response_2023.aprx\F2-1C_SWMU_LOCATIONS_NORTH_34x22 Last Saved By: ACarlone 4/22/2024



SWMU LEGEND

6. CHLORINE PLANT NORTH CHECK POND
7. CHLORINE PLANT SOUTH CHECK POND
22. CHLORINE PLANT 640 PIT
23. CHLORINE PLANT 645 PIT
24. CHLORINE PLANT 650 PIT
25. CHLORINE PLANT MERCURY SYSTEM TREATMENT TANK A
26. CHLORINE PLANT MERCURY SYSTEM TREATMENT TANK B
27. CHLORINE PLANT MERCURY SYSTEM TREATMENT TANK C
28. CHLORINE PLANT MERCURY SYSTEM TREATMENT TANK D
29. CHLORINE PLANT LEAF FILTER EAST
30. CHLORINE PLANT LEAF FILTER WEST
31. CHLORINE PLANT SURGE TANK A
32. CHLORINE PLANT SURGE TANK B
35. BRINE MUD SLURRY PIT
36. BRINE MUD SLURRY TANK (RETROFITTED TO SWMU 35)
37. BRINE MUD HOLDING TANK
38. BRINE MUD TREATMENT TANK
39. BRINE MUD FILTER BUILDING
59. CHLORINE PLANT HAZARDOUS WASTE ACCUMULATION AREA
73. BRINE MUD FILTER BUILDING HAZARDOUS WASTE DUMPSTERS
81. PURAFIL UNIT
82. MERCURY CELL HOUSE SUMPS
83. CHLORINE PLANT CHECK PONDS CARBON ADSORPTION UNIT A
84. CHLORINE PLANT CHECK PONDS CARBON ADSORPTION UNIT B
85. CHLORINE PLANT CHECK PONDS CARBON ADSORPTION UNIT C
86. CHLORINE PLANT CHECK PONDS CARBON ADSORPTION UNIT D
87. CHLORINE PLANT CHECK PONDS CARBON ADSORPTION UNIT E
88. CHLORINE PLANT CELL HOUSE CARBON ADSORPTION UNIT A
89. CHLORINE PLANT CELL HOUSE CARBON ADSORPTION UNIT B
100. INDOOR WASTE OIL STORAGE AREA A
114. SKIMMED WASTE OIL COLLECTION AREA A
135. CHLORINE PLANT NEUTRALIZER AREA DRAINS
136. CHLORINE PLANT MISCELLANEOUS DRAINS
139. CHLORINE PLANT BRINE MUD DUMPSTER AREA
142-D. CHLORINE SHOP PARTS WASHER
153. D009 ROLL-OFF STORAFE AREA
154. USED BULB STORAGE AREA

NOTES:
1. ALL ABOVE LISTED SWMUs WERE REMOVED DURING THE DEMOLITION OF THE CHLORINE PLANT (AOC D).
2. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

(R-10/23/2024)

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
PIN RESPONSE

CHLORINE PLANT PROCESS DRAIN PIPES

ARCADIS

FIGURE
2-2A

Path: T:_ENV\Nouryon\LeMoynePlant_ALIPro_Figures\PIN Response\PIN_Response_2023.aprx\FX_CHLORINE_PLANT_PROCESS_DRAIN_PI
DRAIN_PIPES_LAYOUT Last Saved By: ACarlone 11/17/2023

LEGEND

- CATCH BASIN
- MANHOLE
- SUMP
- PROCESS DRAIN LINES
- PROCESS DRAIN LINES INSPECTED BY CCTV
- PROCESS TRENCH DRAIN
- PROCESS TRENCH DRAIN VISUALLY INSPECTED
- RAILROAD
- FENCE

N

0 100 200

GRAPHIC SCALE IN FEET

NOTES:
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
SWMU 42	CRYSTEX® PLANT WASTEWATER PIT
SWMU 117	CRYSTEX® PLANT PAINT BUILDING DRAINS
SWMU 118	CRYSTEX® PLANT COOLING TOWER BLOWDOWN AREA DRAINS
SWMU 119	CRYSTEX® PLANT CARBON DISULFIDE DECANTER AREA DRAINS
SWMU 120	CRYSTEX® PLANT BAGGING AREA DRAINS
SWMU 121	CRYSTEX® PLANT MISCELLANEOUS DRAINS
SWMU 122	CRYSTEX® PLANT SANITARY DRAINS

42

CRYSTEX SANITARY (122)

CRYSTEX #2 WASTEWATER PIT

W.E. 22.5

W.E. 22.5

W.E. 22.7

CS-042

CRYSTEX COOLING TOWER (118)

CRYSTEX WAREHOUSE

CRYSTEX CS_2 DECANTER (119)

CRYSTEX UTILITIES (117)

EOLN

CRYSTEX BAGGING AREA (120)

TRENCH DRAIN

CRYSTEX OIL STORAGE (121)

CRYSTEX RAILCAR UNLOADING (121)

CS-001 CS-002 CS-003 CS-004 CS-005 CS-006 CS-007 CS-008 CS-009 CS-011 CS-012 CS-013 CS-014 CS-015 CS-016 CS-017 CS-018 CS-019 CS-020 CS-021 CS-022 CS-023 CS-024 CS-025 CS-026 CS-027 CS-028 CS-029 CS-030 CS-031 CS-032 CS-033 CS-034 CS-035 CS-037 CS-038 CS-039 CS-040 CS-041

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
PIN RESPONSE

(R-10/23/2024)

CRYSTEX PLANT PROCESS DRAIN PIPES

ARCADIS

FIGURE
2-2B

Path: T:_ENV\Nouryon\LeMoynePlant_ALIPro_Figures\PIN Response\PIN_Response_2023.aprx\F2-2B_CRYSTEX_PLANT_PROCESS_DRAIN_PIPES_LAYOUT Last Saved By: ACarbone 4/22/2024

LEGEND

- CATCH BASIN
- MANHOLE
- SUMP
- NON-PROCESS DRAIN LINES
- PROCESS DRAIN LINES
- PROCESS DRAIN LINES INSPECTED BY CCTV
- PROCESS TRENCH DRAIN
- PROCESS TRENCH DRAIN VISUALLY INSPECTED
- RAILROAD
- FENCE

N

0 50 100

GRAPHIC SCALE IN FEET

NOTES:
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
SWMU 129	CARBON DISULFIDE PLANT PURIFICATION AREA DRAINS
SWMU 130	CARBON DISULFIDE PLANT MISCELLANEOUS DRAINS
SWMU 131	CARBON TETRACHLORIDE PLANT SULFUR RECOVERY AREA DRAINS

CS_2 MISCELLANEOUS (130)

CS_2 PURIFICATION (129)

CCl_4 RECOVERY (131)

A B C D E F G H I J K L

CS2-001 CS2-002 CS2-003 (VAULT) CS2-004 CS2-005

CS2 SUMP

PIPING NOT FOUND (RECORD DRAWING)

PIPING NOT FOUND (RECORD DRAWING)

20

(R-10/23/2024)

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
PIN RESPONSE

CARBON DISULFIDE PLANT PROCESS DRAIN PIPES AND TRENCHES

ARCADIS

FIGURE **2-2C**

Path: T:_ENV\Nouryon\LeMoynePlant_ALIPro_Figures\PIN Response\PIN_Response_2023.aprx\F2-2C_CS2_PLANT_PROCESS_DRAIN_PIPES_LAYOUT Last Saved By: ACarlone 4/22/2024

LEGEND

- CATCH BASIN
- MANHOLE
- SUMP
- PROCESS DRAIN LINES
- PROCESS DRAIN LINES INSPECTED BY CCTV
- PROCESS TRENCH DRAIN
- PROCESS TRENCH DRAIN VISUALLY INSPECTED
- RAILROAD
- FENCE

N

0 50 100

GRAPHIC SCALE IN FEET

NOTES:
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
SWMU 123	VAPAM PLANT COOLING TOWER BLOWDOWN AREA DRAINS
SWMU 124	VAPAM PLANT MISCELLANEOUS DRAINS
SWMU 126	SULFURIC ACID PLANT FINAL PRODUCT STORAGE AREA DRAINS
SWMU 127	SULFURIC ACID PLANT COOLING TOWER BLOWDOWN AREA DRAINS
SWMU 128	SULFURIC ACID PLANT MISCELLANEOUS DRAINS
SWMU 138	STORMWATER AND OTHER PROCESS DRAIN PIPES
138-A)	SA TRENCH A
138-B)	SA TRENCH B
138-C)	SA TRENCH C

SULFURIC ACID PRODUCT STORAGE (126)

VAPUM COOLING TOWER (123)

VAPUM MISCELLANEOUS (124)

SULFURIC ACID PRODUCT STORAGE (126)

SULFURIC ACID MISCELLANEOUS (128)

SULFURIC ACID COOLING/TOWER BLOWDOWN (127)

SULFURIC ACID NEUTRALIZATION PIT

SA TRENCH A (SWMU 138-A)

SA TRENCH B (SWMU 138-B)

SA TRENCH C (SWMU 138-C)

SA TRENCH D

SA TRENCH E

SA TRENCH F

SA TRENCH G

SWALE

(R-10/23/2024)

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
PIN RESPONSE

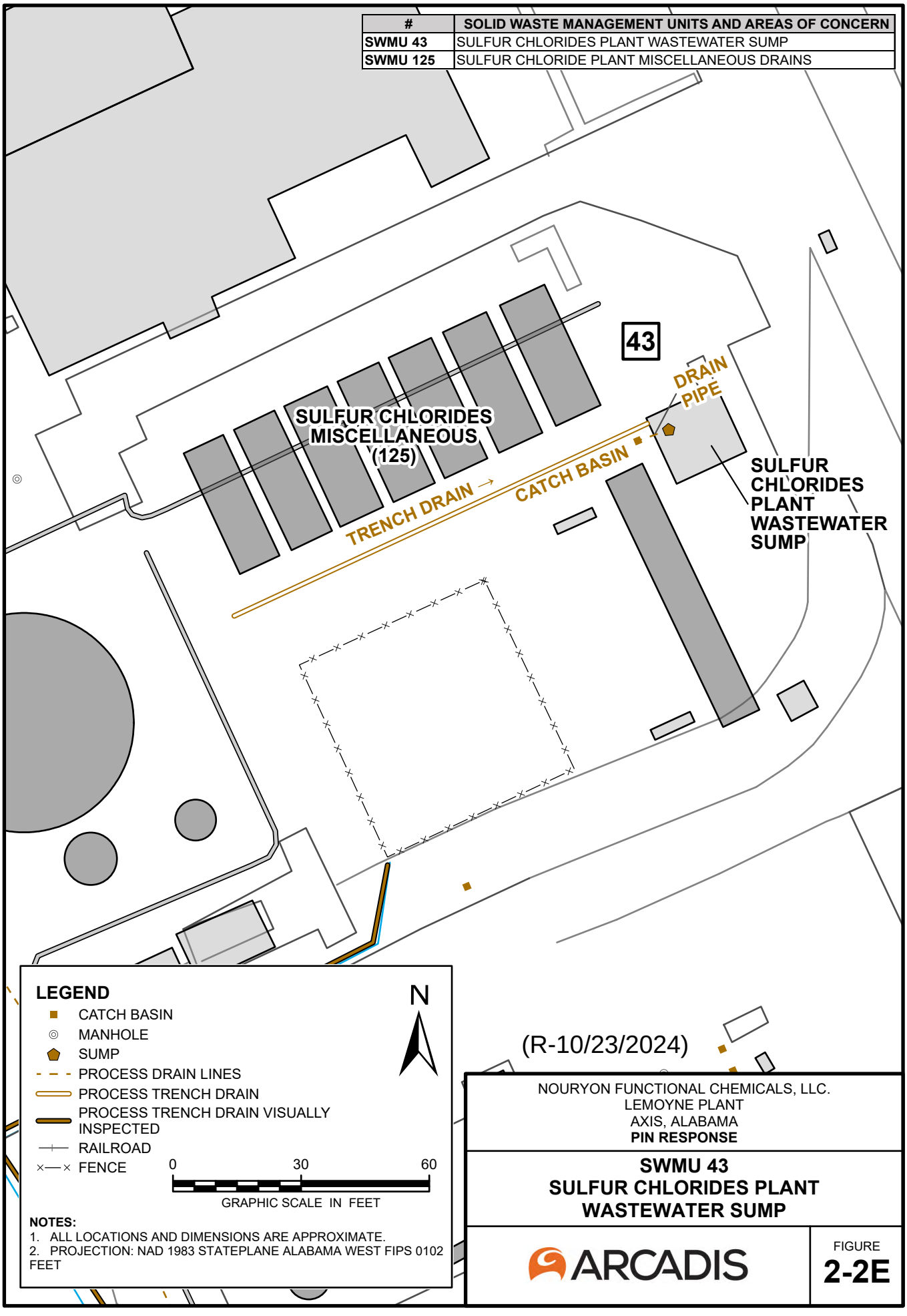
SULFURIC ACID PLANT PROCESS DRAIN PIPES

ARCADIS

FIGURE
2-2D

Path: T:_ENV\Nouryon\LeMoynePlant_ALPro_Figures\PIN Response\PIN_Response_2023.aprx\F2-2D_H2SO4_PLANT_PROCESS_DRAIN_PIPES_LAYOUT Last Saved By: ACarlone 5/14/2024

#	SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN
SWMU 43	SULFUR CHLORIDES PLANT WASTEWATER SUMP
SWMU 125	SULFUR CHLORIDE PLANT MISCELLANEOUS DRAINS



NOTES:
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET

(R-10/23/2024)

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
PIN RESPONSE

SWMU 43
SULFUR CHLORIDES PLANT WASTEWATER SUMP

ARCADIS

FIGURE
2-2E

Path: T:_ENV\Nouryon\LeMoynePlant_AL\Pro_Figures\PIN Response\PIN_Response_2023.aprx\F2-2E_SWMU43_SCL2_WW_SUMP_LAYOUT Last Saved By: ACarlone 4/22/2024

Appendix A-8 Addendum

Hazardous Waste Generation and Processes

Nouryon Chemicals, LLC

LeMoyne Plant

October 23, 2024

(R-10/23/2024)

Attachment A-8 Addendum

Hazardous Waste Generation and Processes

October 23, 2024

Prepared By:
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United States
Phone: 205 930 5700

Prepared For:
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1 **Process Diagrams**

2 **8700-12 Notification of Regulated Waste Activity**

Acronyms and Abbreviations

AMSL	Above Mean Sea Level
ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
AHWMMA	Alabama Hazardous Waste Management and Minimization Act
AOC	Area of Concern
AST	Aboveground Storage Tank
BMP	Best Management Practices
CCP	Cold Creek Plant
CCS	Cold Creek Swamp
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CNA	Courtaulds North America
CS2	Carbon Disulfide
DOT	Department of Transportation
EPA	Environmental Protection Agency
ESD	Explanation of Significant Difference
FS	Feasibility Study
GPS	Global Positioning System
H2S	Hydrogen Sulfide
HCC	Halby Chemical Company
IAROD	Interim Action Record of Decision
LP	LeMoyne Plant
MACT	Maximum Achievable Control Technology
MCA	Monochloroacetic Acid
MLSTZ	Middle Lower Swamp Transition Zone
MMA	Methyl Methacrylate
NaSH	Sodium Hydrosulfide
NPDES	National Pollutant Discharge Elimination System
NFA	No Further Action
NPL	National Priorities List
OU	Operable Unit

RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SWMU	Solid Waste Management Unit
UASZ	Upper Arm Swamp Zone
US	United States
USGS	United States Geological Survey
UST	Underground Storage Tank
VSI	Visual Site Inspection

1 History and Processes

1.1 History of Facility

Provide information relative to the history of the facility including former owners, site uses, manufacturing processes used, wastes generated, and existing buildings and/or structures.

Nouryon Functional Chemicals LLC (Nouryon) operates a chemical manufacturing plant at its Axis, Mobile County, Alabama facility ("the Site"). Nouryon owns approximately 650 acres of property situated generally between United States (US) Highway 43 North to the west and the Mobile River to the east. The chemical manufacturing plant is situated on approximately 85 acres located in the west central portion of the 650-acre property. The 85-acre manufacturing plant is covered by process structures, buildings, pavement, grass, and gravel. The property is enclosed within chain link fencing and access is controlled by secured entry gates and 24-hour security personnel. Beyond the 650-acre property, land use is characterized as industrial and forest land. The property is bounded by a former chemical plant (Courtaulds North America, CNA) to the south (this property is currently owned by the Mobile County Industrial Development Board with Lenzig Fibers and EcoSouth/Axis Environmental Landfill beyond the Mobile County Industrial Board property), and to the north by the former Syngenta/Zeneca Agricultural Cold Creek Plant (CCP) and undeveloped property owned by Alabama Power Company beyond CCP.

The Nouryon property was previously owned by Stauffer Chemical Company (Stauffer) which operated the chemical manufacturing plant (LeMoyne Plant) from 1953 until 1987. In 1987, Akzo Chemie America, Inc. (Akzo), which later became Akzo Nobel Chemicals (Akzo Nobel) in 1994, purchased the property and continued to operate the chemical manufacturing plant. In 2018, Akzo Nobel spun off their specialty chemicals business, which became Nouryon. Prior to Zeneca ownership, the property to the north was also owned by Stauffer, which operated the CCP.

Until about 1975, Stauffer discharged wastewaters from the chemical manufacturing processes in clay-lined ponds, some of which discharged to Cold Creek Swamp (CCS). In 1975, a pipeline was constructed to allow processed water to be discharged to the Mobile River. From 1965 to 1974, Stauffer placed waste from the plant into an unlined landfill (the LeMoyne Landfill) on the eastern side of the Site. In 1975, Stauffer closed the LeMoyne Landfill.

From 1965 to 1979, Halby Chemical Company (HCC) leased a portion of land on the western end of the 85-acre LeMoyne Plant from Stauffer and discharged waste into a pond on the southwest part of the HCC manufacturing area (i.e., the former Halby Pond) next to the Norfolk Southern rail line, and eventually into CCS. On November 16, 1972, HCC was purchased by Argus Chemical Corporation, a subsidiary of Witco Corporation. In 1999, Witco Corporation merged with Crompton & Knowles to form CK Witco. In 2000, CK Witco changed its name to Crompton Corporation. In 2005, Crompton Corporation merged with Great Lakes Chemical Corporation to form Chemtura Corporation.

The Nouryon property is underlain by alluvial deposits consisting of interbedded clay, sand, and gravel. These deposits range in thickness from 130 to 60 feet at the edge of the Mobile River and form the surficial Miocene aquifer, the principal source of water for industries and communities in the Mobile River Valley area. The surficial aquifer has two water-bearing zones. The upper 80 feet has low-to-moderate permeability, with the lowermost

sands containing the most highly permeable material. A dense blue-gray estuarine clay forms the base of the aquifer. Historic operations at the Nouryon site and surrounding industrial properties have affected the surficial aquifer. Constituents in groundwater within the surficial aquifer are primarily within the boundaries of the Nouryon Site but the leading edge of the carbon tetrachloride plume is slightly south of the southern property boundary at the adjacent former CNA chemical manufacturing facility to the south. However, there are no completed exposure pathways because the aquifer is not used for potable water (EPA, 2021). The LeMoyne Public Water Supply System provides water for drinking fountains, bathroom sinks, kitchens, breakrooms, toilets and showers for local businesses including Nouryon.

Before industrialization, the direction of groundwater flow was east toward the Mobile River and the water table ranged from 0 to 20 feet below ground surface. Installation of extraction wells on the CNA property immediately south of Nouryon lowered the water table to between 25 and 75 feet below ground surface. Due to local influence of pumping at the CNA wells and interceptor wells installed during Akzo ownership on the southern part of the Nouryon property, groundwater flowed south to southeast, towards the CNA extraction wells. In early 2002, CNA completely ceased groundwater extraction. The groundwater flow equilibrated and is again flowing east towards the Mobile River. A site layout showing tanks and buildings is provided as **Figure 1-1**.

1.1.1 RCRA History

Stauffer submitted a Resource Conservation and Recovery Act (RCRA) Part A permit application for the hazardous waste management units on November 19, 1980. The United States Environmental Protection Agency (EPA) issued the initial RCRA Hazardous Waste operating permit to Stauffer on October 9, 1986. The Alabama Department of Environmental Management (ADEM) issued an initial RCRA Hazardous Waste operating permit to Akzo in 1988. A total of five minor modifications were made to the permit between 1991 and 1993. In 1992, EPA completed a RCRA Facility Assessment (RFA) at Akzo. A total of 139 Solid Waste Management Units (SWMUs) and 14 Areas of Concern (AOCs) were identified during this assessment. No further action status (NFA) was recommended for 106 SWMUs and 6 AOCs. RFA confirmatory sampling was suggested for 25 SWMUs and 8 AOCs. A RCRA Facility Investigation (RFI) was suggested for an additional 8 SWMUs. Finally, confirmatory sampling was recommended for another 8 SWMUs and 3 AOCs unless adequate demolition and closure documentation could be provided for past closure activities (adequate documentation of proper demolition was provided subsequently for the 8 SWMUs and 3 AOCs).

In a meeting held in August 1992 between the EPA, Akzo, and ICI Americas, it was concluded that the SWMUs identified in the 1992 RFA should be divided into SWMUs that would be addressed under the additional work clause of the Superfund Administrative Order on Consent (i.e., for Operable Unit No. 2) and those that will be addressed under the authority of Akzo's RCRA Corrective Action Permit.

On April 1, 1998, Akzo Nobel applied for a renewal of its RCRA permit. During the permitting process, a second RFA was completed in 2002. A total of 156 SWMUs and 14 AOCs were identified at the Akzo Nobel property as a result of the 2002 RFA. Additional documentation or confirmatory sampling was recommended for 23 SWMUs and 8 AOCs to determine if a release of any hazardous waste and/or hazardous constituents had occurred. Integrity testing was recommended for 32 SWMUs and a RFI was recommended for 1 SWMU and 1 AOC.

ADEM completed a Visual Site Inspection (VSI) and RFA at Akzo Nobel in 2014. Based on the VSI and RFA, 157 SWMUs and 14 AOCs were identified. The recommendations for the SWMUs and AOCs in the 2014 RFA was as follows:

- SWMUs 4, 8, 11, 140 and 150 are being managed by EPA under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) authority.
- SWMU 9 (New Brine Mud Pond) is managed through the facility's ADEM RCRA permit, and the facility should continue to maintain SWMU 9 as required by the ADEM permit.
- No further action (NFA) status was required for SWMUs 1, 2, 3, 5, 6, 7, 10, 12, 13, 17-47, 58-139, 141-149, 151-157, AOCs C-L, and N in the 2014 RFA.
- Corrective Measures for AOCs A and M should continue according to ADEM approved plans. The facility should continue to operate SWMUs 14, 15, and 16 according to the requirements of its Clean Water Act Permit.
- While SMWUs 48-57 and AOC B are being managed by CERCLA, ADEM had no recommendation in 2014 for these units as EPA had not made a final determination on the remediation of these units.

In 2018, a modification to the 2014 permit was completed to provide a modified remedial plan for use of soil vapor extraction (SVE) as the corrective measure at AOC A.

The current listing of SWMUs, AOCs, and current status of each are provided in the Alabama Hazardous Waste Management and Minimization Act (AHWMMA) permit application.

1.1.2 CERCLA History

In December 1978 and May 1979, a Preliminary Assessment and Site Investigation of the Stauffer LeMoyne Landfill (SWMU 46) and Brine Sludge Pond (SWMU 8) were completed by EPA. Mercury was identified as a constituent of concern and a "medium priority" for additional investigation was assigned to both SWMUs. In 1982, the Alabama Department of Public Health (ADPH) and EPA completed an assessment of the Stauffer LeMoyne and Cold Creek sites. Constituents detected in groundwater beneath and downgradient of the sites included metals, chlorides, carbon tetrachloride, and miscellaneous organic compounds. As a result, the Stauffer sites were added to the National Priorities List (NPL) in September 1983.

A Remedial Investigation (RI) and Feasibility (FS) were completed for the LeMoyne Plant (and the adjoining Cold Creek Plant) in 1988. The FS was completed in 1989. EPA issued a Record of Decision (ROD) in 1989 which split the remediation of the sites into three operable units (OU) and identified the suggested remedy for each. A summary of each OU is provided in Sections 1.1.2.1 through 1.1.2.3.

1.1.2.1 OU No. 1-Groundwater

The EPA signed the Record of Decision (ROD) for OU1 in September 1989. The EPA did not formally list remedial action objectives (RAOs) in the September 1989 Record of Decision (ROD). However, the September 1989 ROD states the response actions are to protect public health and the environment by controlling the migration of contaminated groundwater in the surficial aquifer; which is a principal source of water for industrial and domestic users in the Mobile River Valley. The major components selected in the September 1989 ROD include:

- Continued use of existing groundwater intercept and treatment systems at the Stauffer Sites that include a pump-and-treat system at the LeMoyne Plant that includes a groundwater discharge through the air stripper manifold system into the Groundwater Improvement Pond (GWIP, SWMU 11).
- Installation of additional extraction wells.

- Modifications of treatment systems to be determined through pilot-scale tests using in-situ treatment alternatives.
- Installation of detection monitoring wells around the ponds and landfills (previously closed under direction of the Alabama Water Improvement Commission or facility RCRA permits) for contaminant detection purposes.
- Monitoring of effluent, groundwater concentrations and pumping rates.
- Monitoring of surface water discharge to ensure concentration limits specified in the National Pollutant Discharge Elimination System (NPDES) permit are met.
- Implementation of a contingency remedy in case pumping of the CNA wells was terminated.

1.1.2.2 OU No. 2-LeMoyne Plant Source Units

EPA signed the OU2 ROD for the LeMoyne Plant (LP) Site in March 1999 to address subsurface soil at the former Halby Pond. Other source areas such as the LeMoyne Landfill had been closed previously under oversight of the Alabama Water Improvement Commission in 1975. The Old Chlorine Wastewater Pond, and the Old and New Brine Mud Ponds were closed under a RCRA permit in 1988.

Under the RCRA permit, Nouryon is also completing corrective action at two AOCs, including AOC A (also known as the former carbon disulfide transfer tanks area) and AOC M (the vertical carbon disulfide storage tank #4 area). The Remedial Action Objective (RAO) is to prevent contamination from migrating into groundwater, which has potential beneficial use as a drinking water supply. The selected remedy for OU2 at the Site addresses the cleanup of the contaminated subsurface soil at the former Halby Pond. Major remedial components include:

- Institutional controls to restrict construction on the former Halby Pond until subsurface soil performance standards are met and to restrict residential use at the LP Site.
- Construction of a soil flushing system in the former Halby Pond to accelerate the migration of contaminants from subsurface soil into groundwater, where it will be captured and treated by the OU1 groundwater remedy.
- Annual monitoring of subsurface soil in the former Halby Pond for cyanide and thiocyanate to determine if contaminants are moving into the groundwater in a controlled manner where they will be captured and treated by the OU1 groundwater remedy.
- Periodic reporting of annual monitoring results to the EPA.

An updated human health risk assessment for the Halby Portion of OU2 is currently being completed and is expected to be submitted to EPA and ADEM in 2023.

1.1.2.3 OU No. 3-Cold Creek Swamp

The EPA signed the ROD for OU3 in September 1993 to select a remedy to address mercury contamination in Cold Creek Swam (CCS) sediment. The EPA issued an Explanation of Significant Differences (ESD) in May 1996 to remove the September 1993 ROD requirement for a levee between the CCS and the Mobile River. In addition, the ESD included a requirement for long-term monitoring for CCS. In September 2010, the EPA issued an Interim Amended ROD (IAROD) for OU3 requiring the use of a new capping technology that was not available for consideration when the EPA issued the September 1993 OU3 ROD. The IAROD also included revised cleanup goals for fish tissue. The ESD and IAROD resulted in less habitat destruction during cleanup of sediment contamination. The RAOs listed in the September 2010 IAROD include:

- Reduce concentrations of contaminants in sediments in the CCS to levels that are protective of ecological receptors.
- Prevent continued migration of contaminants from the Upper Arm Swamp Zone (UASZ) to the Middle Lower Swamp Transition Zone (MLSTZ) and the Mobile River.
- Prevent exposure to contaminants in sediments in the UASZ above levels that pose an unacceptable risk to ecological receptors.
- Reduce contaminant levels in fish tissue to levels that are protective of ecological consumers.

The major components of the remedy include:

- Construction of an in-situ cap to isolate the contaminated sediments in the UASZ.
- Installation of water level controls in the UASZ to maintain current pool conditions.
- Wetland mitigation to compensate for the temporary or permanent loss of wetlands due to the use of in-situ capping technology.
- Implementation of a monitoring and assessment program in the CCS to determine if, following capping, natural processes would reduce mercury contamination and associated risk to human health and the environment.
- Institutional controls to prevent future disturbance of the cap and floodplain and swamp areas.

1.2 Present and Former Locations of all Process Units

Closed processes are discussed in Section 1.2.1 and active processes are described in Sections 1.2.2 through 1.2.6. Flow diagrams for processes including materials, wastes, and general operating designs, and the waste management plan for process wastes are provided in **Attachment 1**.

1.2.1 Closed Processes

This subsection provides a brief description of the processes at Nouryon which are closed. A more thorough description of each process can be found in the 2002 and 2014 RFA documents.

1.2.1.1 Carbon Tetrachloride Plant

The Carbon Tetrachloride Plant included spent polishing filters; wastewater from process washdowns and rainwater; neutralizer stripper effluent from the carbon tetrachloride purification process; and sulfur spoils, wash water, fume system water, and hydrochloric acid from the sulfur purification process. The plant ceased operation in July 1991. The Carbon Tetrachloride Plant Demolition (AOC C) was completed in 1992.

1.2.1.2 Chlorine Plant

The Chlorine Plant began operation in 1964. The Chlorine Plant produced chlorine for use as a raw material in the manufacture of carbon tetrachloride. The raw materials used in the chlorine manufacturing process were salt, brine, mercury, and water. The process started with a brine preparation and purification step. The filtered brine then flowed to the mercury cell house where it was depleted by electrolysis in the mercury cells to produce sodium amalgam and chlorine gas. The chlorine gas was then cooled, dried with sulfuric acid, and compressed before being piped to the Carbon Tetrachloride Plant. If the Carbon Tetrachloride Plant was shut down for any

reason, the chlorine gas was liquefied and stored in three chlorine tanks. The Chlorine Plant closed in 1991 and the Chlorine Plant demolition (AOC D) was completed in 1992.

1.2.1.3 Grain Fumigant and Aroid Plant

From the late 1960s until 1986, Stauffer manufactured two grain fumigants and Aroid® in the area where the Old Grain Fumigant Drum Storage Area (SWMU 65) was located. Aroid® was produced from carbon disulfide and oil, and at least one of the grain fumigants consisted of 80 percent carbon tetrachloride and 20 percent carbon disulfide. The fumigants were mixed in tanks and shipped off-site from the Railcar Loading/Unloading Areas (AOC I). The two types of grain fumigants manufactured were Max High Life® and FIA 80-20®.

1.2.1.4 Halby Plant

The Halby Plant, which operated from 1965 until 1979, produced dye chemicals, including sodium hydrosulfide. Although little information is available concerning Halby Plant operations, it is known that waste products and effluents were held in an onsite pond, referred to as the Former Halby Plant Treatment Pond (SWMU 48). The Former Halby Plant Demolition (AOC B) is located in the northwest corner of the 85-acre manufacturing area.

1.2.1.5 Vapam Plant

The Vapam Plant began operating in 1985. It produced Vapam (metam sodium, a soil fumigant) and the proprietary product GY-81® by the same process. The plant also periodically manufactured Enzone®. The Vapam process required methyl methacrylate (MMA), water, carbon disulfide, and a 50 percent caustic solution. In addition to these raw materials, the GY-81® process also required sulfur and hydrogen sulfide. Carbon disulfide was piped to the Vapam Plant from the Carbon Disulfide Plant, and caustic (sodium hydroxide) was piped from storage tanks that were originally sourced from the Chlorine Plant until its closure and later from external suppliers. The raw materials were mixed in a reactor to produce a concentrated form of Vapam. Water from the Vapam Plant Collection Tank (SWMU 106) was added to the reactor to dilute the solution; then the pH was adjusted, excess carbon disulfide removed, and the air was vented to the Vapam Plant Scrubbers A and B (SWMUs 76 and 77). The diluted Vapam was filtered before the final product was loaded at either the Vapam Plant Railcar Loading/Unloading Area (SWMU 107) or the Vapam Plant Tanker Truck Loading Area (SWMU 105). Wastes generated by the Vapam Plant include spills and rainwater collected in the Vapam Plant Sump (SWMU 44) and the Vapam Plant Railcar Loading/Unloading Area (SWMU 107), spills and washdown water, non-contact cooling tower blowdown, water from draining the Vapam Plant Scrubbers A and B (SWMUs 76 and 77) and spent filter cartridges. The Vapam Plant was taken out of service in 1995.

1.2.2 Active Processes

This subsection provides a detailed description of the processes at Nouryon which are currently operational. Process diagrams including waste generation and waste codes are provided in **Attachment 1**. Process locations and waste generation points are shown on **Figure 1-1**, and SWMU locations (waste management points of the process descriptions are shown on figures in **Appendix A-8**.

1.2.2.1 Carbon Disulfide Process

The Carbon Disulfide (CS2) manufacturing unit operates as a continuous process with a maximum permitted capacity of 350 tons per day or 127,750 tons per year. This unit was originally constructed in 1953 and redesigned in 1956 to operate as a continuous stream process. The continuous stream process includes the following five major process areas: carbon disulfide reaction, sulfur condensation, oil absorption, purification, and the Claus sulfur recovery unit. Carbon disulfide is produced by preheating methane and sulfur and reacting the methane with sulfur in a vapor state. The carbon disulfide chemical reaction is reacted with an excess of sulfur to ensure consumption of the methane with hydrogen sulfide being produced as a by-product of the reaction. The process area and waste generation described in this section are located in the “CS2 Unit” and location “X003” as shown on **Figure 1-1**. A wastewater flow diagram for the carbon disulfide process is provided on **Figure 1-2**. Carbon disulfide process SWMU locations are shown in **Appendix A-8** figures.

The carbon disulfide, hydrogen sulfide, and excess sulfur continuous streams enter the sulfur condensation area and undergo sulfur removal. The stream is cooled and allows for the carbon disulfide and hydrogen sulfide to be separated from the sulfur through condensing and scrubbing methods. The liquid carbon disulfide stream containing trace amounts of hydrogen sulfide is further purified in the purification process. The purification process removes the impurities from the CS2 by separating the CS2 as a finished product and either recycling the impurities or transferring the impurities to the still bottoms tank (SWMU 21).

The uncondensed vapor carbon disulfide and hydrogen sulfide continuous stream enters the oil absorption area where the carbon disulfide vapor is transferred to oil through an oil absorption process. The hydrogen sulfide exits the oil absorption area and is reacted with oxygen in the furnace of a Claus Sulfur Recovery Unit. In this unit the hydrogen sulfide and sulfur dioxide mixture are passed through catalytic conversion units where sulfur is produced in the vapor state, condensed, and collected in the virgin sulfur pit. The tail gases from the sulfur recovery unit, which contain trace amounts of hydrogen sulfide, carbon disulfide, and sulfur, are vented to the Fume Incinerator (SWMU 45).

Sulfur recovered through the Claus Sulfur Recovery Unit operating at a minimum efficiency of 96 percent is reused as raw material. Tail gas from the recovery unit passes through the Fume Incinerator (SWMU 45), converting remaining sulfur compounds to sulfur dioxide which is emitted to the atmosphere.

Finished carbon disulfide product is stored in fixed external roof tanks with internal floating roofs as required by the Maximum Achievable Control Technology (MACT) Standards of the Clean Air Act. There are two CS2 storage tanks, 8T095 (CS2 Vertical 5 Storage Tank) which can hold 1,340,094 gallons and 8T096 (CS2 Vertical 6 Storage Tank) which can hold 1,458,660 gallons. 8T095 is located near SWMU 63 and 8T096 is located at AOC-G-2. The material is then packaged and shipped via railcars (AOC I-2), iso tank containers (SWMU 149), and portable tanks.

The Sodium Hydrosulfide plant utilizes the hydrogen sulfide stream as part of its chemical process that also uses 50 percent caustic solution. Excess hydrogen sulfide returns to the Claus Sulfur recovery unit.

The impurities for disposal generated from the purification area are known as the still bottoms (D001 and D018) contain trace amounts of carbon disulfide, benzene, sulfur, and oil and are periodically transferred to the Still Bottoms Tank (SWMU 21). The Still Bottoms Tank is a less than 90 Day Hazardous Waste Storage Tank. Still bottoms are piped from the tank to a trailer loading station for transfer to an off-site disposal facility (Eco Services in Baton Rouge, Louisiana). Other impurities from CS2 purification process area include H2S and CS2 that are

sent back to the Oil Absorption Area and H2S and Water that are sent to the H2S Water Stripper. The H2S water stripper separates the water and sends it to ORP (SWMU 20) and sends the H2S to the claus sulfur recovery unit.

Carbon disulfide sludges (P022) are generated when the carbon disulfide tanks are cleaned out. These sludges are stored at the less than 90 Day Hazardous Waste Storage Area (SWMU 157) and disposed of off-site as hazardous waste.

Sludges accumulate in the bottom of the Carbon Disulfide Plant Oil Retention Pit (SWMU 20). Periodically, these sludges are removed. The hazardous sludges are stored at the less than 90 Day Hazardous Waste Storage Area (SWMU 157) prior to disposal. If the sludges are non-hazardous, they are drummed and disposed of off-site as non-hazardous waste.

Waste oil from process areas is collected in the Carbon Disulfide Plant Oil Retention Pit (SWMU 20). The oils are removed by a skimmer (SWMU 115) into a drum. When the drum is full, it is placed in storage (located between SWMU 70 and 152B) until shipped off-site for recycling.

Alumina Catalyst used in the Claus Unit converters is replaced each turnaround (approximately every 3-5 years). The waste catalyst is shipped off-site for non-hazardous waste disposal.

Carbon Disulfide Process Waste

The Still Bottoms Tank waste is loaded into a trailer owned by Nouryon and shipped using Safeway. It is shipped to Eco-Services where it is reclaimed. As described in this section, the waste has waste codes D001, D018 and disposal code H050.

Carbon disulfide sludge is generated from tank clean outs or clean up. The sludge is sent to Waste Management Emelle Landfill as long as the carbon disulfide concentration is below the treatment standard. If the carbon disulfide concentration is too high for landfill disposal, then it is incinerated. The waste code is P022.

Oil from the Oil Retention Pit (ORP) is sent to Aaron Oil for recovery and recycling.

Process wastewater is sent to the onsite wastewater treatment plant (LeCreek SWMU 16, 14, 15).

Process drains (SWMU 129, 130) are sent to the oil recover pit (SWMU 20) which sends the water to LeCreek (SWMU 16, 14, 15)

1.2.2.2 Sulfuric Acid Process

The sulfuric acid process operates with a maximum capacity of 850 tons per day. Raw materials used in the process include water, oxygen and sulfur. Air for the process is passed through a drying tower prior to introduction to the sulfur burner. Sulfur for the production of sulfuric acid is stored in a sulfur pit in the Sulfuric Acid Plant. The plant is connected to other on-site plants by supplying steam to the other units. The process area and waste generation described in this section are located in the “H2SO4 Plant” and location “Z005” as shown on **Figure 1-1** and the inset table on the figure. A wastewater flow diagram for the sulfuric acid process is provided on **Figure 1-2**. Sulfuric acid process SWMU locations are shown in the **Appendix A-8** figures.

To make sulfuric acid, the Sulfuric Acid Plant first burns sulfur with oxygen from the dried air to form sulfur dioxide, Carbons Disulfide (CS2) can also be burned with Sulfur to form Sulfur Dioxide. The sulfur dioxide is passed through catalyst beds in the presence of oxygen to produce sulfur trioxide. The sulfur trioxide then passes through an absorbing tower where it is absorbed in a circulating sulfuric acid stream. Water from the site process

well is added to control sulfuric acid strength in the circulating pump tanks for the absorbing tower and drying tower.

The absorbing tower gas stream previously vented to a Sulfuric Acid Plant Demister (SWMU 75) prior to discharging the gas stream to the atmosphere. The plant design was modified in 2017 so the gas stream discharge from the absorbing tower would vent to a hydrogen peroxide scrubber prior to atmospheric discharge. Sulfuric acid is manufactured in varying strengths including 93 percent, 96 percent, and 98 percent through the dilution with water.

Sulfuric acid is stored in tanks at the Sulfuric Acid Plant prior to being loaded and shipped off-site to customers at the Railcar Loading/Unloading Area (AOC I) and the Tanker Truck Loading/Unloading Area (AOC J). The storage tanks include; 4T021 – 93% Acid Storage with a capacity of 537,500 gal, 4T022 – 96% Acid Storage with a capacity of 406,000 gal, 4T023 – 96% Acid Storage with a capacity of 406,000 gal, 4T025 – 93% Acid Storage with a capacity of 537,500 gal, 4T026 – 96% Acid Storage with a capacity of 158,000 gal, 4T027 – 98% Acid Storage with a capacity of 158,000 gal, and 4T029 – 96% Acid Storage with a capacity of 70,000 gal.

Large quantities of steam are generated by the sulfuric acid manufacturing process. This steam is repurposed on-site and used in the Crystex Plant, Carbon Disulfide Plant, Sodium Chlorides Plant, and Sodium Hydrosulfide Plant.

Sulfuric Acid Process Waste

Wastes generated from the Sulfuric Acid Plant include blowdown from the non-contact cooling tower, wash water containing sulfates and solids produced from the drying and absorbing towers during turnarounds, and sludge from the Sulfuric Acid Plant turnarounds.

Prior to 1975, all wastewater generated by the Sulfuric Acid Plant was discharged to natural drainage. Natural drainage for this area of the plant included the Old Firewater Pond (SWMU 12) which drains to the Unnamed Tributary (SWMU 13). In 1976, curbing was installed around the Sulfuric Acid Plant to capture stormwater, washdown water, process water, and spills. Curbing and drains were also installed around the sulfuric acid tank storage area. Starting in 1976, all captured wastewater from the plant area and washdown water from the Sulfuric Acid Plant Railcar Washing Station Collection Box (SWMU 111) was treated in the Sulfuric Acid Plant Neutralization Pit (SWMU 40). In 1985, this unit was replaced by the Sulfuric Acid Plant Neutralization Tank (SWMU 41). The Sulfuric Acid Plant Neutralization Pit and Tank (SWMUs 40, 41) drains to the LeCreek Inlet Effluent Treatment Tank (SWMU 16). The Acid Plant storage area drains (SWMU 126), acid cooling tower blowdown area drains (SWMU 127), acid plant miscellaneous drains (SWMU 127), and stormwater and other process water drain pipes (SWMU 138-SA Trench A,B,C) feed to the neutralization pit (SWMU 41).

Two additional wastewater streams are generated during Sulfuric Acid Plant turnarounds. Acid plant turnaround sludge is generated from cleaning sulfuric acid tanks and turnaround water from the Sulfuric Acid Plant drying and absorbing towers. The acid plant turnaround sludge was treated on-site in the Former Sulfuric Acid Plant Hazardous Waste Accumulation Area (SWMU 64) in the Sulfuric Acid Temporary Neutralization Tank (SWMU 152-A). Due to space constraints, this operation was moved to the sulfur chlorides plant where sludges are currently neutralized (SWMU 152-B). Treatment consists of mixing the acid sludge with soda ash until a neutral pH is reached. The material is placed in a roll off box for storage until transported off-site for disposal.

The wastewater stream from the Sulfuric Acid Plant drying and absorbing towers contains sulfates and solids. The Sulfuric Acid Plant also has a non-contact cooling tower. Since 1975, the blowdown water from this tower has been discharged to the LeCreek Inlet Effluent Treatment Tank (SWMU 16).

If the Sulfuric Acid Plant needs to be started from a cold start, a natural gas pre-heat is used to prepare the system to accept sulfur. This pre-heat phase normally lasts 40 hours and involves raising the temperature of the converter beds to an acceptable level. As a result, the efficiency of the unit is increased during the startup thereby reducing emissions. Once the system reaches proper temperature, the natural gas burners are replaced with sulfur burners and the manufacturing of sulfuric acid begins. On average, this process is performed once per year. Smaller unplanned shutdowns may require 12 hour heat-up cycles and occur approximately 3 times per year.

1.2.2.3 Monochloroacetic Acid Process

The monochloroacetic acid (MCA) unit originally began operating in 1994 as a batch process. The unit was expanded and converted to a semi-continuous operation in 2005. MCA flakes are shipped in supersacks to the LeMoyne facility from other Nouryon facilities including Hengelo in the Netherlands, Taixing in China, and Denak in Japan. The supersacks are offloaded from trucks directly outside the building door and are stored over a concrete floor and racks inside the plant building. The flakes are dissolved in water in a batch system to produce a 70 percent or 80 percent MCA liquid solution for Nouryon customers. MCA fumes from the dissolver, storage tanks, and shipping containers (truck loading) are vented to a scrubber. The MCA Plant Trash Compactor (SWMU 147), installed in December 1996, is used to compact the bags that the flakes are shipped in. Approximately 45,000 pounds of compacted bags are generated annually. The MCA solution is transferred into stationary storage tanks and shipped to customers in trucks. Throughput calculations are based on 80,000,000 pounds per year.

The unit is designed on a zero discharge basis. Vents from the process area, storage tanks, and loading are directed to a scrubber. The scrubber is a once through design and the water is recycled into the process thus eliminating any wastewater discharge. The emission from the scrubber goes out the permitted emission point MC-1

The process area and waste generation described in this section are located in the “MCA Plant” and location “X044” and “X045” as shown on **Figure 1-1** and the inset table on the figure. MCA process area SWMU locations are shown in the **Appendix A-8** figures.

MCA Process Waste

RCRA Empty MCA bags are bags that held the MCA flakes and are determined RCRA empty and disposed of as non-hazardous waste. RCRA empty MCA bags are shipped to Republic Timberland Landfill.

Off Spec Product – This is MCA flakes with damaged bags. The damaged bags cannot be emptied safely into the process. This is hazardous waste that is also sent to Waste Management Emelle Landfill. This is not waste generated during normal conditions. The bags never make it to the process and so this waste stream is not shown on the flow diagram. However in 2023 there were several damaged bags shipped to the LeMoyne Site and had to be disposed of due to the hazards associated with either using the bags or trying to ship them back to the manufacturer.

1.2.2.4 Sodium Hydrosulfide

The Sodium Hydrosulfide (NaSH) manufacturing unit is a continuous process, which was constructed in 2001 and started operations in 2002. Hydrogen Sulfide Gas (H2S) from the Carbon Disulfide (CS2) Unit at the oil absorption area (approximately 98% H2S) is used in the production of NaSH instead of being sent to the Claus Sulfur

Recovery Unit. H2S and 50% Caustic (NaOH) react in the NaSH Reaction Area. Vents from the reactors are sent to the condenser to cool before it is returned back to the existing Claus Sulfur Recovery Unit, while the vents from the storage tanks (nitrogen with trace amounts of H2S) are returned to a vent knock-out pot before being vented to the Fume Incinerator (SWMU 45). In the event of a shutdown or process upset, the reactor vents can be directed to the existing emergency flare system in the CS2 Unit. The storage tank will vent to the Sulfur Chloride Maintenance (MTC) Scrubber.

The NaSH is stored as a solution in various storage tanks and can be transferred to railcars, iso-containers, or tank trailers for shipment to customers. Storage Tanks include, 8T600A – NaSH Storage Tank with a capacity of 359,830 gallons, 8T600B – NaSH Storage Tank with a capacity of 359,830 gallons, and 8T700B – NaSH Storage Tank with a capacity of 359,830 gallons. Typically NaSH concentrations range from 30-60% inside of the storage tanks.

Environmental aspects of this project are positive as hydrogen sulfide consumed in NaSH production will be diverted from the existing Claus sulfur recovery unit and incrementally reduce sulfur dioxide emissions leaving the Claus process. The NaSH process is designed as a closed loop system and has no atmospheric emission points. All process vents and emissions are directed back to the Claus sulfur recovery unit, with exception to process upsets or turnarounds. This design essentially results in 100 percent sulfur recovery efficiency for the portion of hydrogen sulfide that is diverted for NaSH production.

Assuming a production rate of 50,000 tons per year dry basis, NaSH production will result in an annual reduction of 2,285 tons of sulfur dioxide emissions from the CS2 Plant Incinerator (Point Source ID Number CS-1).

The process area and waste generation described in this section are location “X003” as shown on **Figure 1-1** and the inset table on the figure. NaSH process area SWMU locations are shown in the **Appendix A-8** figures.

1.2.2.5 Sulfur Chlorides Process

The Sulfur Chlorides (SxCLx) unit began operation in 1977 producing various sulfur chlorides such as sulfur monochloride and sulfur dichloride in a series of batch reactors. Batch size is normally 200,000 lbs (100 tons) with a batch time of 40 to 48 hours and are able to produce either Sulfur Monochloride or Sulfur Dichloride. Sulfur Monochloride is the chemical produced in the unit. Chlorine is unloaded from the railcar and sent to Chlorine Vaporization. Chlorine Vapor and Sulfur are sent to the SxCLx Reactor Area. The final product is sent from the SxCLx Reactor Area to either Storage, Railcar Loading (SWMU 78 / AOC I-2), or Iso-Contai (r-4/24/2024) ge tanks hold the product prior to shipment and consist of two storage tanks (3T902B and 3T90 re permitted to hold either sulfur monochloride or sulfur dichloride and both tanks have a capacity of 18,000 gallons each.

Emissions from Chlorine Railcar, CL2 Vaporization, SxCLx Reactor Area, and SxCLx Storage Tanks vent to the Sulfur Chloride Maintenance (MTC) Scrubber Unit. The MTC Scrubber Unit can also receive emissions from the Sodium Hydrosulfide Unit during process upsets or turnovers. Water and Caustic flow from the MTC Scrubber Unit flow to the Sulfur Chlorides Plant Area Wastewater Sump (SWMU 43) which flows through the Carbon Tetrachloride Plant Effluent Treater Tank B (SWMU 19) before feeding into the plant wastewater treatment plant, LeCreek (SWMU 16, 14, 15). Emissions from MTC Scrubber Unit discharge to the Permitted Emissions Point (SC-1). The emission from both iso-container loading and railcar loading are vented to the Sulfur Chlorides Railcar Loading Scrubber (SWMU 78). Water and Caustic flow from the Railcar Loading Scrubber Unit and feed

into the plant wastewater treatment plant, LeCreek (SWMU 16, 14, 15). Emissions from Railcar Loading Scrubber Unit discharge to the Permitted Emissions Point (SC-2).

SxCLx Process drains (SWMU 125) flow to the Sulfur Chlorides Plant Area Wastewater Sump (SWMU 43) which flows through the Carbon Tetrachloride Plant Effluent Treater Tank B (SWMU 19) before feeding into the plant wastewater treatment plant, LeCreek (SWMU 16, 14, 15).

Please note that no treatment takes place in the Carbon Tetrachloride Plant Effluent Treater Tank B (SWMU 19). The tank receives waste water from the Sulfur Chlorides plant from there the water overflows to LeCreek (SWMU 16, 14, 15) via piping.

The process area and waste generation described in this section are located in the “SxCLx Plant” and location “Z015” as shown on **Figure 1-1** and the inset table on the figure. A wastewater flow diagram for the Sulfur Chlorides process is provided on **Figure 1-2**. Sulfur Chlorides process area SWMU locations are shown in the **Appendix A-8** figures.

1.2.2.6 Crystex® Process

Crystex® has been manufactured at the Site since 1975 using a proprietary continuous process which produces a special form of sulfur that is insoluble in all known solvents. The maximum permitted capacity of the unit is 33,500 dry tons per year. The only raw material used in the manufacture of Crystex® is sulfur that is piped from the Carbon Disulfide Plant sulfur storage tank. The sulfur is vaporized, processed, and dried. The excess sulfur removed during these processes is recycled back to the vaporization operation. The process area and waste generation described in this section are located in the “Crystex Plant” and locations “Z012” and “Z013” as shown on **Figure 1-1** and the inset table on the figure. A wastewater flow diagram for the Crystex® Plant process is provided on **Figure 1-2**. Crystex® Plant process area SWMU locations are shown in the **Appendix A-8** figures.

Carbon disulfide from the on-site plant is used as a processing agent and recycled within the plant. The carbon disulfide is recovered by being condensed by a chill water recovery system, then the condensed carbon disulfide is passed through an oil absorption column. The oil is stripped to recover the carbon disulfide. The drying, classification, mixing, and scalping system operations are all nitrogen padded. The nitrogen from the drying and classification systems is continuously purged to the vent header. The nitrogen from the mixing and scalping system is purged from the bag filters in the oil treating area (4 bag houses). The Crystex® Plant discharges nitrogen contaminated with a small amount of carbon disulfide to the Fume Incinerator (SWMU 45).

The Crystex® product is classified and then mixed, in a batch process, with product oil to produce oil-treated Crystex®. The oil is transported to the Crystex® Plant from the tank farm by railcar and unloaded at the Railcar Loading/Unloading Areas (AOC I-4). The Crystex® then passes through a scalping system where the oversized particles are separated and ground to a fine, bright yellow powder which is packaged in a variety of bag sizes including 20 kg bags and 800 kg super sacks. The processed Crystex® is then bagged and stored in the Crystex® warehouse until shipped off-site by truck. The Crystex® Plant was originally designed with the capability to ship Crystex® from the Railcar Loading/Unloading Area (AOC I-4), the loading area is no longer there and was never utilized.

The wastes generated by the Crystex® Plant include vapor which discharges to the Fume Incinerator (SWMU 45) and atmosphere, process wastewater, sanitary wastes (SWMU 122), plant drains (SWMU 116, 117, 118, 119, 120, and 121), oil wastes, and sulfur debris.

Starting in 1976, the Crystex® plant sanitary and oil wastes drained to the Crystex® Plant Sewage Collection Pit (SWMU 108), where digestion occurred. The Crystex® Plant Sewage Collection Pit (SWMU 108) overflows to the Crystex® Plant Wastewater Pit (SWMU 42), which receives all Crystex® plant wastewater, floor drains, spills, stormwater, decanted water from the carbon disulfide separation vessel and run-off water. Oil is recovered from the Crystex® Plant Wastewater Pit (SWMU 42) and drummed and stored at the Skimmed Waste Oil Collection Area C (SWMU 116) prior to off-site disposal. The Crystex® Plant Wastewater Pit (SWMU 42) drains to the LeCreek Inlet Effluent Treatment Tank (SWMU 16).

Crystex® plant oil (D001, D018, F003, and F005) is generated during decontamination of the CS2 oil absorption system. The oil is accumulated in a 55-gallon drum at the plant, and when the drum is full, it is sent to the less than 90 Day Hazardous Waste Storage Area (SWMU 157) prior to shipment off-site for disposal. The plant also utilized 4 baghouses. There are 2 dust collectors (SWMU 144) that capture dust in the nitrogen vent streams to atmosphere and Permitted Emission Points CX-7 and CX-8. These two dust collectors feed the captured Crystex® back into the process. There is a Packaging Dust Collector (SWMU 144) that capture the dust during packaging. The dust is collected into drums and disposed of as Sulfur Debris. The emissions discharge out Permitted Emission Point CX-7. The last baghouse is the Vacuum Dust Collector (SWMU 156) and is used to collect Crystex® dust and spills. The dust is collected into drums and disposed of as Sulfur Debris. The emissions discharge out Permitted Emission Point CX-8.

Crystex® Process Waste

Hazardous Oil Waste is generated in the Oil Absorption process and the Oil Recovery System (ORP). This oil is a hazardous waste and has the waste codes D001, D018, F003, and F005 and disposal code H141. All other wastes generated from the process are non-hazardous.

1.4 Flow Diagrams

See **Attachment 1**.

2 Waste Generation and Management

2.1 Hazardous Wastes and Non Regulated Solid Wastes Generated or Handled (2021-2023)

Waste generation and management are discussed in Sections 2.1 through 2.5.

2.1.1 Storage and Management of Non-Hazardous Waste

General office refuse, non-hazardous shop waste, and non-hazardous plant wastes are placed in dumpsters (SWMU 74) located throughout the facility.

Active parts cleaners, located in the acid shop, main shop, and Crystex® shop (SWMUs 142 A-C) have been switched to a non-hazardous cleaning solution in 2013. The parts cleaners are serviced by Safety Kleen.

The laboratory has the ability to conduct approximately 90 different analyses, tests or calibration routines, primarily for product quality control and in-process testing for products manufactured at the LeMoyne Plant. Unused portions of product and in-process samples are typically consolidated and then returned to the process units for recycling or use directly within the process. Water insoluble reagents such as solvents that are used in small quantities for laboratory testing are collected and combined with established waste streams that are a part of the site's recycled fuels programs. Water soluble reagents and test solutions used in the laboratory are typically neutralized or otherwise rendered non-hazardous and then routed to the site's main wastewater process system (SWMU 14). Glass bottles are disposed of in a 6-yard container which is located near the building to promote safe handling of the glass.

Table 3-1 provides information for non-hazardous waste management.

2.1.2 Storage and Management of Hazardous Waste

Nouryon routinely generates the following waste streams: Carbon Disulfide Stillbottoms (D001, D018), Crystex® Plant Oil (D001, D018, F003, F005), Paint Solids and Thinner (D001, F003, F005), Bead Blast dust (D006), Soil or Tank Residue contaminated by Carbon Disulfide (P022), Acid Plant Sludge (D002) and Discarded Aerosol Cans (D001).

Carbon Disulfide Stillbottoms (D001/D019) are generated from the purification of carbon disulfide solution. The waste is flammable and contains small amounts of benzene. As the waste is generated, it is piped to a storage tank (SWMU 21) for accumulation. The waste is then piped to a truck loading area (SWMU 105) where it is placed in tank trucks and transported off-site for recycling at the Eco-Service in Baton Rouge, Louisiana (RCRA TSDF). It is estimated that approximately 60,000 lbs are generated on a yearly basis.

Crystex ® Plant Oil (D001/D018/F003/F005) is generated during the decontamination of the carbon disulfide oil absorption system, it is approximated that 14,000 lbs are generated yearly. During decontamination, the resulting oil is placed in 55 gallon drums in the Crystex Plant satellite accumulation area (SWMU 61). When the drums are full, they are transferred to the less than 90 Day Hazardous Waste Storage Area (SWMU 157). From here, the waste is transported to an off-site RCRA permitted TSDF (Chemical Waste Management, Emelle, Alabama) for transfer to another site for fuel blending.

Waste Paint Solids and Thinner (F003/F005/D001) is waste paint liquid from maintenance painting operations. It is hazardous due to ignitability, methyl ethyl ketone, and acetone content. It is incinerated or fuels blended depending on solids content at an off-site RCRA permitted TSDF. It is estimated that 1,200 lbs are generated on a yearly basis.

Spent Paint and Solvent (F005, D001, and D035) is waste paint liquids from maintenance painting operations. It is classified as hazardous waste due to ignitability and methyl ethyl ketone content. The waste is incinerated at an off-site RCRA-permitted TSDF.

Bead Blast Dust (D006) is generated from the cleaning of bead blaster. The hazardous constituent is inherent in the glass beads. This waste is stabilized and landfilled at an off-site RCRA permitted TSDF.

Soil or Tank Residue contaminated by Carbon Disulfide (P022) is a listed waste material resulting from clean-out of storage tank or process equipment which stores CS2 or a spill of the commercial product. This waste may be landfilled if the CS2 content is below the treatment standard. If not, the waste must be incinerated. All disposal is

completed at an off-site RCRA permitted TSDF. It is estimated that approximately 1,200 lbs of waste are generated annually.

Acid Plant Sludge (D002) is generated from the clean out of process equipment used to handle or store sulfuric acid. This waste is neutralized on-site (SWMU 152-B) using the permit by rule exemption.

Discarded Aerosol Cans (D001) are generated from the use of canned commercial products onsite. The discarded cans are collected, stored at the less than 90 Day Hazardous Waste Storage Area (SWMU 157), and sent off-site to a TSDF for disposal. It is estimated that 400 lbs of waste is generated yearly.

Hazardous wastes are packaged in accordance with Department of Transportation regulations under 49 CFR parts 173, 178, and 179 at LeMoyne in open head or tighthead 55-gallon steel or plastic drums. Exceptions are: 1) carbon disulfide stillbottoms, which are shipped in DOT approved Tank Trucks, 2) Off-spec Material; and 3) parts cleaner solution which is transferred in DOT approved containers less than 55 gallons.

The drummed waste is currently stored on secondary containment pallets at the less than 90-day hazardous waste storage area (SWMU 157). The storage area is a pad which consists of a concrete slab that is coated with a chemical-resistant material.

During a typical year Nouryon recycles approximately 100,000 pounds of hazardous waste.

See most recent 8700-12 Report to ADEM for this information (**Attachment 2**).

2.2 Biennial Report

See most recent 8700-12 Report to ADEM for this information (**Attachment 2**).

2.3 Used Oil

Used oil is generated in the Crystex® Maintenance Shop and stored in SWMU 103 (Indoor Waste Oil Storage Area D) in 55-gallon drums. The used oil generated at the main maintenance shop is stored in SWMU 102 (Indoor Waste Oil Storage Area C) in 55- gallon drums. Used oil collected from SWMUs 20 (Carbon Disulfide Plant Oil Retention Pit) and 42 (Crystex Plant Wastewater Pit) is stored in 55-gallon drums in SWMUs 115 (Skimmed Waste Oil Collection Area B) and 116 (Skimmed Waste Oil Collection Area C), respectively. Used oil is sent off site for recycling. Nouryon currently uses Safety Kleen and Aaron Oil for recycling. It is estimated that the facility collects or generates approximately 96,450 pounds of used oil annually.

See Annual 8700-12 Report to ADEM for this information (**Attachment B**).

2.4 Universal Wastes

Universal Wastes: (batteries, mercury thermostats, and fluorescent bulbs) generated throughout the plant are accumulated in two separate areas. Fluorescent bulbs are accumulated at the I&E Shop (Building 1BG090) (SWMU 154) and sent off-site for disposal annually. Electronics (including batteries and thermostats) are accumulated at the receiving building and sent off-site annually for recycling.

3 References

Alabama Hazardous Waste Management and Minimization Act Permit USEPA ID #ALD008161176. Prepared by the ADEM. July 2, 2018.

CERCLA Information System Site Information, accessed from website: https://www.epa.gov/superfund/stauffer-chemical-lemoyne. Accessed December 4, 2023.

Corrective Measures Implementation Report (Construction Complete Report) Remediation for AOC A –Former Carbon Disulfide Transfer Tank Area Nouryon Functional Chemicals LLC – LeMoyne Plant. Prepared by Sovereign Consulting, Inc. September 2019.

EPA Fifth Five-Year Review Report for Stauffer Chemical Co. (Cold Creek Plant) and Stauffer Chemical Co. (LeMoyne Plant) Superfund Sites Mobile County Alabama. Prepared by U.S. EPA Region 4. September 30, 2021.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008l6ll76 OU-1. Prepared by U.S. EPA Region 4. September 27, 1989.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008l6ll76 OU-3. Prepared by U.S. EPA Region 4. September 17, 1993.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008161176 OU-2. Prepared by U.S. EPA Region 4. March 18, 1999.

Final RCRA Facility Assessment for Akzo Nobel Functional Chemicals, LLC. Prepared by the ADEM. September 24, 2014.

RCRA Part B Post-Closure Permit Visual Site Inspection Response. Prepared by Akzo Nobel Functional Chemicals, LLC. December 19, 2013.

Operations and Maintenance Plan for OU-1 Groundwater Operable Unit. Nouryon Chemicals, LLC. LeMoyne Plant. Revised March 2020.

Figures

Path: T:_ENV\Nouryon\LeMoynePlant_ALLPro_Figures\PIN Response\PIN_Response_2023_SiteFeatures_Bldgs aprxlF1-3_BUILDING_AND_TANK_LAYOUT Last Saved By: ACarlone 4/23/2024

LEGEND

- PROPERTY LINE
- FENCE
- RAILROAD
- BUILDING
- TANK
- REACTOR

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. PROJECTION: NAD 1983 STATEPLANE ALABAMA WEST FIPS 0102 FEET
3. BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY, ACCESSED 4/23/2024

N

0 110 220 330 440

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
PIN RESPONSE

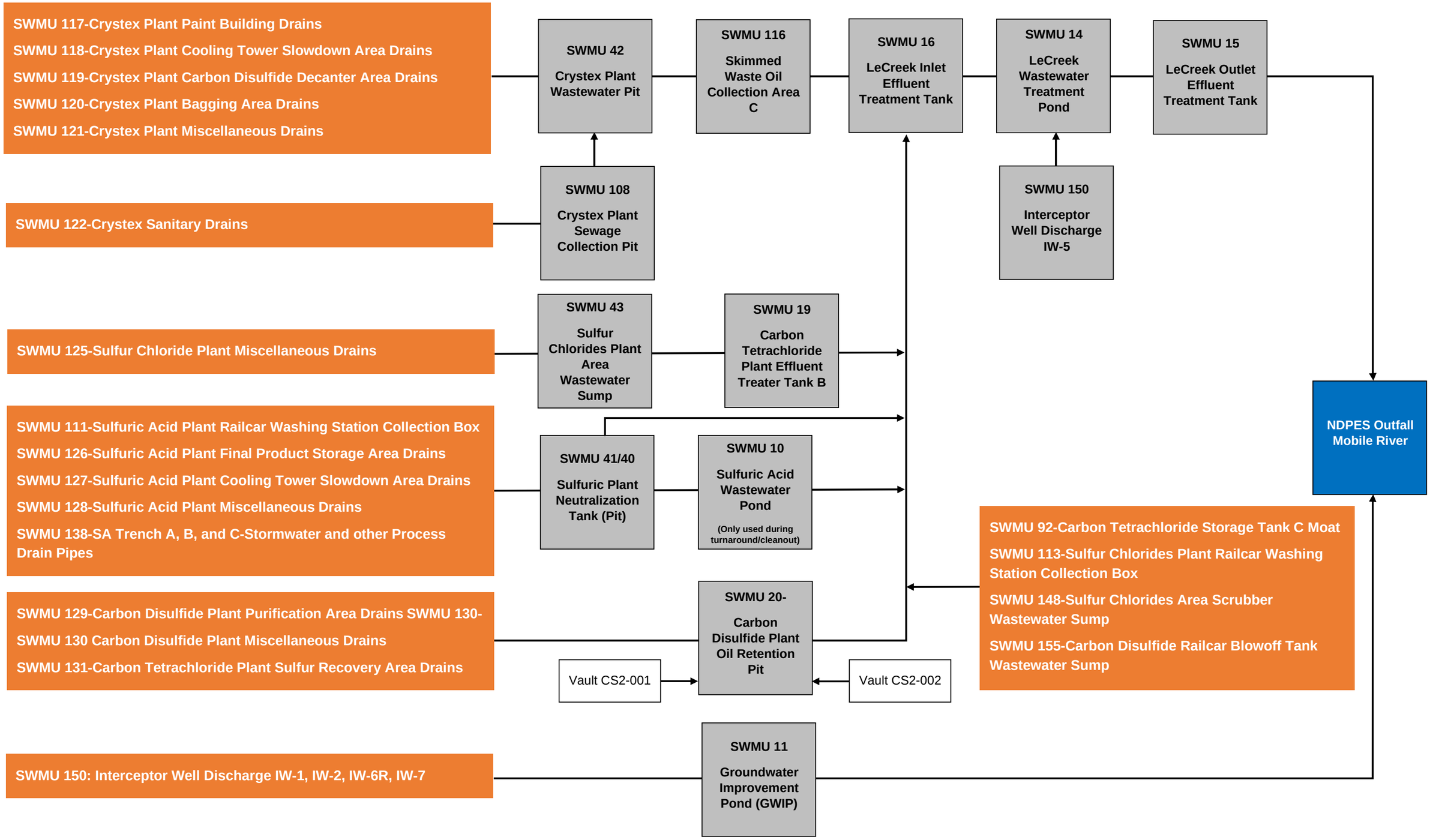
BUILDING AND TANK LAYOUT

ARCADIS

FIGURE
1-1

(R-10/23/2024)

Figure 1-2 Nouryon LeMoyne Wastewater Flow Diagram

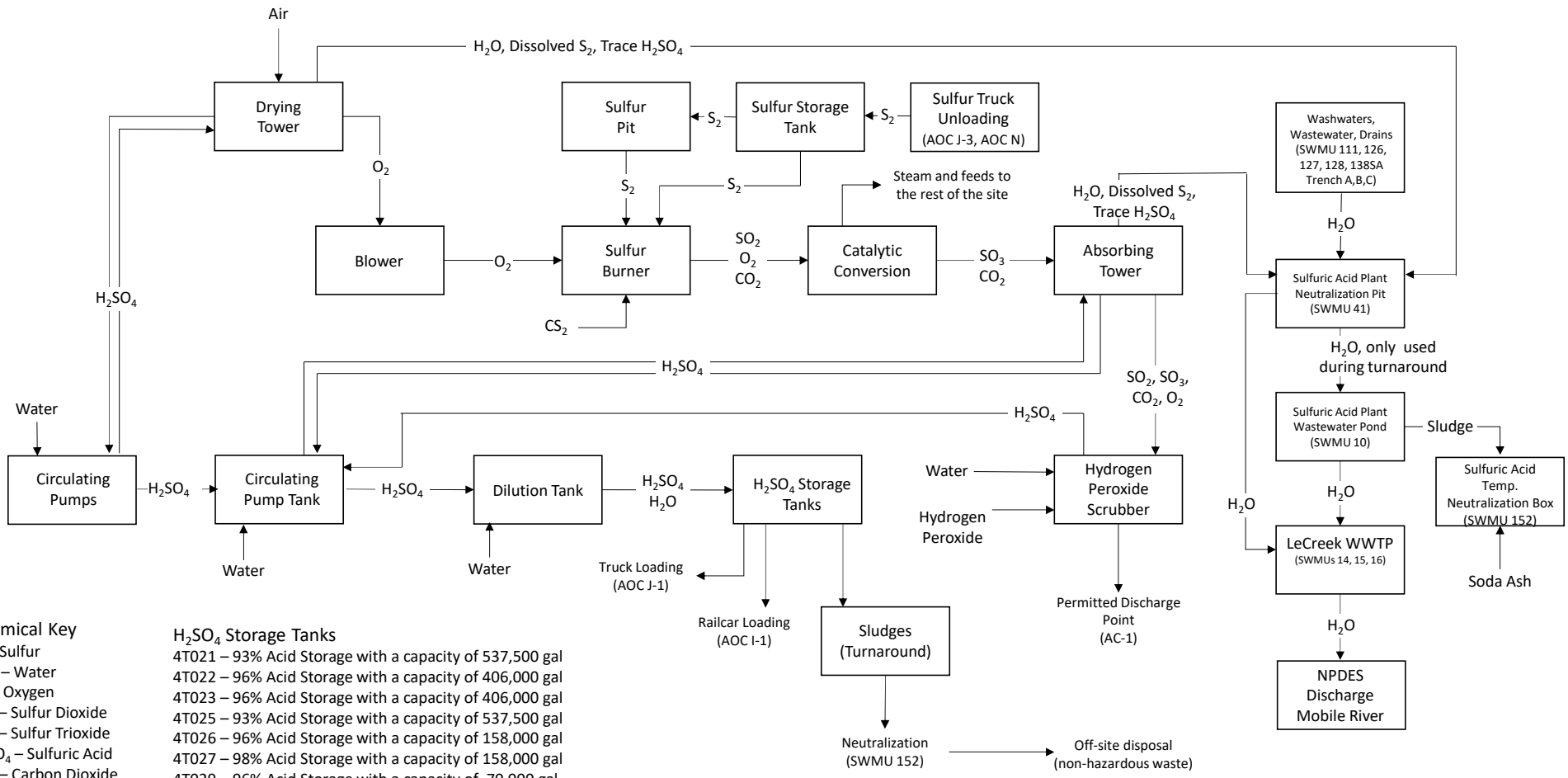


(R-10/23/2024)

Attachment

1 Process Diagrams

Sulfuric Acid Process Description



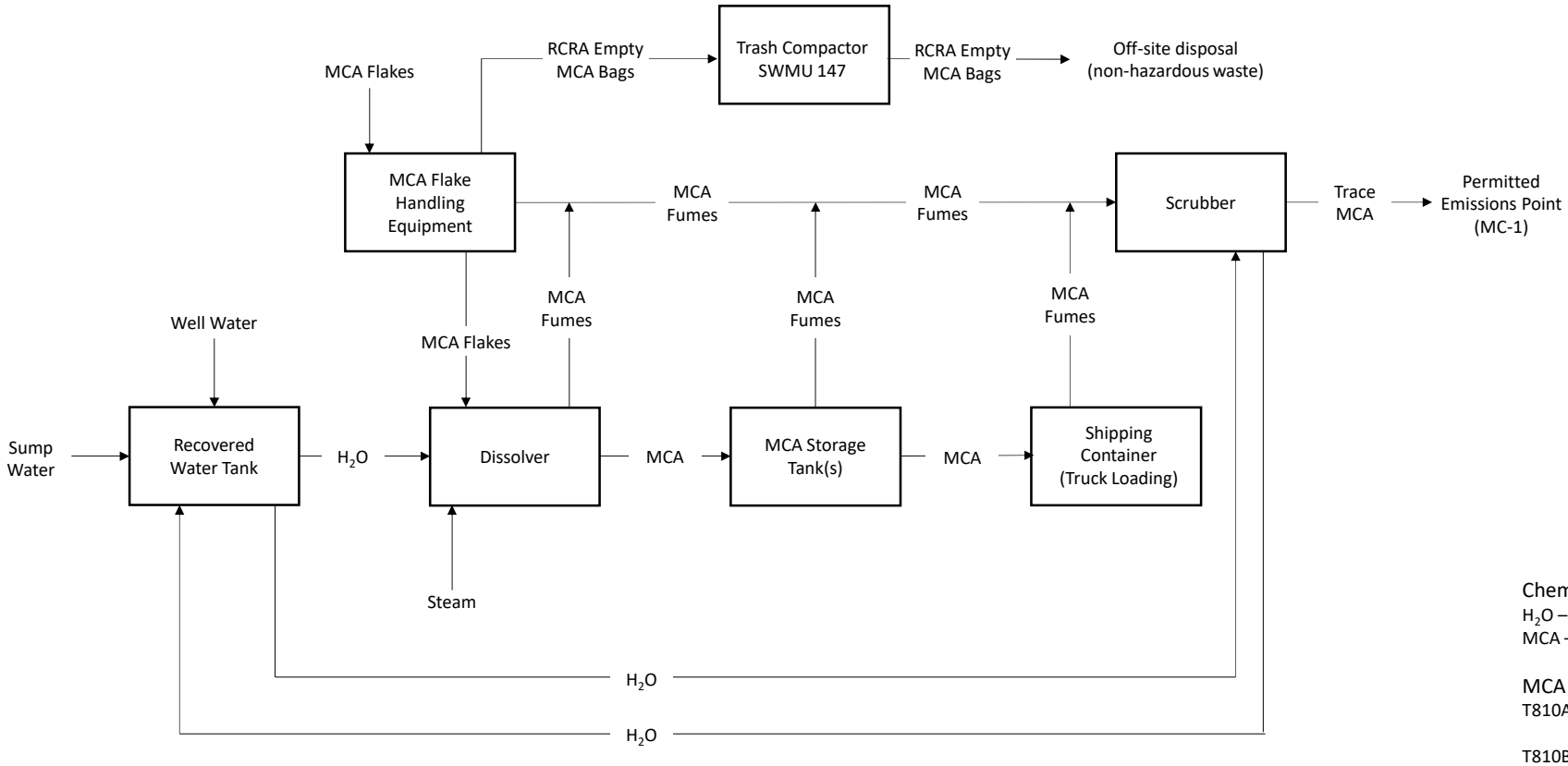
Chemical Key

S_2 – Sulfur
H_2O – Water
O_2 – Oxygen
SO_2 – Sulfur Dioxide
SO_3 – Sulfur Trioxide
H_2SO_4 – Sulfuric Acid
CO_2 – Carbon Dioxide
CS_2 – Carbon Disulfide

H_2SO_4 Storage Tanks

4T021 – 93% Acid Storage with a capacity of 537,500 gal
4T022 – 96% Acid Storage with a capacity of 406,000 gal
4T023 – 96% Acid Storage with a capacity of 406,000 gal
4T025 – 93% Acid Storage with a capacity of 537,500 gal
4T026 – 96% Acid Storage with a capacity of 158,000 gal
4T027 – 98% Acid Storage with a capacity of 158,000 gal
4T029 – 96% Acid Storage with a capacity of 70,000 gal

Monochloroacetic Acid (MCA) Manufacturing Process



Waste:

- RCRA MCA bags – bags that held the MCA flakes. They are considered RCRA emptied and disposed of as non-hazardous waste. They are shipped to Republic Timberland Landfill.
- Off Spec Product – This will be MCA flakes with damaged bags. The damaged bags cannot be emptied safely into the process. Making it hazardous waste that is sent to Waste Management Emelle Landfill.

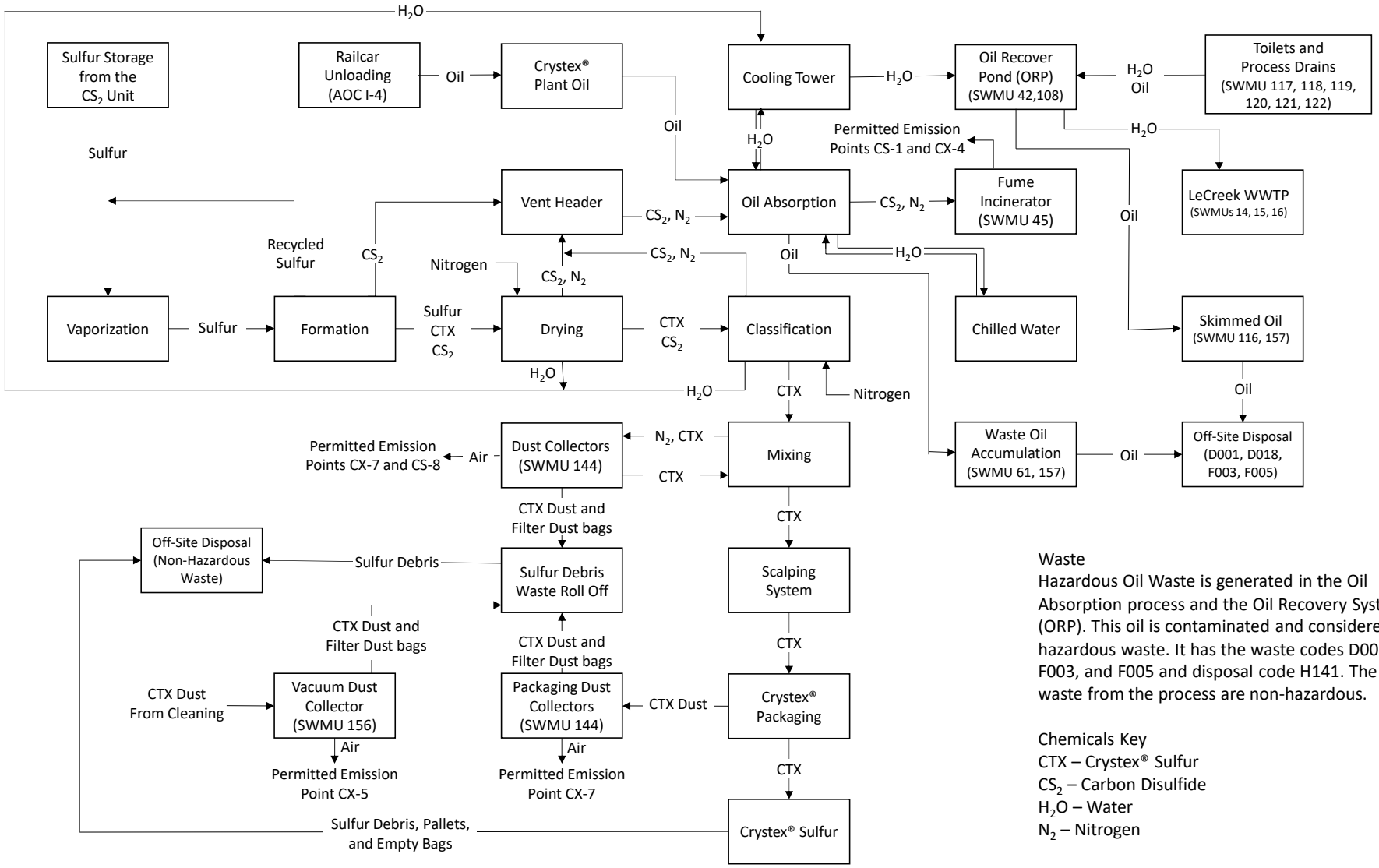
Chemical Key

H_2O – Water
MCA – Monochloroacetic Acid

MCA Storage Tanks

T810A – 80% MCA Storage capacity of 13000 gal
T810B – 80% MCA Storage capacity of 8450 gal
T810C – 70% MCA Storage capacity of 8450 gal
T810D – 70% MCA Storage capacity of 5780 gal
T810E – 70% MCA Storage capacity of 12500gal
T810F – 70% MCA Storage capacity of 12500 gal

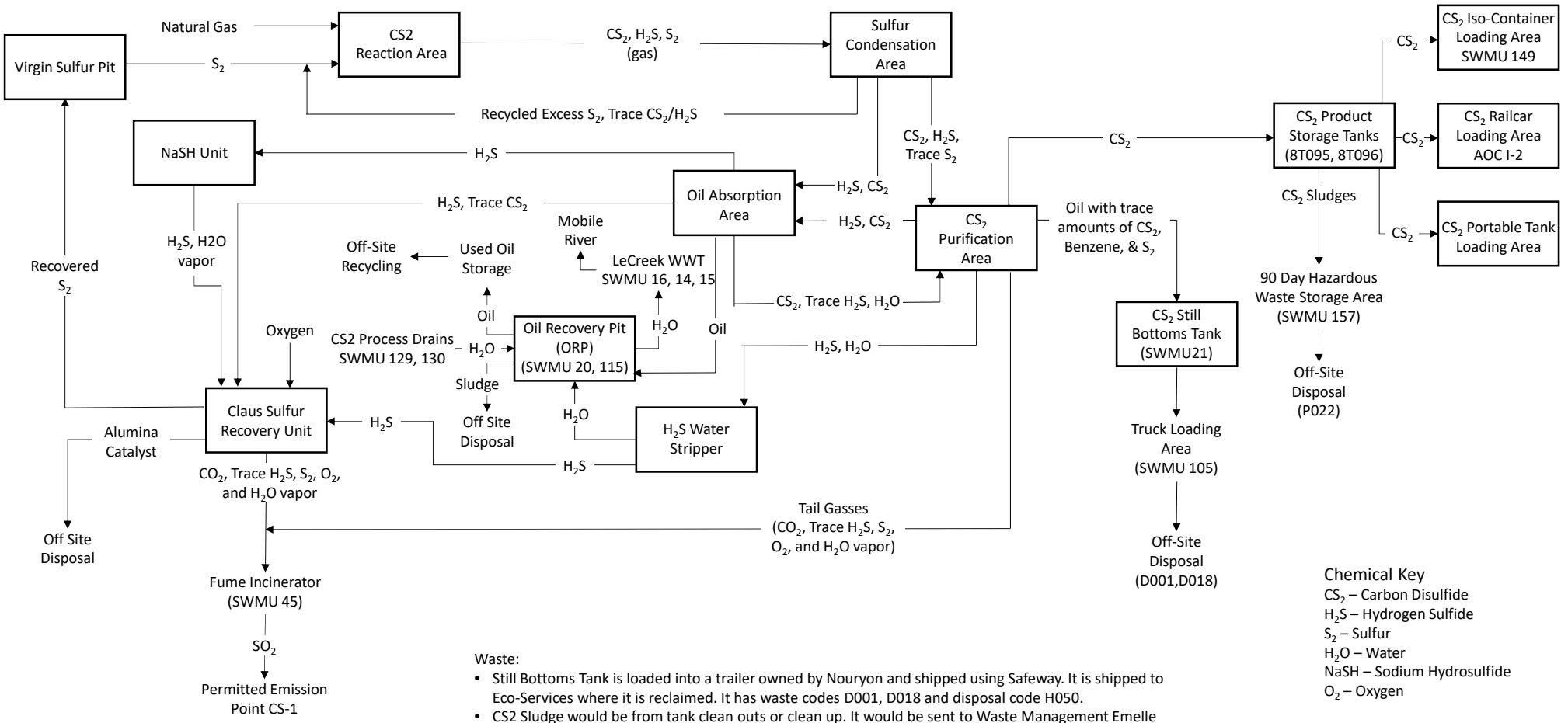
Crystex® Process Description



Waste
Hazardous Oil Waste is generated in the Oil Absorption process and the Oil Recovery System (ORP). This oil is contaminated and considered hazardous waste. It has the waste codes D001, D018, F003, and F005 and disposal code H141. The other waste from the process are non-hazardous.

Chemicals Key
CTX – Crystex® Sulfur
CS_2 – Carbon Disulfide
H_2O – Water
N_2 – Nitrogen

Carbon Disulfide (CS_2) Manufacturing Process



Waste:

- Still Bottoms Tank is loaded into a trailer owned by Nouryon and shipped using Safeway. It is shipped to Eco-Services where it is reclaimed. It has waste codes D001, D018 and disposal code H050.
- CS2 Sludge would be from tank clean outs or clean up. It would be sent to Waste Management Emelle Landfill as long as the CS_2 concentration below the treatment standards. If the CS_2 concentration is too high for landfill then it would be incinerated. It has waste codes P022.
- Oil from ORP is sent off site to Aaron for recovery.
- Sludge from ORP is analyzed to determine the method of disposal.
- Aluminum Catalyst from the Claus Unit is sent to eh Waste Management Emelle Landfill.
- Process wastewater is sent to the onsite wastewater treatment plant (LeCreek)

Chemical Key

CS_2 – Carbon Disulfide
H_2S – Hydrogen Sulfide
S_2 – Sulfur
H_2O – Water
NaSH – Sodium Hydrosulfide
O_2 – Oxygen

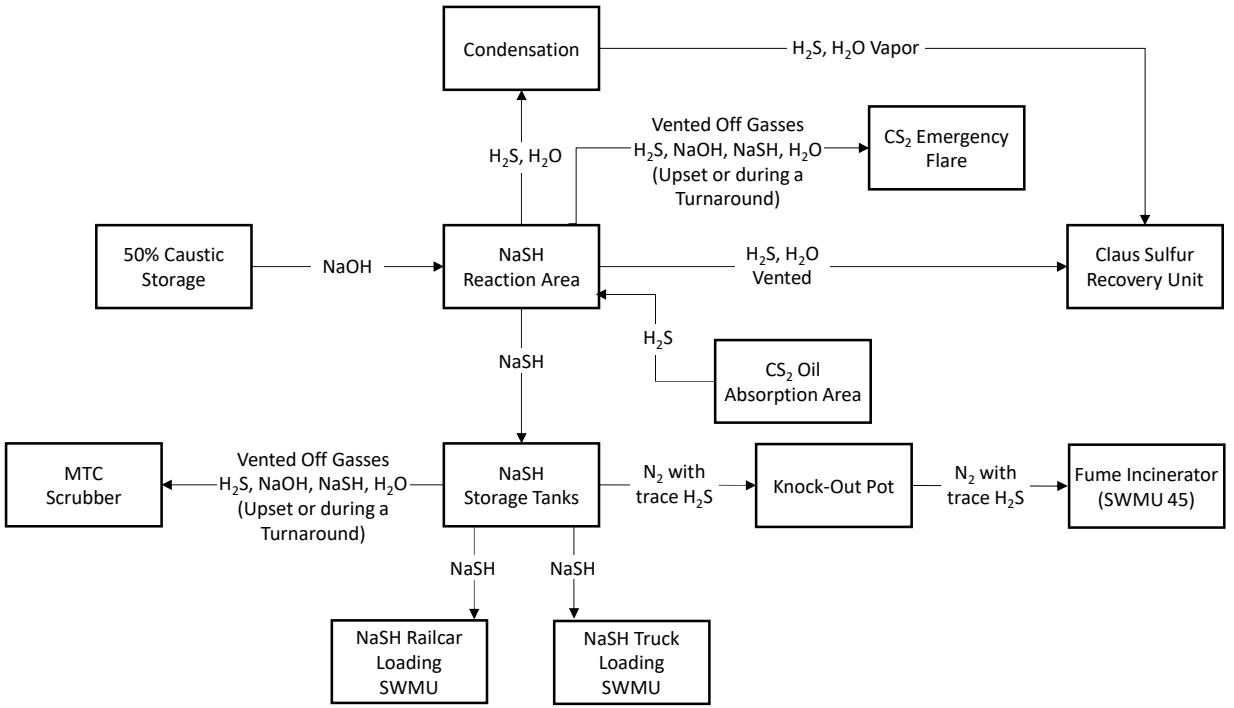
CS_2 Storage Tanks

8T095 – CS_2 Vertical 5 Storage Tank capacity of 1,340,094 gallons.
8T096 – CS_2 Vertical 6 Storage Tank capacity of 1,458,660 gallons.

Nouryon

(R-10/23/2024)

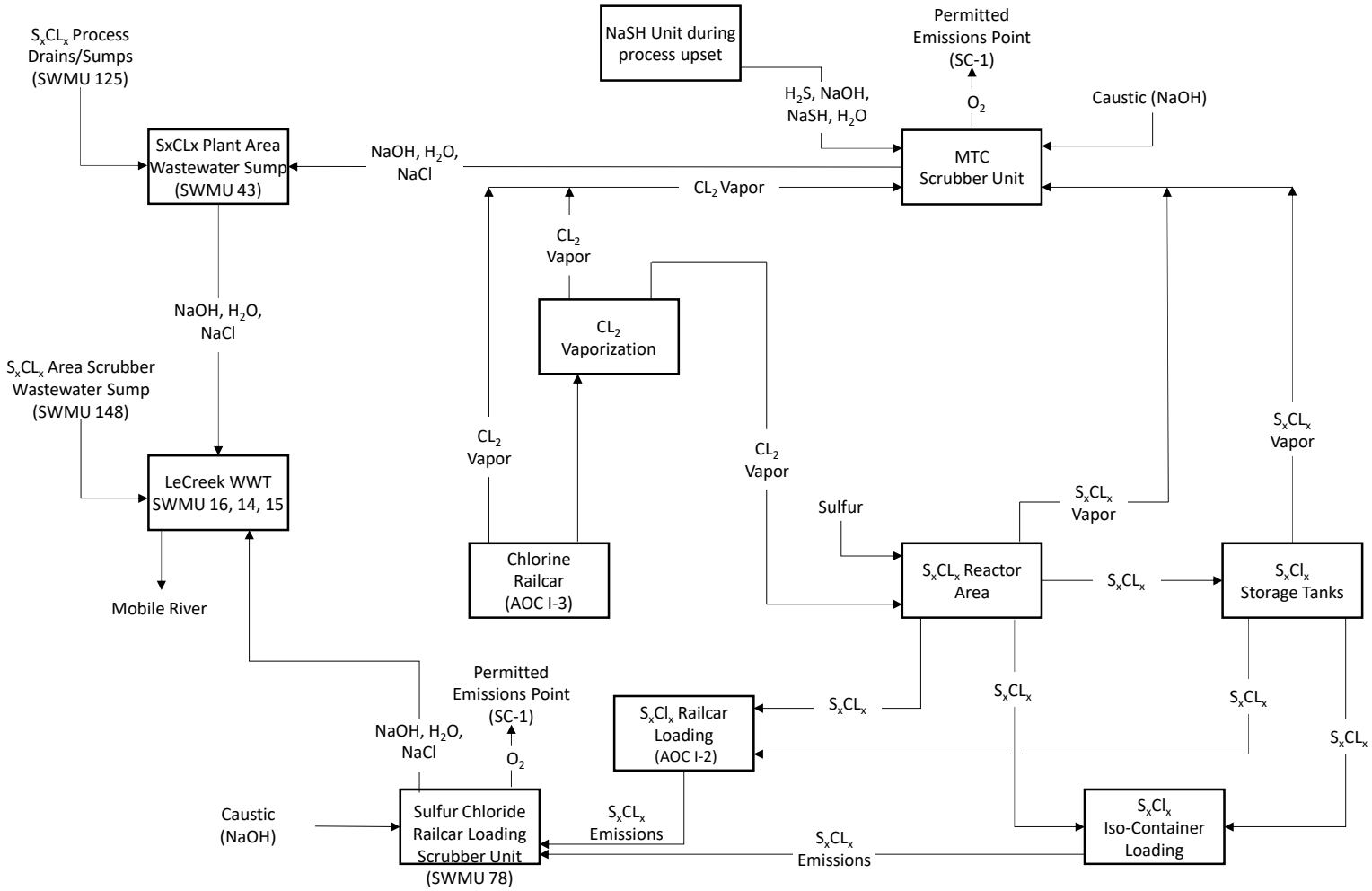
Sodium Hydrosulfide (NaSH) Manufacturing Process



Chemical Key
NaSH – Sodium Hydrosulfide
H_2S – Hydrogen Sulfide
H_2O – Water
CS_2 – Carbon Disulfide
NaOH – Caustic
N_2 – Nitrogen

NaSH Storage Tanks
8T600A – 40% NaSH Storage Tank
Capacity 359,830 gallons
8T600B – 60% NaSH Storage Tank
Capacity 359,830 gallons
8T700B – 40% NaSH Storage Tank
Capacity 359,830 gallons

Sulfur Chlorides Manufacturing Process



Chemical Key

S_xCL_x – Sulfur Monochloride or Sulfur Dichloride
CL_2 – Chlorine
H_2S – Hydrogen Sulfide
NaOH – Caustic
NaSH – Sodium Hydrosulfide
H_2O – Water
NaCl – Chlorine Salt

S_xCl_x Storage Tanks

3T905B – S_xCl_x Storage Tank Capacity 18,000 gallons
3T905C – S_xCl_x Storage Tank Capacity 18,000 gallons

Attachment

2 8700-12 Notification of Regulated Waste Activity

Cycle	Site Name	Site ID
2023	NOURYON	ALD008161176

1. Reason for Submittal	
BR / AR with Notification. [Source B]	*BR Exempt* No

2. Site ID
ALD008161176

3. Site Name
NOURYON

4. Site Location		
Street Number 13440	*Street 1* HWY 43 NORTH	*Street 2*
Zip 36505	*City, Town or Village* AXIS	*State* ALABAMA
Country UNITED STATES	*County* MOBILE	
Latitude 30.887	*Longitude* -88.013	*Use Lat/Long as Primary Address* No

5. Site Mailing Address		
Street Number 13440	*Street 1* HWY 43 NORTH	*Street 2*
Zip 36505	*City, Town or Village* AXIS	*State* ALABAMA
Country UNITED STATES		

6. Site Land Type
Private

7. North American Industry Classification System (NAICS)
Primary NAICS 32518 - OTHER BASIC INORGANIC CHEMICAL MANUFACTURING
Other NAICS

8. Site Contact Person		
First Name Samantha	*Middle Initial* R	*Last Name* JOHNSTON
Title HSE ADVISOR	*Email* SAMANTHA.JOHNSTON@NOURYON.COM	*Language* ENGLISH
Phone Number 251-679-4315	*Extension*	*Fax*

8a. Site Contact Address		
Street Number 13440	*Street 1* HWY 43 NORTH	*Street 2*
Zip 36505	*City, Town or Village* AXIS	*State* ALABAMA
Country UNITED STATES		

9a. Legal Owner #1		
Name NOURYON	*Date* 10/09/2018	*Type* Private
Street Number 525	*Street 1* EAST VAN BUREN ST	*Street 2*
Zip 60607-3823	*City, Town or Village* CHICAGO	*State* ILLINOIS
Country UNITED STATES		
Email michael.mitchell@nouryon.com		
Phone Number 312-544-7000	*Extension*	*Fax*
Public Comments		

9b. Legal Operator #1

Name	*Date*	*Type*
NOURYON	10/09/2018	Private
Street Number	*Street 1*	*Street 2*
13440	US Highway 43 North	
Zip	*City, Town or Village*	*State*
36505	Axis	ALABAMA
Country		
UNITED STATES		
Email		
michael.mitchell@nouryon.com		
Phone Number	*Extension*	*Fax*
251-675-1310		
Public Comments		

10. Type of Federal Regulated Waste Activity

A. Hazardous Waste Activities

1. Generator of Hazardous Waste (Federal)	*3. Treater, Storer, or Disposer of Hazardous Waste*	*6. Exempt Boiler and / or Industrial Furnace*
1 - Large Quantity Generator	Yes	None selected
Generator of Hazardous Waste (State)	*4. Receives Hazardous Waste from Off-site*	
1 - Large quantity generator	No	
2. Short Term Generator	*5. Recycler of Hazardous Waste*	
No	None selected	

B. Waste Codes for Federally Regulated Hazardous Wastes

Hazardous Waste Codes (Federal)

D001, D002, D018, D039, F001, F003, F005, P022

C. Waste Codes for State Regulated (non-Federal) Hazardous Wastes

Hazardous Waste Codes (State)

None selected

11. Additional Regulated Waste Activities

A. Other Waste Activities

1. Transporter of Hazardous Waste	*3. United States Importer of Hazardous Waste*	*5. Importer/Exporter of SLABs*
None selected	No	None selected
2. Underground Injection Control	*4. Recognized Trader*	
No	None selected	

B. Universal Waste Activities

1. Large Quantity Handler of Universal Waste

Accumulated/Managed:
None selected
Generated:
None selected

2. Destination Facility for Universal Waste

No

C. Used Oil Activities

1. Used Oil Transporter	*3. Off-Specification Used Oil Burner*
None selected	No
2. Used Oil Processor and / or Re-refiner	*4. Used Oil Fuel Marketer*
None selected	None selected

D. Pharmaceutical Activities

Operating under 40 CFR 266 Subpart P for the management of hazardous waste pharmaceuticals.

Withdrawing from operating under 40 CFR 266 Subpart P for the management of hazardous waste pharmaceuticals.

No

E. State Activities

State Activities

AFP - TSD FACILITY SUBJECT TO PERMIT
AFPPC - TSD FACILITY SUBJECT TO PERMIT POST CLOSURE CARE
SQHUB - SMALL QUANTITY HANDLER OF UNIVERSAL WASTE BATTERIES
SQHUL - SMALL QUANTITY HANDLER OF UNIVERSAL WASTE LAMPS
SQHUW - SMALL QUANTITY HANDLER OF UNIVERSAL WASTE
UOG - USED OIL GENERATOR
UOGOG - USED OIL GENERATOR COLLECTOR ON SITE GENERATION ONLY

12. Eligible Academic Entities with Laboratories

1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories.

None selected

2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories.

No

13. Episodic Generation

Are you an SQG or VSQG generating hazardous waste from a planned or unplanned episodic event, lasting no more than 60 days, that moves you to a higher generator category pursuant to 40 CFR Part 262 Subpart L? If "Yes", you must fill out the Addendum for Episodic Generator.

No

14. LQG Consolidation of VSQG Waste

14. LQG Consolidation of VSQG Waste

Are you an LQG notifying of consolidating VSQG hazardous waste under the control of the same person pursuant to 40 CFR 262.17(f)?

No

15. Notification of LQG Site Closure for a Central Accumulation Area (CAA) (optional) and Entire Facility

Your state does not participate in Notification of LQG Site Closure.

16. Notification of Hazardous Secondary Material (HSM) Activity

Are you reporting HSM activities?

No

17. Electronic Manifest Broker

Are you notifying as a person, as defined in 40 CFR 260.10, electing to use the EPA electronic manifest system to obtain, complete, and transmit an electronic manifest under a contractual relationship with a hazardous waste generator?

No

18. Comments

Public Comments

19. Certification

Certifier #1		
First Name	*Middle Initial*	*Last Name*
Michael	P	Mitchell
Title	*Email*	*Date Signed*
Site Director	michael.mitchell@nouryon.com	02/29/2024

Please print or type in the *unshaded* areas only

ADEM Form 8700-12 (8/04m2)

Please refer to the ADEM Form 8700-12 Notification Form *Instructions* before completing this form. Information requested here is required by law (§ 3010 of the *Resource Conservation and Recovery Act).*

Notification of Regulated Waste Activity

Alabama Department of Environmental Management

(for ADEM Use Only)

I. Notification Class (*Check appropriate box and enter ID number, if known.*)

☐ **Initial Notification** ☑ **Annual Notification**

Facility's EPA ID Number
ALD008161176

II. Operating Name of Facility (Include company and specific site name)

Nouryon

Operating Name of Facility (*Continued*)

III. Change of Facility Name?

☑ **No** ☐ **Yes** *(If Yes, enter previous name of Facility below).*

IV. Location of Facility *(Physical address no P.O. Box or Route Number)*

Street
13440 Hwy 43 North

City or Town	State	Zip Code
Axis	AL	36505

V. Geographic Location (*See Instructions)*

Method	Latitude	Longitude
S	30.751159	-88.02500

County Name
Mobile

VI. Facility Contact *(Person to be contacted regarding waste activities at site)*

	Name *(First)*	*(Last)*
	Sylvia	Williams

Job Title	Phone Number *(Area Code and Number)*
HSE Business Pa	251-679-4315 **Ext.**

Contact Email Address *(Optional)*
sylvia.williams@nouryon.com

VII. Facility Mailing Address *(See Instructions)*

Street or P.O. Box
13440 Hwy 43 North

City or Town	State	Zip Code
Axis	AL	36505

VIII. Description of Facility Processes *(See instructions for NAICS Code listings)*

A. Facility Process In the space provided below, describe each of the processes at your facility that produce Regulated Wastes.

1. Chemical Conversion
2.
3.
4.
5.

B. NAICS Codes: Enter the six-digit North American Industry Classification System (NAICS) Code of the overall production, distribution, or service activity of your site. Also, provide any additional NAICS Codes that describe the specific industrial processes that are used.

Primary	2	3	4	5
325188				

IX. Ownership *(See Instructions)*

A. Legal Name of Facility

Nouryon

B. Name of Facility's Legal Owner

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*	C. Land Type	D. Owner Type	E. Operator Type	Change of Owner Indicator	Date Changed
312-544-7000	Private	Private	Private	Yes ☐ ☑ No	

F. Name of Facility's On-Site Operator

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*

312-544-7000 **Ext.**

G. Name of Facility's Parent Company

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*	Change of Owner Indicator	Date Changed
312-544-7000 **Ext.**	Yes ☐ ☑ No	

H. Name of Facility's Property Owner

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*	Change of Owner Indicator	Date Changed
312-544-7000 **Ext.**	Yes ☐ ☑ No	

Please print or type in the unshaded areas only

X. Certification Status

Note: Pursuant to Rules 335-1-6 of the ADEM Administrative Code, all Notification Forms submitted to the Department must Include the appropriate certification fee in order to be complete.

During at least 2 month of the year, this facility will operate and/or maintain: (*Check all that apply)*

A. Hazardous Waste Activities *(Attach Schedule A)*

1. ☑ Large Quantity Generator ≥ 2,200 lbs/month (≥ 1,000 kg/month)
2. ☐ Small Quantity Generator between 221 and 2,199 lbs/month (between 101 and 999 kg/month)
3. ☐ Conditionally Exempt Generator ≤ 220 lbs/month (≤ 100 kg/month)

(Note: Household generation is exempt under 335-14-2-01(4)(b)1.)

4. ☐ Transporter/Transfer Facility
5. ☐ Treatment Facility – Combustion
6. ☐ Treatment Facility – Other than Combustion
7. ☑ Storage Facility
8. ☑ Disposal Facility

B. Used Oil Activities *(Attach Schedule B)*

1. ☑ Generator (≥ 25 gallons /month)
2. ☐ Transporter/Transfer Facility
3. ☐ Processor/Re-refiner
4. ☐ Fuel Marketer
5. ☐ Burner

C. Universal Waste Activities (*Attach Schedule C)*

1. ☐ Universal Waste Transporter
2. ☐ Large Quantity Handler ≥ 11,020 lbs (≥ 5,000 kg)
3. ☑ Small Quantity Handler < 11,020 lbs (< 5,000 kg)

Any ADEM Form 8700-12 submitted without all appropriate waste3 schedules and certification fees will not be processed.

XI. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature	Name and Official Title (*Type or Print)*	Date Signed
	Sylvia Williams Sr. Environmental Engineer	12/14/2021

XI. Comments

Date Processed
(for Official Use Only)

Mail completed form, a check or money order for all appropriate certification fees, and all necessary schedules and attachments to:

Alabama Department of Environmental Management
Permits & Services Division
P.O. Box 301463
Montgomery, AL 36130-1463

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

Please print or type in the unshaded areas only

XIII. Additional Information Sheet

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule A
Certification of Hazardous Waste Management

(for ADEM Use Only)

I. Type of Hazardous Waste Activity *(Mark 'X' in the appropriate boxes; See Instructions)*

☑ **A. Hazardous Waste Generator**
- ☑ 1. 2,200 lbs (1,000 kg) per month or more (LQG)
- ☐ 2. 221 to 2,199 lbs (101-999 kg) per month (SQG)
- ☐ 3. 220 lbs (100 kg) per month or less (CESQG)
- ☐ 4. United States Importer of Hazardous Waste

☐ **B. Hazardous Waste Transporter/Transfer Facility** ††
- ☐ 1. Commercial Transporter (received wastes from others)
  - ☐ a. Air
  - ☐ b. Rail
  - ☐ c. Highway
  - ☐ d. Water
  - ☐ e. Other (Specify) _____
- ☐ 2. Self Transporter (Own Waste Only)
- ☐ Transfer Facility
  - ☐ a. Loaded trucks
  - ☐ b. Off-loaded containers
  - ☐ c. Bulk Transfer between vehicles

☑ **C. Treatment, Storage, Disposal Facility (**at Facility)††
- ☑ 1. Facilities subject to Permit
  - ☐ a. Operating Units
  - ☐ b. SWMU CA
  - ☑ c. Post closure Care
  - ☐ d. Other (Specify) _____
- ☑ 2. Permit Exempt Treatment (subject to ADEM verification)
  - ☑ a. WWTU/ENU
  - ☐ b. Recycling Unit
  - ☐ c. TETF
  - ☐ d. Generator Evaporation
  - ☐ e. Generator Physical Processing
  - ☐ f. Other (Specify)_ _____

☐ **D. Hazardous Waste Fuel Activity** ††
- ☐ 1. Blender Marketing to Burner
- ☐ 2. Other Marketers
- ☐ 3. Boiler and/or Industrial Furnace
  - ☐ a. Smelter Deferral
  - ☐ b. Small Quantity Exemption

☑ **E. Recycling Activities** (Specify)
Oil, Electronics, battreries, flourescent tubes

†† **Note**: *A permit may be required for this activity. Contact (334) 271-7730 for more information.*

II. Hazardous Waste Generation

A. Waste Description *In the space provided, list the types of regulated waste typically generated or handled by your facility. Attach additional sheets as necessary.*

	Types of Waste Generated	Estimated Yearly Generation in lbs.
1.	Carbon Disulfide Stillbottoms	49700
2.	Crystex Plant Oil	2300
3.	Waste Paint Material	400
4.	CS2 Tank Solids	600

B. Characteristics of Nonlisted Hazardous Wastes. *(Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your Facility handles; See 335-14-2-03(1) – (5). Additional spaces are available on the Supplemental page if you need to list more hazardous waste numbers.)*

☑ 1. Ignitable (D001) ☑ 2. Corrosive (D002) ☑ 3. Reactive (D003) ☑ 4. Toxicity Characteristic

(List specific EPA hazardous waste number(s) for the Toxicity characteristic contaminant(s))

D018 D026 D009 D011

C. Listed Hazardous Wastes (See 335-14-2-.04(2) – (4)); Attach the Supplemental page if you need to list more hazardous waste numbers

P022 F003 F005 P022

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule A
Certification of Hazardous Waste Management

(for ADEM Use Only)

I. Type of Hazardous Waste Activity *(Mark 'X' in the appropriate boxes; See Instructions)*

☑ **A. Hazardous Waste Generator**
- ☑ 1. 2,200 lbs (1,000 kg) per month or more (LQG)
- ☐ 2. 221 to 2,199 lbs (101-999 kg) per month (SQG)
- ☐ 3. 220 lbs (100 kg) per month or less (CESQG)
- ☐ 4. United States Importer of Hazardous Waste

☐ **B. Hazardous Waste Transporter/Transfer Facility** ††
- ☐ 1. Commercial Transporter (received wastes from others)
  - ☐ a. Air
  - ☐ b. Rail
  - ☐ c. Highway
  - ☐ d. Water
  - ☐ e. Other (Specify) _____
- ☐ 2. Self Transporter (Own Waste Only)
- ☐ Transfer Facility
  - ☐ a. Loaded trucks
  - ☐ b. Off-loaded containers
  - ☐ c. Bulk Transfer between vehicles

☑ **C. Treatment, Storage, Disposal Facility (**at Facility)††
- ☑ 1. Facilities subject to Permit
  - ☐ a. Operating Units
  - ☐ b. SWMU CA
  - ☑ c. Post closure Care
  - ☐ d. Other (Specify) _____
- ☑ 2. Permit Exempt Treatment (subject to ADEM verification)
  - ☑ a. WWTU/ENU
  - ☐ b. Recycling Unit
  - ☐ c. TETF
  - ☐ d. Generator Evaporation
  - ☐ e. Generator Physical Processing
  - ☐ f. Other (Specify)_ _____

☐ **D. Hazardous Waste Fuel Activity** ††
- ☐ 1. Blender Marketing to Burner
- ☐ 2. Other Marketers
- ☐ 3. Boiler and/or Industrial Furnace
  - ☐ a. Smelter Deferral
  - ☐ b. Small Quantity Exemption

☑ **E. Recycling Activities** (Specify)
Oil, Electronics, battreries, flourescent tubes

†† **Note**: *A permit may be required for this activity. Contact (334) 271-7730 for more information.*

II. Hazardous Waste Generation

A. Waste Description *In the space provided, list the types of regulated waste typically generated or handled by your facility. Attach additional sheets as necessary.*

	Types of Waste Generated	**Estimated Yearly Generation** in lbs.
1.	Empty Aerosol Cans	400
2.		
3.		
4.		

B. Characteristics of Nonlisted Hazardous Wastes. *(Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your Facility handles; See 335-14-2-03(1) – (5). Additional spaces are available on the Supplemental page if you need to list more hazardous waste numbers.)*

☑ 1. Ignitable (D001) ☑ 2. Corrosive (D002) ☑ 3. Reactive (D003) ☑ 4. Toxicity Characteristic

(List specific EPA hazardous waste number(s) for the Toxicity characteristic contaminant(s))

D018 D026 D009 D011

C. Listed Hazardous Wastes (See 335-14-2-.04(2) – (4)); Attach the Supplemental page if you need to list more hazardous waste numbers

P022 F003 F005 P022

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

II. Hazardous Waste Generation (*continued)*

III. Hazardous Waste Transporter/Transfer Facility

During a typical year, this facility transports/transfers_____ **of Hazardous Waste.**
(quantity in pounds)

IV. Treatment, Storage, Disposal Facility (at Facility)

During a typical year, this facility treats 0 **of Hazardous Waste.**
(quantity in pounds)

During a typical year, this facility stores 0 **of Hazardous Waste.**
(quantity in pounds)

During a typical year, this facility disposes 0 **of Hazardous Waste.**
(quantity in pounds)

V. Hazardous Waste Fuel Activity

During a typical year, this facility markets _____ **of Hazardous Waste.**
(quantity in pounds)

During a typical year, this facility combusts _____ **of Hazardous Waste.**
(quantity in pounds)

VI. Recycling Activity

During a typical year, this facility recycles 100000 **of Hazardous Waste.**
(quantity in pounds)

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

Comments:
We have one permitted RCRA facility which is in post closure. We operate as a 90 day large quantity generator.

II. Hazardous Waste Generator (Supplemental)

D. Listed and Nonlisted Hazardous Waste Codes. *[See 335-14-2-.04(2) – (4) and 335-14-2-.03(1) – (5)] If you need to list more hazardous waste numbers, attach copies of this page as necessary*

II. Hazardous Waste Generator (Supplemental)

D. Listed and Nonlisted Hazardous Waste Codes. *[See 335-14-2-.04(2) – (4) and 335-14-2-.03(1) – (5)] If you need to list more hazardous waste numbers, attach copies of this page as necessary*

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule B
Certification of Used Oil Management

(for ADEM Use Only)

I. Type of Used Oil Management Activity (See Instructions)

☑ **A. Used Oil Generator/Collector**
- ☑ 1. On-site Generation Only
- ☐ 2. Do-it-yourself Collection Center (i.e., from off-site source)
- ☐ 3. Collection Center (i.e., from off-site source)
- ☐ 4. Aggregation Point (i.e., from off-site source)

☐ **B. Used Oil Fuel Marketer**
- ☐ 1. Directs Shipment of Used Oil to Off-Specification Burner
- ☐ 2. First Claims Used Oil Meets Specification Fuel
- ☐ 3. burns Only Used Oil Generated On-site as On-Specification Fuel

☐ **C. Off-Specification used Oil Burner**
- ☐ 1. Burns Only Off-Specification Used Oil Generated On-Site
- ☐ 2. Indicate Type(s) of Devices
  - ☐ a. Utility Boiler
  - ☐ b. Industrial Boiler
  - ☐ c. Industrial Furnace

☐ **D. Used Oil Transporter ††**
- ☐ 1. Only For Used Oil Generated On-site
- ☐ 2. Operates a Transfer Facility

☐ **E. Used Oil Processor/Re-refiner**

†† **NOTE:** A permit is required for this activity. Contact (334) 271-7758 for more information

II. Used Oil Generation

During a typical year, this facility collects/generates 96450 _____ **of Used Oil.**
(quantity in pounds)

III. Used Oil Fuel Marketer

During a typical year, this facility markets _____ **of Used Oil.**
(quantity in pounds)

IV. Used Oil Burner

During a typical year, this facility burns _____ **of Used Oil.**
(quantity in pounds)

V. Used Oil Transporter

During a typical year, this facility transports _____ **of Used Oil.**
(quantity in pounds)

VI. Used Oil Processor/Re-refiner

During a typical year, this facility processes/re-refines _____ **of Used Oil.**
(quantity in pounds)

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

Comments:
Calculated using 1 gallon of oil is 7.7 lbs of oil

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule C

Certification of Universal Waste Management

(for ADEM Use Only)

I. Type of Used Universal Waste Activity (See Instructions)

☐ **A. Universal Waste Transporter**

☐ **B. Large Quantity Handler**

	Estimated Yearly Amount (in lbs)	
	Accumulated	**Generated**
1. Battery(ies)		
2. Pesticide(s)		
3. Thermostat(s)		
4. Lamps		
5. Other (specify)_____		

☑ **C. Small Quantity Handler**

	Estimated Yearly Amount (in lbs)	
	Accumulated	**Generated**
1. Battery(ies)	100	100
2. Pesticide(s)	0	0
3. Thermostat(s)	0	0
4. Lamps	100	100
5. Other (*specify)*_____		

II. Universal Waste Transporter

During a typical year, this facility transports _____ **of Universal Waste.**

(quantity in pounds)

III. Universal Waste Handler

During a typical year, this facility handles 200 _____ **of Universal Waste.**

(quantity in pounds)

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

Comments:

Facility's EPA ID Number

ALD008161176

(R-10/23/2024)

Please print or type in the *unshaded* areas only

ADEM Form 8700-12 (8/04m2)

Please refer to the ADEM Form 8700-12 Notification Form *Instructions* before completing this form. Information requested here is required by law (§ 3010 of the *Resource Conservation and Recovery Act).*

Notification of Regulated Waste Activity

Alabama Department of Environmental Management

(for ADEM Use Only)

I. Notification Class (*Check appropriate box and enter ID number, if known.*)

☐ **Initial Notification** ☑ **Annual Notification**

Facility's EPA ID Number
ALD008161176

II. Operating Name of Facility (Include company and specific site name)

Nouryon

Operating Name of Facility (*Continued*)

III. Change of Facility Name?

☑ **No** ☐ **Yes** *(If Yes, enter previous name of Facility below).*

IV. Location of Facility *(Physical address no P.O. Box or Route Number)*

Street
13440 Hwy 43 North

City or Town	State	Zip Code
Axis	AL	36505

V. Geographic Location (*See Instructions)*

Method	Latitude	Longitude
S	30.751159	-88.02500

County Name
Mobile

VI. Facility Contact *(Person to be contacted regarding waste activities at site)*

	Name *(First)*	*(Last)*
	Brent	Parker

Job Title	Phone Number *(Area Code and Number)*
HSE Business Pa	251-679-4315 **Ext.**

Contact Email Address *(Optional)*
brent.parker@nouryon.com

VII. Facility Mailing Address *(See Instructions)*

Street or P.O. Box
13440 Hwy 43 North

City or Town	State	Zip Code
Axis	AL	36505

VIII. Description of Facility Processes *(See instructions for NAICS Code listings)*

A. Facility Process In the space provided below, describe each of the processes at your facility that produce Regulated Wastes.

1. Chemical Conversion
2.
3.
4.
5.

B. NAICS Codes: Enter the six-digit North American Industry Classification System (NAICS) Code of the overall production, distribution, or service activity of your site. Also, provide any additional NAICS Codes that describe the specific industrial processes that are used.

Primary	2	3	4	5
325188				

IX. Ownership *(See Instructions)*

A. Legal Name of Facility

Nouryon

B. Name of Facility's Legal Owner

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*	C. Land Type	D. Owner Type	E. Operator Type	Change of Owner Indicator	Date Changed
312-544-7000	Private	Private	Private	Yes ☐ ☑ No	

F. Name of Facility's On-Site Operator

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*

312-544-7000 **Ext.**

G. Name of Facility's Parent Company

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*	Change of Owner Indicator	Date Changed
312-544-7000 **Ext.**	Yes ☐ ☑ No	

H. Name of Facility's Property Owner

Nouryon

Street, P.O. Box or Route Number

525 West Van Buren Street

City or Town	State	Zip Code
Chicago	IL	60607-3823

Phone Number *(Area Code and Number)*	Change of Owner Indicator	Date Changed
312-544-7000 **Ext.**	Yes ☐ ☑ No	

Please print or type in the unshaded areas only

X. Certification Status

Note: Pursuant to Rules 335-1-6 of the ADEM Administrative Code, all Notification Forms submitted to the Department must Include the appropriate certification fee in order to be complete.

During at least 2 month of the year, this facility will operate and/or maintain: (*Check all that apply)*

A. Hazardous Waste Activities *(Attach Schedule A)*

1. ☑ Large Quantity Generator ≥ 2,200 lbs/month (≥ 1,000 kg/month)
2. ☐ Small Quantity Generator between 221 and 2,199 lbs/month (between 101 and 999 kg/month)
3. ☐ Conditionally Exempt Generator ≤ 220 lbs/month (≤ 100 kg/month)

(Note: Household generation is exempt under 335-14-2-01(4)(b)1.)

4. ☐ Transporter/Transfer Facility
5. ☐ Treatment Facility – Combustion
6. ☐ Treatment Facility – Other than Combustion
7. ☑ Storage Facility
8. ☑ Disposal Facility

B. Used Oil Activities *(Attach Schedule B)*

1. ☑ Generator (≥ 25 gallons /month)
2. ☐ Transporter/Transfer Facility
3. ☐ Processor/Re-refiner
4. ☐ Fuel Marketer
5. ☐ Burner

C. Universal Waste Activities (*Attach Schedule C)*

1. ☐ Universal Waste Transporter
2. ☐ Large Quantity Handler ≥ 11,020 lbs (≥ 5,000 kg)
3. ☑ Small Quantity Handler < 11,020 lbs (< 5,000 kg)

Any ADEM Form 8700-12 submitted without all appropriate waste3 schedules and certification fees will not be processed.

XI. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature	**Name and Official Title (***Type or Print)*	**Date Signed**
	Angelia Simonton	12/15/2022

XI. Comments

Date Processed
(for Official Use Only)

Mail completed form, a check or money order for all appropriate certification fees, and all necessary schedules and attachments to:

Alabama Department of Environmental Management
Permits & Services Division
P.O. Box 301463
Montgomery, AL 36130-1463

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

Please print or type in the unshaded areas only

XIII. Additional Information Sheet

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule A
Certification of Hazardous Waste Management

(for ADEM Use Only)

I. Type of Hazardous Waste Activity *(Mark 'X' in the appropriate boxes; See Instructions)*

☑ **A. Hazardous Waste Generator**
- ☑ 1. 2,200 lbs (1,000 kg) per month or more (LQG)
- ☐ 2. 221 to 2,199 lbs (101-999 kg) per month (SQG)
- ☐ 3. 220 lbs (100 kg) per month or less (CESQG)
- ☐ 4. United States Importer of Hazardous Waste

☐ **B. Hazardous Waste Transporter/Transfer Facility** ††
- ☐ 1. Commercial Transporter (received wastes from others)
  - ☐ a. Air
  - ☐ b. Rail
  - ☐ c. Highway
  - ☐ d. Water
  - ☐ e. Other (Specify) _____
- ☐ 2. Self Transporter (Own Waste Only)
- ☐ Transfer Facility
  - ☐ a. Loaded trucks
  - ☐ b. Off-loaded containers
  - ☐ c. Bulk Transfer between vehicles

☑ **C. Treatment, Storage, Disposal Facility (**at Facility)††
- ☑ 1. Facilities subject to Permit
  - ☐ a. Operating Units
  - ☐ b. SWMU CA
  - ☑ c. Post closure Care
  - ☐ d. Other (Specify) _____
- ☑ 2. Permit Exempt Treatment (subject to ADEM verification)
  - ☑ a. WWTU/ENU
  - ☐ b. Recycling Unit
  - ☐ c. TETF
  - ☐ d. Generator Evaporation
  - ☐ e. Generator Physical Processing
  - ☐ f. Other (Specify)_ _____

☐ **D. Hazardous Waste Fuel Activity** ††
- ☐ 1. Blender Marketing to Burner
- ☐ 2. Other Marketers
- ☐ 3. Boiler and/or Industrial Furnace
  - ☐ a. Smelter Deferral
  - ☐ b. Small Quantity Exemption

☑ **E. Recycling Activities** (Specify)
Oil, Electronics, batteries, fluorescent tubes

†† **Note**: *A permit may be required for this activity. Contact (334) 271-7730 for more information.*

II. Hazardous Waste Generation

A. Waste Description *In the space provided, list the types of regulated waste typically generated or handled by your facility. Attach additional sheets as necessary.*

	Types of Waste Generated	Estimated Yearly Generation in lbs.
1.	Carbon Disulfide Stillbottoms	49700
2.	Crystex Plant Oil	14000
3.	Waste Paint Material	1200
4.	CS2 Tank Solids	1200

B. Characteristics of Nonlisted Hazardous Wastes. *(Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your Facility handles; See 335-14-2-03(1) – (5). Additional spaces are available on the Supplemental page if you need to list more hazardous waste numbers.)*

☑ 1. Ignitable (D001) ☑ 2. Corrosive (D002) ☑ 3. Reactive (D003) ☑ 4. Toxicity Characteristic

(List specific EPA hazardous waste number(s) for the Toxicity characteristic contaminant(s))
D018 D009 D039

C. Listed Hazardous Wastes (See 335-14-2-.04(2) – (4)); Attach the Supplemental page if you need to list more hazardous waste numbers

P022 F003 F005

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule A
Certification of Hazardous Waste Management

(for ADEM Use Only)

I. Type of Hazardous Waste Activity *(Mark 'X' in the appropriate boxes; See Instructions)*

☑ **A. Hazardous Waste Generator**
- ☑ 1. 2,200 lbs (1,000 kg) per month or more (LQG)
- ☐ 2. 221 to 2,199 lbs (101-999 kg) per month (SQG)
- ☐ 3. 220 lbs (100 kg) per month or less (CESQG)
- ☐ 4. United States Importer of Hazardous Waste

☐ **B. Hazardous Waste Transporter/Transfer Facility** ††
- ☐ 1. Commercial Transporter (received wastes from others)
  - ☐ a. Air
  - ☐ b. Rail
  - ☐ c. Highway
  - ☐ d. Water
  - ☐ e. Other (Specify) _____
- ☐ 2. Self Transporter (Own Waste Only)
- ☐ Transfer Facility
  - ☐ a. Loaded trucks
  - ☐ b. Off-loaded containers
  - ☐ c. Bulk Transfer between vehicles

☑ **C. Treatment, Storage, Disposal Facility (**at Facility)††
- ☑ 1. Facilities subject to Permit
  - ☐ a. Operating Units
  - ☐ b. SWMU CA
  - ☑ c. Post closure Care
  - ☐ d. Other (Specify) _____
- ☑ 2. Permit Exempt Treatment (subject to ADEM verification)
  - ☑ a. WWTU/ENU
  - ☐ b. Recycling Unit
  - ☐ c. TETF
  - ☐ d. Generator Evaporation
  - ☐ e. Generator Physical Processing
  - ☐ f. Other (Specify)_ _____

☐ **D. Hazardous Waste Fuel Activity** ††
- ☐ 1. Blender Marketing to Burner
- ☐ 2. Other Marketers
- ☐ 3. Boiler and/or Industrial Furnace
  - ☐ a. Smelter Deferral
  - ☐ b. Small Quantity Exemption

☑ **E. Recycling Activities** (Specify)
Oil, Electronics, batteries, fluorescent tubes

†† **Note**: *A permit may be required for this activity. Contact (334) 271-7730 for more information.*

II. Hazardous Waste Generation

A. Waste Description *In the space provided, list the types of regulated waste typically generated or handled by your facility. Attach additional sheets as necessary.*

	Types of Waste Generated	**Estimated Yearly Generation** in lbs.
1.	Empty Aerosol Cans	400
2.	Parts Washer Waste	3000
3.		
4.		

B. Characteristics of Nonlisted Hazardous Wastes. *(Mark 'X' in the boxes corresponding to the characteristics of nonlisted hazardous wastes your Facility handles; See 335-14-2-03(1) – (5). Additional spaces are available on the Supplemental page if you need to list more hazardous waste numbers.)*

☑ 1. Ignitable (D001) ☑ 2. Corrosive (D002) ☑ 3. Reactive (D003) ☑ 4. Toxicity Characteristic

(List specific EPA hazardous waste number(s) for the Toxicity characteristic contaminant(s))
D018 D009 D039

C. Listed Hazardous Wastes (See 335-14-2-.04(2) – (4)); Attach the Supplemental page if you need to list more hazardous waste numbers

P022 F003 F005

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

II. Hazardous Waste Generation (*continued)*

III. Hazardous Waste Transporter/Transfer Facility

During a typical year, this facility transports/transfers_____ **of Hazardous Waste.**
(quantity in pounds)

IV. Treatment, Storage, Disposal Facility (at Facility)

During a typical year, this facility treats 0 **of Hazardous Waste.**
(quantity in pounds)

During a typical year, this facility stores 0 **of Hazardous Waste.**
(quantity in pounds)

During a typical year, this facility disposes 0 **of Hazardous Waste.**
(quantity in pounds)

V. Hazardous Waste Fuel Activity

During a typical year, this facility markets _____ **of Hazardous Waste.**
(quantity in pounds)

During a typical year, this facility combusts _____ **of Hazardous Waste.**
(quantity in pounds)

VI. Recycling Activity

During a typical year, this facility recycles 100000 **of Hazardous Waste.**
(quantity in pounds)

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

Comments:
We have one permitted RCRA facility which is in post closure. We operate as a 90 day large quantity generator.

II. Hazardous Waste Generator (Supplemental)

D. Listed and Nonlisted Hazardous Waste Codes. *[See 335-14-2-.04(2) – (4) and 335-14-2-.03(1) – (5)] If you need to list more hazardous waste numbers, attach copies of this page as necessary*

II. Hazardous Waste Generator (Supplemental)

D. Listed and Nonlisted Hazardous Waste Codes. *[See 335-14-2-.04(2) – (4) and 335-14-2-.03(1) – (5)] If you need to list more hazardous waste numbers, attach copies of this page as necessary*

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule B
Certification of Used Oil Management

(for ADEM Use Only)

I. Type of Used Oil Management Activity (See Instructions)

☑ **A. Used Oil Generator/Collector**
- ☑ 1. On-site Generation Only
- ☐ 2. Do-it-yourself Collection Center (i.e., from off-site source)
- ☐ 3. Collection Center (i.e., from off-site source)
- ☐ 4. Aggregation Point (i.e., from off-site source)

☐ **B. Used Oil Fuel Marketer**
- ☐ 1. Directs Shipment of Used Oil to Off-Specification Burner
- ☐ 2. First Claims Used Oil Meets Specification Fuel
- ☐ 3. burns Only Used Oil Generated On-site as On-Specification Fuel

☐ **C. Off-Specification used Oil Burner**
- ☐ 1. Burns Only Off-Specification Used Oil Generated On-Site
- ☐ 2. Indicate Type(s) of Devices
  - ☐ a. Utility Boiler
  - ☐ b. Industrial Boiler
  - ☐ c. Industrial Furnace

☐ **D. Used Oil Transporter ††**
- ☐ 1. Only For Used Oil Generated On-site
- ☐ 2. Operates a Transfer Facility

☐ **E. Used Oil Processor/Re-refiner**

†† **NOTE:** A permit is required for this activity. Contact (334) 271-7758 for more information

II. Used Oil Generation

During a typical year, this facility collects/generates 96450 _____ **of Used Oil.**
(quantity in pounds)

III. Used Oil Fuel Marketer

During a typical year, this facility markets _____ **of Used Oil.**
(quantity in pounds)

IV. Used Oil Burner

During a typical year, this facility burns _____ **of Used Oil.**
(quantity in pounds)

V. Used Oil Transporter

During a typical year, this facility transports _____ **of Used Oil.**
(quantity in pounds)

VI. Used Oil Processor/Re-refiner

During a typical year, this facility processes/re-refines _____ **of Used Oil.**
(quantity in pounds)

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

Comments:
Calculated using 1 gallon of oil is 7.7 lbs of oil

Facility's EPA ID Number
ALD008161176

(R-10/23/2024)

Please print or type in the unshaded areas only

Please refer to the ADEM Form 8700-12 Notification Form Instructions before completing this form. Information requested here is required by law (§ 3010 of the Resource Conservation and Recovery Act).

ADEM Form 8700-12

Schedule C

Certification of Universal Waste Management

(for ADEM Use Only)

I. Type of Used Universal Waste Activity (See Instructions)

☐ **A. Universal Waste Transporter**

☐ **B. Large Quantity Handler**

	Estimated Yearly Amount (in lbs)	
	Accumulated	**Generated**
1. Battery(ies)		
2. Pesticide(s)		
3. Thermostat(s)		
4. Lamps		
5. Other (specify)_____		

☑ **C. Small Quantity Handler**

	Estimated Yearly Amount (in lbs)	
	Accumulated	**Generated**
1. Battery(ies)	100	100
2. Pesticide(s)	0	0
3. Thermostat(s)	0	0
4. Lamps	100	100
5. Other (*specify)*_____		

II. Universal Waste Transporter

During a typical year, this facility transports _____ **of Universal Waste.**

(quantity in pounds)

III. Universal Waste Handler

During a typical year, this facility handles 200 _____ **of Universal Waste.**

(quantity in pounds)

Note: In order for this schedule to be accepted by ADEM, it must be attached to a completed Notification of Regulated Waste Activity, ADEM Form 8700-12, and must include the appropriate certification fees, as required by 335-1-6.

Comments:

Facility's EPA ID Number

ALD008161176

(R-10/23/2024)

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Part A and Part B Post-Closure Permit Renewal Application (Volume 2 of 2)

Nouryon Chemicals, LLC

LeMoyne Site

13440 Highway 43 North

Axis, Alabama 36505

USEPA ID No. ALD008161176

February 29, 2024

Appendix B

Post-Closure and Corrective Measures Monitoring and Analysis Plan

Post-Closure and Corrective Measures Monitoring Plan

LeMoyne Site
13440 Highway 43 North
Axis, Alabama 36505
USEPA ID #ALD008161176

February 29, 2024

Post-Closure and Corrective Measures Monitoring Plans and Procedures

LeMoyne Site

Axis, Mobile County, Alabama

USEPA ID #ALD008161176

February 29, 2024

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Appendix B-3 **Example Chain of Custody**

1 Introduction

This document presents the Post-Closure and Corrective Measures Monitoring Plan (Plan) for the Nouryon Chemicals, LLC. LeMoyne Plant located in Axis, Mobile County, Alabama. The Plan outlines the groundwater monitoring procedures as required by the Alabama Hazardous Waste Management and Minimization Act (AHWMMA) Permit No. ALD008161176 ("the Permit"). All procedures in this plan are prepared in general accordance with the most recent edition of the Alabama Environmental Investigation and Remediation Guidance (AEIRG) and Alabama Department of Environmental Management (ADEM) Admin. Code R. 335-14.

1.1 Current Groundwater Monitoring

Routine groundwater quality monitoring has been conducted at the Lemoyne Plant since 1981 with reports submitted to the ADEM and United States Environmental Protection Agency (USEPA) documenting the results of the monitoring events. The post-closure groundwater monitoring program outlined in the current Permit requires detection monitoring for the New Brine Mud Pond and the effectiveness of the corrective measures program for AOC A and AOC M. The monitoring program includes monitoring of carbon disulfide concentration reductions at AOC A and AOC M, and detection monitoring of total mercury at the New Brine Mud Pond (NBMP). A Site Layout showing all LeMoyne Plant monitoring wells associated with the RCRA and CERCLA programs is provided a **Figure B-1**.

1.2 Detection Monitoring Program (NBMP)

As part of post-closure care for the NBMP, detection monitoring has been implemented to detect total mercury concentrations related to post-closure care. The monitoring program includes a semi-annual schedule for monitoring 10 wells (**Figure B-2**): three wells hydraulically upgradient (O-59, O-60, and O-61); and seven downgradient of the NBMP. Three downgradient wells (O-62, O-63, and O-64) were installed in 1981 and the four other downgradient wells were constructed in 1987 (O-81, O-82, O-83, and O-84). Two program wells are used for groundwater elevation mapping (O-67 and O-68). Well construction details are shown in **Table B-1**. The point of compliance wells are located within 100 feet of the closed unit boundary, in the downgradient direction from the downgradient edge of the former waste management area. In accordance with the Permit, the detection monitoring wells are sampled semi-annually for the analysis of total mercury.

1.3 Corrective Measures Effectiveness Monitoring Program (AOC A and AOC M)

The Corrective Measures Monitoring Program was implemented to measure remedial effectiveness at AOC A and AOC M. The corrective measure for each AOC includes the following:

- AOC A – Soil Vapor Extraction System (see AOC A CMIP in **Appendix C** of the Permit Renewal Application)
- AOC M – Groundwater Extraction System (see AOC M CMIP in **Appendix D** of the Permit Renewal Application)

The monitoring wells for AOC A and AOC M are included in **Table B-1** and shown in **Figure B-3**. In accordance with the Permit, the corrective measures monitoring wells are sampled on a quarterly basis for the analysis of

carbon disulfide and carbon tetrachloride. A summary of the AOC A and AOC M monitoring well designations follows:

- AOC A monitoring wells:
  - Groundwater Extraction (EXT) Well IW-6R
  - Effectiveness (EFF)/Point of Compliance (POC) Wells MW-30, O-44, O-45, O-46, O-47
  - Boundary (BDY) Wells O-30, O-76
- AOC M monitoring wells:
  - EXT Well IW-6R
  - EFF/POC Wells O-36, O-29, O-30, O-39
  - BDY Wells O-30, O-76

When evaluating the monitoring results to determine the effectiveness of the corrective measures, the AOC A and AOC M monitoring program:

- Determines if the corrective action system effectively addresses the entire constituent plume;
- Determines if the concentration of the constituents are decreasing (pH increasing or decreasing toward neutrality, as applicable) in the effectiveness wells;
- Determines if constituents are being released into the environment; and,
- Determines if hazardous constituents have been detected in the boundary wells.

2 Groundwater Monitoring Procedures

2.1 Procedure for Well Integrity and Security Inspection

Monitoring wells are inspected to verify that the well is locked, and that the well casing and apron are in good condition. If the well is not locked, or casing or the apron is not in good condition, immediately notify the Nouryon project manager. A qualified contractor under the supervision of an Nouryon project manager will make any repairs to wells, aprons, or well casings.

Nouryon will redevelop any monitoring well when either of the following two conditions occur:

1. Silt or sediment is determined to have entered the well and has accumulated to a depth of one foot, or 20 percent of the screen length, whichever is less; or
2. Yield from the well is noted to have significantly decreased or recovery time has significantly increased, indicating clogging of the screen and/or sand filter.

Repairs to the well above the casing and the apron can be made so long as the well below ground is in good condition. If the groundwater monitoring well is damaged beyond repair, the damaged well must be reported to ADEM within 24 hours and replaced in accordance with permit conditions.

Obstruction of the well is normally a result of equipment that may be caught at an awkward angle. If something is lodged in the pipe, attempt a visual inspection with a flashlight and try to remove it. If the obstruction cannot be moved, do not attempt to purge the well. Notify Nouryon project engineer immediately.

2.2 Procedure for Determination of Groundwater Elevation for each Well

To collect data for potentiometric mapping, the depth of the well and the depth of water in each well will be measured and recorded before purging any wells. The static depth-to-water will be measured in each well in the groundwater monitoring system, and the total depth of the well will be sounded using an electronic water level indicator. The water level is measured as the distance from the water surface to the marked edge (notched edge) at the top of the well casing. Measurements will be made to the nearest 0.01 foot and recorded. After each use, the electric water level device will be carefully rinsed with distilled water to prevent cross- contamination.

2.3 Well Evacuation Procedure

Low flow/low volume purging techniques/procedures are used to minimize purged water volumes and minimize sediment introduction into the sample. Low flow procedures will follow the AEIRG. Flow rates do not exceed the recharge rate of the aquifer (no decrease in the water level in the monitoring well). The pump intake is placed within the screened interval at the zone of sampling, preferably, the zone with the highest flow rate. The water level is monitored with a water level recorder or similar device while pumping. Low flow purging techniques are acceptable for use in aquifers that exhibit relatively high to moderate transmissivities. The following low flow purging procedures will be followed:

1. Low-flow purging will be limited to monitoring wells that, with sustained pumping, exhibit no continuous drawdown. Water levels are measured and recorded before pumping. Purging will be initiated and the flow adjusted to a rate that results in minimal (< 0.1 meter) well drawdown. Water levels and flow rates will be recorded every 5 to 10 minutes during purging and upon completion of sampling. The optimum pumping rate for each well will be determined from this information and recorded for future reference.
2. The tubing/pump intake will be located near the middle of the screened interval to avoid mixing formation water with sediments in the well bottom or the overlying stagnant water within the well casing. A peristaltic pump or bladder pump will be utilized for the low flow sampling procedures.
3. Purge rates for low-flow sampling will typically be 0.1 – 0.5 liter per minute (L/min). A higher purge rate may be acceptable, based on the site hydrology and will be determined at each well location. If purge rates greater than 0.25 L/min are used, pump lines will be cleared using a flow rate less than 0.25 L/min prior to sample collection for analysis of volatile organic compounds (VOCs).
4. The minimum purge volume will be the equivalent of at least twice the combined volumes of the sampling equipment.
5. An in-line flow-through-cell will be used for field-parameter measurements of temperature, specific conductance, pH, dissolved oxygen, oxidation-reduction potential, Turbidity measured in nephelometric turbidity units (NTUs), using a turbidity meter, will also be included as a stabilization parameter. The well will be purged until water quality parameters (temperature, specific conductance, DO, ORP, pH, and turbidity) have stabilized for three consecutive measurements taken at 3- to-5-minute intervals. The stabilization of groundwater chemistry parameters will be assessed in accordance with the criteria included in the AEIRG, most recent edition.
6. All purge data, including purge volumes, elapsed times, pump-flow rates, and water-level and values for geochemical parameters will be recorded on field data sheets. The pumping rate used for sampling will be the same or less than the purging rate and will be sufficiently low to minimize sample aeration. When

collecting samples for VOC analysis, pumps will be operated at rates less than 0.25 L/m in, and the discharge from the pump will be a thin, continuous stream of water when filling the sample vial. Field-parameter measurements will be submitted with sampling results.

2.4 Record Keeping and Field Parameters

A field record will be made in a bound paginated field notebook or data tablet during sample collection. The Contractor will complete an Nouryon well monitoring sheet for each well that is sampled and submit them to Nouryon in a formal report. The following information will be recorded. An example sample log sheet is provided in **Appendix B-1**.

General Information

- Reason for sampling
- Significant weather conditions
- Sampler's Identity
- Name and location of laboratory performing analyses
- Sample container description

Individual Well Information

- Well number, location
- Depth of well as referenced from top of well casing
- Depth to water in well prior to purging
- Sampling method

Individual Sample Information

- Time and date of sample
- Sample identification Number
- Appearance of sample
- Sample temperature
- Sample conductivity
- Sample pH
- Analytical determination to be performed

2.5 Sample Collection, Preservation and Shipment

After the well has been properly purged, sample collection can proceed. The pumping rate for sampling will be the same or less than the purging rate and will be sufficiently low to minimize sample aeration. When collecting samples for VOC analyses, pumps will be operated at rates less than 0.25 L/min, and the discharge from the pump will be a thin, continuous stream of water when filling the sample vial. Groundwater samples will be poured directly into the laboratory-supplied containers.

Containers will be filled to the neck of the bottle. If necessary for sample preservation, laboratory-issued containers may include a measured volume of appropriate preservative (**Table B-2**). Vials for VOC analyses will be filled to form a meniscus at the top of the vial to avoid headspace.

Each sample container will be carefully labeled as to its contents, sample location, date, time, and name of sampler. The labeled information will be transferred to the Sampling Field Data Form for each well sampled. The full sample containers with tightened caps will be placed in ice chests and maintained at 4 degrees Celsius throughout the period.

Table B-2 presents the analytical method, container type, preservation, and holding time for the parameters which will be analyzed. The laboratory selected for water testing will provide the sample bottles needed for analysis, as shown in **Table B-2**. Bottles will be properly cleaned and sterilized prior to delivery to the well site. In addition to preservation provided by chilling in an ice chest at 4 degrees Celsius, samples may be preserved as shown in **Table B-2**. Sample handling and analysis is performed according to the applicable standard methodology. A copy of the applicable standard operating procedures for sample handling and analysis used by the contract laboratory is included in **Appendix B-2**.

Table B-2 Groundwater Sampling Analysis Plan Container, Preservative, Holding Time, and Analytical Method

Parameters	Method	Container	Preservative	Holding Time
Carbon Disulfide and Carbon Tetrachloride (AOC A and M)	8260	2-3 40 ml VOA Vials	HCL to pH<2 Cool to 4°C, +/- 2 °C	14 days
Total Mercury (New Brine Mud Pond)	7470 A	500 ml Plastic Bottle	HNO3 to pH<2, Cool to 4°C, +/- 2 °C	60 days

2.6 Quality Control

In addition to the samples required for RCRA analyses, the following samples will be included for quality control and assurance:

- Field Blank – 1 per week during the sampling event
- Duplicate sample – 10 percent frequency
- Pump Rinsate – 1 per sampling episode
- Sample Spike per sampling episode
- Spiked Field Blank per sampling episode

Field Blank — Deionized water will be carried to each sampling location and transferred to bottles of the same type as those used for sample collection. These deionized water samples collected weekly will serve as field blanks. Each field blank is handled as a unique well sample and is recorded in the RCRA field log as a field blank sample. A sample identification number is assigned, and the samples are labeled accordingly.

Duplicate Sample — The amount of sample collected at the well is doubled. The second set of samples is treated like a unique RCRA well sample. The well number and reason for sampling and sample identification number are recorded in the RCRA field logbook. The sample description in the logbook includes the word duplicate. The

samples are assigned a unique sample identification number and labeled accordingly. At least one set of true duplicate samples is collected each sampling episode.

Pump Decontamination Rinsate Sample - After each collection, the pump will be triple rinsed with distilled water between uses. A sample of the final rinse water is once per event to determine the quality of the decontamination procedures. The sample will be collected in laboratory supplied bottles and labeled accordingly.

Duplicate Spiked Sample -- The amount of sample collected at the well is doubled. The second set of samples is treated like a unique RCRA well sample. The well number, reason for sampling and sample identification number are recorded in the field logbook. The sample description in the logbook includes the worked duplicate spike. The sample are assigned a unique sample identification number and labeled accordingly.

Adding a known volume of the constituent being analyzed to the sample or blank makes spiked samples. The contract laboratory will provide standard solutions for spiking samples and will add them to the samples at the lab.

Spiked Blanks - The amount of water dispensed for blank samples will be doubled. The second set of samples is treated like a unique RCRA well sample. The well number and reason for sampling and sample identification number are recorded in the field logbook. The sample description in the logbook includes the words "Blank Spike". The samples are assigned a unique sample identification number and labeled accordingly.

Adding a known volume of the constituent being analyzed to the sample or blank makes spiked samples. The contract laboratory will provide standard solutions for spiking samples and will add them to the samples at the lab.

Sampling Episode - One of the semi-annual RCRA sampling events.

2.7 Chain-of-Custody Control

At the time of sampling, the person collecting the sample will record in the field log:

- Sample identification number
- Date and time of sample collection
- Source of sample
- Preservatives
- Analysis to be performed

The field log will be signed and dated by the person making the entries.

A waterproof label with the sample identification number and information about the analysis to be performed will be affixed to the sample bottle at the time of sampling.

Each bottle cap will be sealed immediately after sample collection and preservation.

The mode of shipment of the samples to a laboratory for analysis will be documented in the field log. Upon arrival at the laboratory, a sample custodian will receive the samples and record the date and time of receipt, the condition of each sample and sample seal, and the sample identification numbers in a permanently bound logbook. These log book entries will be signed and dated by the sample custodian. The samples will be stored in a secure, refrigerated area.

The sample custodian, or a designated representative, will distribute the samples to the laboratory personnel performing the analyses. The analyst will record the sample number, date, time, and condition of the sample seal in a permanently bound laboratory notebook, which will be signed and dated.

The entries into the field log , laboratory log books, and laboratory analyst's notebook will constitute the chain-of-custody record.

2.8 Decontamination of Equipment

The procedures described in this section will be followed during groundwater sampling to maintain quality control of the samples and reduce the possibility of cross-contamination:

- Monitoring wells will be purged and sampled in the order from least to most contaminated.
- If a stainless-steel submersible purge pump or bladder pump is used during well evacuation, the pump will be triple rinsed with distilled water between uses.
- If disposable bailers or decontaminated re-usable bailers are used to collect groundwater samples, the cord used to lower the bailer will be discarded after each well.
- If polyethylene tubing is used during low flow sampling procedures, the tubing will be discarded after each use.

2.9 Analytical Procedures

The laboratory Quality Assurance Manual has been included in **Appendix A**.

Table B-3 Laboratory Analysis

Analyte	SW-846 Method No.
VOCs (Carbon Disulfide and Carbon Tetrachloride)	8260 C
Total Mercury	7470 A

2.10 Confirmation of Proper Sampling and Analysis Procedures

Field blank, duplicate, matrix spike, and matrix spike duplicates will be used to confirm proper sampling and analysis procedures. A field blank of distilled deionized water will be carried to each sampling location and transferred to bottles of the same type as those used for each of the samples collected and submitted to the laboratory for analysis. One true duplicate sample will be collected per sampling episode and submitted for the same analyses. Additionally, one matrix spike (groundwater) and one blind (deionized water) spike sample will be collected per episode and analyzed for the determination of recovery values.

2.11 Annual Determination of the Uppermost Aquifer Flow Rate

Static water level elevation data from monitor wells upstream and downstream of the regulated unit are made during the groundwater monitoring. All of these measurements should be made on the same day, if possible.

The static water-level elevation data and the horizontal distance between the paired depth (shallow, medium, or deep) wells are used to calculate the groundwater gradient values. Using the gradient values and data on the hydraulic conductivity of the aquifer, the groundwater flow rates are calculated.

2.12 Post-Closure Statistical Evaluation Procedure (New Brine Mud Pond)

Statistical evaluation of indicator parameters will be determined using the Analysis of Variance (ANOVA) in accordance with ADEM Admin Code R. 335-14-8-.02(5)(c)6.(iv) and 335-14-5-.06(8)(h). EPA guidance will also be used to evaluate the analytical data (*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance March 2009 EPA 530/R-09-007)*. For any indicator parameters, which are below the reporting limit, control charts will be used until such time as a level is detected. Once the statistically significant event is confirmed, the ANOVA statistical evaluation will be applied to the data.

2.12.1 Time Constraints

Analyses of samples must be completed within holding times recommended by EPA SW-846. Statistical evaluation must be completed within 45 days of the sampling event. A written report of the results of groundwater monitoring data must be submitted to ADEM annually. If a statistically significant event occurs, then the report of the statistically significant increase must be submitted within 7 days of the confirmation of the statistically significant event.

2.12.2 Procedure to be Implemented if a Statistically Significant Increase in any Constituent or Parameter is Identified at any Compliance Monitoring Well

If a significant increase was indicated by the statistical evaluation procedure, the sampling and analysis procedure described in the preceding sections first would be repeated with a fresh sample from the compliance well. If the second set of analyses confirms a statistically significant difference in the indicator parameter, the ADEM will be contacted within 7 days of the confirmation. Unless it can be demonstrated that the source is other than the regulated unit, a Compliance Monitoring Program and a Corrective Action Program will be developed as appropriate and submitted to ADEM for review.

Water samples will be handled in a manner that minimizes potential for accidental sample contamination. A minimum number of personnel will be responsible for sample procurement, storage, and transport. Sample analysis request forms will accompany each sampling event. Sampling Field Data Forms will be used to record field measurements and sampling analysis. Chain of custody forms will accompany the samples to the laboratory facility. Samples will be included in the Master Log-In Book upon arrival at the laboratory facility. An example of an appropriate chain of custody form and the typical information recorded is included as **Appendix B-3**.

3 Reporting

Annual detection monitoring (New Brine Mud Pond) and annual corrective measures (AOC A and M) reports will continue to be submitted to include data from groundwater monitoring, analysis, and conclusions regarding the

program. If the analysis of the data warrants any changes to the long-term monitoring programs, recommendations for revisions will be included in the annual report.

3.1 Annual Corrective Measures Effectiveness Report (AOC A and AOC M)

The Annual Corrective Measures Effectiveness Report (ACMER) for AOC A and AOC M will include:

- Site history or reference to previously submitted site history.
- Descriptions of the corrective measures effectiveness and progress, including changes to site geochemical, hydraulic, or vapor extraction conditions over the annual period.
- Groundwater monitoring activities including sample locations and dates, analytical methods, method reporting limits, quality assurance and quality control.
- A map of the groundwater monitoring system.
- Groundwater potentiometric and flow direction mapping.
- Constituent concentration mapping and isoconcentration plume mapping.
- Constituent concentration trend analysis and time versus concentration graphs.
- Tables of carbon disulfide concentration(s) comparisons to the Groundwater Protection Standard.

3.2 Annual Detection Monitoring Report (New Brine Mud Pond)

The Annual Detection Monitoring Report for the New Brine Mud Pond will include:

- Site history or reference to previously submitted site history.
- Descriptions of any changes to site geochemical or hydraulic conditions over the annual period.
- Groundwater monitoring activities including sample locations and dates, analytical methods, method reporting limits, quality assurance and quality control.
- A map of the groundwater monitoring system.
- Groundwater potentiometric and flow direction mapping.
- Tables of laboratory analytical results with comparison to the Groundwater Protection Standard(s).
- A summary of the statistical analysis performed to determine whether there is statistically significant evidence of mercury above background levels at each monitoring well.
- The statistical analysis must be completed each semi-annual period within 45 calendar days after completion of each sampling event. The statistical evaluation of monitoring well analytical data will be performed pursuant to ADEM Admin. Code r. 335-14-5-.06(9)(f).

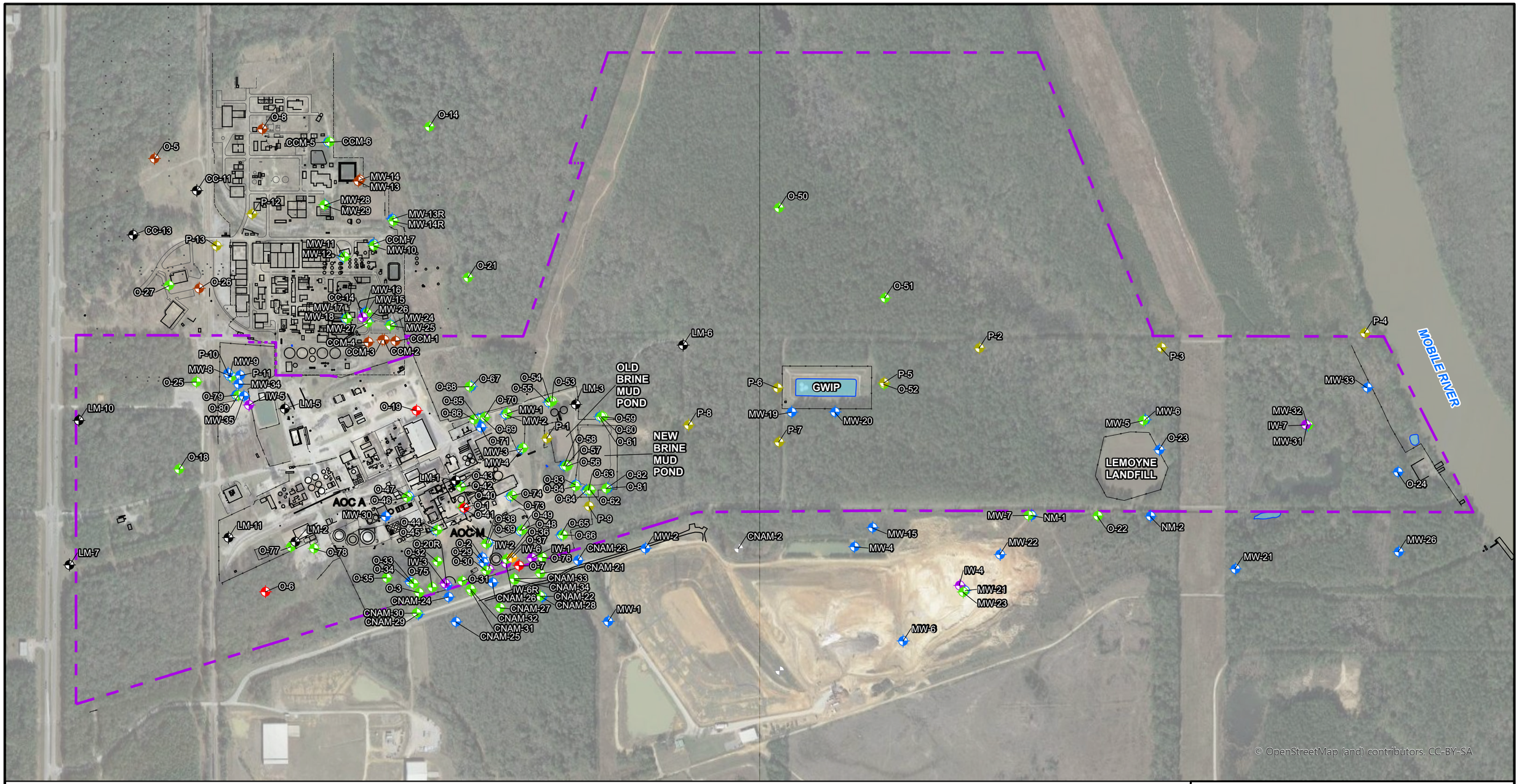
Table

Table B-1
Monitoring Well Designation
Nouryon Chemical LLC
USEPA I.D. ALD 008 161 176
Axis, Alabama

WELL NUMBER	WELL TYPE *	WELL LATITUDE (or Northing)**	WELL LONGITUDE (or Easting)**	UNIT(S) MONITORED	WELL DEPTH (ft)	GROUND ELEVATION (ft. MSL)	TOP-OF-RISER ELEVATION (ft. MSL)	SCREENED INTERVAL (ft. MSL)	MONITORED ZONE
O-59 RCRA	BKG	N 30° 52′ 01.26″	W 92° 41′ 25.40″	New Brine Mud Pond 5EP-202	123	36.322	38.861	107-117	Deep
O-60 RCRA	BKG	N 30° 52′ 01.25″	W 92° 41′ 25.54″	New Brine Mud Pond 5EP-202	96	36.282	38.492	73-93	Intermediate
O-61 RCRA	BKG	N 30° 52′01.25″	W 92° 41′ 25.68″	New Brine Mud Pond 5EP-202	70	36.035	38.487	57-67	Upper
O-62 RCRA	POC	N 30° 51′56.01″	W 92° 41′ 26.09″	New Brine Mud Pond 5EP-202	120	33.989	35.818	104-114	Deep
O-63 RCRA	POC	N 30° 51′56.00″	W 92° 41′ 26.26″	New Brine Mud Pond 5EP-202	93	34.010	35.959	80-90	Intermediate
O-64 RCRA	POC	N 30° 51′55.00″	W 92° 41′ 26.44″	New Brine Mud Pond 5EP-202	76	33.468	35.506	64-74	Upper
O-81 RCRA	POC	N 30° 51′56.06″	W 92° 41′ 24.86″	New Brine Mud Pond 5EP-202	65	33.774	36.322	47.5-62.5	Upper
O-82 RCRA	POC	N 30° 51′56.04″	W 92° 41′ 24.99″	New Brine Mud Pond 5EP-202	120	33.631	36.274	97.5-112.5	Deep
O-83 RCRA	POC	N 30° 51′56.21″	W 92° 41′ 27.63″	New Brine Mud Pond 5EP-202	65	33.938	36.743	47.5-62.5	Upper
O-84 RCRA	POC	N 30° 51′56.08″	W 92° 41′ 27.64″	New Brine Mud Pond 5EP-202	120	33.907	37.013	97.5-112.5	Deep
O-67 RCRA	PGM	N 30° 52′03.13″	W 92° 41′ 36.97″	New Brine Mud Pond 5EP-202	77	24.821	27.254	54-74	Upper
O-68 RCRA	PGM	N 30° 52′03.11″	W 92° 41′ 37.14″	New Brine Mud Pond 5EP-202	119	24.884	27.441	96-116	Deep
MW-30	EFF/POC	352592.288	1805829.690	AOC A	50	37.681	41.027	40-50	Upper
O-44	EFF/POC	352490.575	1806216.676	AOC A	119	33.822	36.623	99-119	Deep
O-45	EFF/POC	352486.414	1806206.341	AOC A	92	33.566	35.136	71-91	Upper-Inter
O-46	EFF/POC	352737.310	1805989.866	AOC A	126	37.655	39.591	106-126	Deep
O-47	EFF/POC	352743.704	1806003.904	AOC A	92	37.590	39.810	71-91	Upper-Inter
IW-6R	REC	352239.953	1806733.77	AOC M	125	40.087	40.517	75-125	Deep
O-36	EFF/POC	352272.095	1806738.195	AOC M	128	38.940	40.878	108-128	Deep
O-29	EFF/POC	352244.509	1806566.269	AOC M	88	35.501	36.126	58-88	Upper-Inter
O-30	EFF/POC /BDY	352185.541	1806584.383	AOC A/M	117	35.141	36.509	97-117	Deep
O-39	EFF/POC	352392.568	1806598.036	AOC M	89	31.885	32.525	69-89	Upper-Inter
O-76	BDY	352285.056	1807005.006	AOC A/M	114	32.685	35.010	54-114	Upper-Deep

* Well Type:
POC - Point of Compliance Wells
PGM - Piezometers and/or General Monitoring Wells
BKG - Background Wells
EFF – Effectiveness Monitoring Wells
BDY – Boundary Monitoring Wells
REC – Recovery Wells
* Well Locations were re-surveyed in May 2017 in Alabama State Plane Coordinate System (NAD83)

Figures



LEGEND

- DEEP MONITORING WELL
- PLANT PRODUCTION WELL
- PIEZOMETER
- SHALLOW MONITORING WELL
- INTERCEPT WELL
- FORMER IW-6 - ABANDONED
- WELL NOT ON NEW SURVEY
- OFFSITE WELL
- WELL NO LONGER IN SERVICE
- PROPERTY LINE
- FENCING
- BUILDING
- SITE FEATURE
- POND

NOTE:
ALL LOCATIONS ARE APPROXIMATE.

N

0 700 1,400
Feet

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
2023 RCRA PERMIT RENEWAL APPLICATION

SITE LAYOUT

ARCADIS

FIGURE
B-1

CITY:(DEN-TECH) DIV/GROUP:(ENV/GIS) DB: ACARLONE LD: PIC: PM: TM:
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LEGEND

- DEEP MONITORING WELL
- SHALLOW MONITORING WELL
- FENCE
- RAILROAD
- STREAM
- WATER BODY
- SOLID WASTE MANAGEMENT UNIT
- BUILDING
- TANK

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   SWMU = SOLID WASTE MANAGEMENT UNIT
3. PROJECTION: NAD 1983 STATE PLANE ALABAMA WEST, US FEET
4. DATA SOURCES:
   NOURYON FUNCTIONAL CHEMICALS, LLC. - SITE LAYOUT, WELL NETWORK

0 100 200

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

NEW BRINE MUD POND PERMIT AREA

ARCADIS

FIGURE
B-2

Basemap Source: Esri, NASA, NGA, USGS, FEMA, Google, City of Mobile GIS Department, CONANP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS, accessed 2/1/2024.

LEGEND

- DEEP MONITORING WELL
- SHALLOW MONITORING WELL
- INTERCEPT WELL
- FENCE
- RAILROAD
- STREAM
- WATER BODY
- SOLID WASTE MANAGEMENT UNIT
- BUILDING
- TANK

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   SWMU = SOLID WASTE MANAGEMENT UNIT
3. PROJECTION: NAD 1983 STATE PLANE ALABAMA WEST, US FEET
4. DATA SOURCES:
   NOURYON FUNCTIONAL CHEMICALS, LLC. - SITE LAYOUT, WELL NETWORK

0 120 240

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
RCRA PERMIT RENEWAL APPLICATION 2023

PERMIT AREAS AOC A AND M

ARCADIS

FIGURE
B-3

Basemap Source: Esri, NASA, NGA, USGS, FEMA, Google, City of Mobile GIS Department, CONANP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS, accessed 1/31/2024.

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Appendix B-1

Sample Log Sheet

Groundwater Sampling Form

ARCADIS

Project Number	Well ID		Date
Project Name/Location	Weather(°F)		
Measuring Pt. Description	MP Elevation	Casing Diameter (in)	Well Casing Material
Static Water Level (ft-bmp)	Total Depth (ft-bmp)	Water Column (ft)	Gallons in Well
Purge Start	Pump Intake (ft-bmp)	Purge Method	Purge Equipment
Purge End	Volumes Purged	Sample ID	Sampled by
Sample Time	Gallons Purged	Replicate/ Code No.	Sample Type

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallon Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor

Constituent Sampled	Container	Number	Preservative

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot 1 = 0.04; 1.5 = 0.09; 2.5 = 0.26; 3.5 = 0.50; 6 = 1.47
1.25 = 0.06; 2 = 0.16; 3 = 0.37; 4 = 0.65

Well Information

Well Location: _____ Well Locked at Arrival: _____

Condition of Well: _____ Well Locked at Departure: _____

Well Completion: _____ Key Number To Well: _____

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = milliv

Appendix B-2

Laboratory Standard Operating Procedures

Quality Assurance Manual

Eurofins Savannah
5102 LaRoche Avenue
Savannah, GA
Telephone: 912-354-7858

www.eurofinsus.com/environment-testing

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1.0 Title Page

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3.0 INTRODUCTION, SCOPE AND APPLICABILITY

3.1 Introduction and Compliance References

Eurofins Savannah's Quality Assurance (QA) Manual is a document prepared to define the overall policies, organization objectives and functional responsibilities for achieving the

laboratory's QA Program. Governing SOPs are in place within the organization to ensure the proper execution of this QA Manual (refer to Appendix 1). This manual and referenced documents are required reading for all personnel.

The laboratory is a team of people who work together to serve the health and environmental needs of society through science and technology. We offer comprehensive expertise in environmental laboratory applications *OR* maintain a local perspective in its scope of services and client relations and maintain a national perspective in terms of quality.

As such, this QA Manual has been prepared to assure compliance with The NELAC Institute (TNI) Standard, dated 2009 and 2016; ISO/IEC Guide 17025:2005 and 2017 and the Department of Defense (DoD) Quality Systems Manual (QSM). Policies and procedures listed in Appendix 1 are compliant with the National Divisional Support Center (NDSC) Quality Management Plan (QMP) for Eurofins Environment Testing, Eurofins Savannah and the various accreditation and certification programs which are held by the laboratory to support environmental work (Appendix 2). The QMP provides a summary of Eurofins Savannah's quality and data integrity system. It contains requirements and general guidelines under which all Eurofins facilities shall conduct their operations.

Refer to Appendix 3 for a list of additional references for which this QA Manual is compliant; and Appendix 4 for the compliance crosswalk of this manual to the TNI & ISO/IEC Guide 17025 requirements.

3.2 Terms and Definitions

A QA Program is a system designed to ensure that data produced by the laboratory conforms to the standards set by state and/or federal regulations. The program functions at the local management level through company goals, from guidance at the executive management level and at the analytical level through Standard Operating Procedures (SOPs) and quality control. Our program is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization to better serve our clients.

Refer to Appendix 5 for a list of Terms and Acronyms.

3.3 Scope / Fields of Testing

The laboratory analyzes a broad range of environmental and industrial samples. Sample matrices vary among air, drinking water, effluent water, groundwater, hazardous waste, sludge and soils. The QA Program contains specific procedures and methods to test samples of differing matrices for chemical, physical and biological parameters. The Program also contains guidelines on maintaining documentation of analytical processes, reviewing results, servicing clients and tracking samples through the laboratory. The technical and service requirements of all analytical requests are thoroughly evaluated before commitments are made to accept the work. Measurements are made using published reference methods or methods developed and validated by the laboratory.

The methods covered by this manual include the most frequently requested methodologies needed to provide analytical services in the United States and its territories. The specific list of test methods used by the laboratory can be found.

Our areas of expertise include:

Standard Services	Specialty Services
• Volatiles • Semivolatiles • Metals • Pesticides/PCBs/Herbicides • Petroleum Hydrocarbons • Waste Characterization • Non-Potable Water Testing • Drinking Water Testing • Soil and Surface Water Testing • Sediment and Tissue Testing • Method Development	• 1,4-Dioxane • Aldehydes

NOTE: All current certificates and scopes of accreditation are available on the laboratory's website at https://www.eurofinsus.com/environment-testing/resources/certifications/.

The approach of this manual is to define the minimum level of quality assurance and quality control necessary to meet these requirements. All methods performed by the laboratory shall meet these criteria as appropriate. In some instances, quality assurance project plans (QAPPs), project specific data quality objectives (DQOs) or local regulations may require criteria other than those contained in this manual. In these cases, the laboratory will abide by the requested criteria following review and acceptance of the requirements by the, Laboratory Director and/or Business Unit Manager and the Quality Assurance (QA) Manager. In some cases, QAPPs and DQOs may specify less stringent requirements. The Laboratory Director and/or Business Unit Manager and the QA Manager must determine if it is in the lab's best interest to follow the less stringent requirements.

3.4 Management of the Manual

3.4.1 Review Process

The template on which this manual is based is reviewed annually by Eurofins National Divisional Support Center (NDSC) which houses the Quality Assurance leadership team for Eurofins Environment Testing. NDSC QA will assure that the template remains in compliance with Section 3.1. This manual itself is reviewed annually or as required by state program, such as CA ELAP**)** by senior laboratory management to assure that it reflects current practices and meets the requirements of the laboratory's clients and regulators as well as the QMP. Occasionally, the manual may need changes in order to meet new or changing regulations and operations. The QA Manager will review the changes in the normal course of business and incorporate changes into revised sections of the document. All updates will be reviewed by the senior laboratory management staff. The laboratory updates and approves such changes according to our Document Control & Updating procedures (refer to SOP SA-QA-001)

4.0 MANAGEMENT REQUIREMENTS

4.1 Overview

The laboratory is a local operating unit of Eurofins Environment Testing. The laboratory's operational and support staff have the day-to-day independent operational authority under the direction of Laboratory Director and/or Business Unit Manager and is supported by the NDSC QA team. The laboratory management staff includes directors, managers and group leaders. The organizational chart of the management staff are presented in Figure 4-1.

4.2 Roles and Responsibilities

In order for the QA Program to function properly, all members of the staff must clearly understand and meet their individual responsibilities as they relate to the quality program. The responsibility for quality resides with every employee of the laboratory. All employees have access to the QA Manual, are trained to this manual, and are responsible for upholding the standards therein. Each person carries out his/her daily tasks impartially and in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs. The following descriptions briefly define each role in its relationship to the Quality Assurance Program.

4.2.1 Vice President of Quality and Environmental Health and Safety (VP-QA/EHS)

The Vice President (VP) of QA/EHS reports directly to Eurofins Environment Testing Chief Operating Officer (COO). With the aid of the NDSC Quality Team Members, Business Unit Managers, Laboratory Directors, the VP-QA/EHS has the responsibility for the establishment, general overview and maintenance of the Quality Assurance and EH&S Programs within Eurofins Environment Testing. Additional responsibilities include:

- Review of QA/QC and EHS aspects of NDSC Official Document national projects and expansions or changes in services.
- Work with various organizations outside of the laboratory to further the development of quality standards and represent the laboratory at various trade meetings.
- Prepare monthly reports for quality and EH&S metrics across the environmental testing laboratories and a summary of any quality and EH&S related initiatives and issues.
- With the assistance of the Executive Management, and the EHS Managers, maintenance and implementation of the Eurofins Environment Testing Environmental, Health and Safety Program.

4.2.2 Quality Directors

There are four (4) Quality Directors within NDSC that report directly to the VP-QA/EHS. These Quality Directors have oversight of the general overview and maintenance of the QA Program within the Eurofins Environment Testing laboratories. Supported tasks include:

- Monitors laboratory internal audit findings;
- Identifies common laboratory weaknesses and monitors corrective action closures.

- Develops NDSC quality guidance documents and management tools for ensuring and improving compliance;
- Monitors and communicates DoD/DoE requirements;
- Monitors and communicates regulatory and certification requirements;
- Training and Onboarding
- Laboratory assessments, mentoring, and interventions
- Track/drive root cause investigations and corrective action plans
- Builds knowledge base for preventive actions.

4.2.3 Quality Information Manager

The Quality Information works directly with the NDSC Quality Directors and EHS Managers; and reports directly to the VP-QA/EHS. The Quality Information Manager is responsible for the management of:

- NDSC Official Documents
- TALS/LIMS Certification Module Data
- Company's Intranet website
- Company's Regulatory Limits Database
- Subcontract laboratory and approved vendor information
- Internal and External client support for various company groups (e.g., Client Services, EH&S, Legal, IT, Sales) for both quality and operational functions
- Communicate regulatory information and lists.

4.2.4 Environmental Health and Safety (EH&S) Managers

There are 3 EH&S Managers within NDSC that report directly to the VP-QA/EHS. These EH&S Managers have oversight of the general overview and maintenance of the EH&S Program within the Eurofins Environment Testing laboratories. Supported tasks include:

- Consolidation and tracking all safety and health-related information and reports for the company, and managing compliance activities for Eurofins Environment Testing locations.
- Coordination/preparation of the Environmental, Health and Safety Manual Template that is used by each laboratory to prepare its own laboratory-specific Safety Manual/ CHP.
- Preparation of information and training materials for laboratory EHS Coordinators.
- Assistance in the coordination of employee exposure and medical monitoring programs to insure compliance with applicable safety and health regulations.
- Serving as Department of Transportation (D.O.T.) focal point and providing technical assistance to location management.
- Serving as Hazardous Waste Management main contact and providing technical assistance to location management.

4.2.5 Ethics and Compliance Officers (ECOs)

The NDSC VP-QA/EHS and Corporate Counsel are designated Ethics and Compliance Officer (ECO). Each ECO acts as a back-up to the other ECO and both are involved when data investigations occur. Each ECO has a direct line of communication to the entire executive management personnel and lab management staff.

The ECOs monitor and audit procedures to determine compliance with policies and to make recommendations for policy enhancements to the President, COO, Laboratory Director or other appropriate individuals within the laboratory. The ECO will assist the laboratory QA Manager in the coordination of internal auditing of ethical policy related activities and processes within the laboratory, in conjunction with the laboratory's regular internal auditing function.

The ECOs will also participate in investigations of alleged violations of policies and work with the appropriate internal departments to investigate misconduct, remedy the situation, and prevent recurrence of any such activity.

4.2.6 Laboratory Director

The Laboratory Director is responsible for the overall quality, safety, financial, technical, human resource and service performance of the whole laboratory and reports to their business unit President. The Laboratory Director is also responsible for any service centers connected with their laboratory that perform analytical tests, such as short holding time analyses for pH. The Laboratory Director provides the resources necessary to implement and maintain an effective and comprehensive Quality Assurance and Data Integrity Program.

Specific responsibilities include, but are not limited to:

- Provides one or more technical managers for the appropriate fields of testing. If the Technical Manager is absent for a period of time exceeding 15 consecutive calendar days, the Laboratory Director must designate another full time staff member meeting the qualifications of the Technical Manager to temporarily perform this function. If the absence exceeds 35 consecutive calendar days, the primary accrediting authority must be notified in writing.
- Ensures that all analysts and supervisors have the appropriate education and training to properly carry out the duties assigned to them and ensures that this training has been documented. Works with Eurofins Environment Testing Human Resources for hiring of new personnel.
- Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Ensures company human resource policies are adhered to and maintained.
- Ensures that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory. Assesses laboratory capacity and workload.
- Ensures that appropriate corrective actions are taken to address analyses identified as requiring such actions by internal and external performance or procedural audits. Procedures that do not meet the standards set forth in the QA Manual or laboratory SOPs may be temporarily suspended by the Laboratory Director.
- Ensures all approved SOPs are implemented and adhered to.

- Pursues and maintains appropriate laboratory certification and contract approvals. Supports ISO 17025 requirements.
- Ensures client specific reporting and quality control requirements are met.
- Contributes to the continuous improvement of the laboratory operations.
- Maintains an awareness of technical developments and regulatory requirements.
- Captains the management team, consisting of the QA Manager, the Technical Manager(s), and the Operations Manager as direct reports.

4.2.7 Quality Assurance (QA) Manager or Designee

The QA Manager has responsibility and authority to ensure the continuous implementation of the quality system at the laboratory where they work. The QA Manager is also responsible for any service centers connected with their laboratory that perform analytical tests, such as short holding time analyses for pH.

The QA Manager reports directly to the Laboratory Director and their NDSC Quality Director. This position is able to evaluate data objectively and perform assessments without outside (e.g., managerial) influence. The NDSC QA Team may be used as a resource in dealing with regulatory requirements, certifications and other quality assurance related items. The QA Manager directs the activities of the QA office to accomplish specific responsibilities, which include, but are not limited to:

- Serves as the focal point for QA/QC in the laboratory.
- Have functions independent from laboratory operations for which he/she has quality assurance oversight.
- Have documented training and/or experience in QA/QC procedures and the laboratory's Quality System.
- Have a general knowledge of the analytical test methods for which data audit/review is performed (and/or having the means of getting this information when needed).
- Arrange for or conducting internal audits on quality systems and the technical operation
- Notifying laboratory management of deficiencies in the quality system and ensuring corrective action is taken. Procedures that do not meet the standards set forth in the QA Manual or laboratory SOPs shall be investigated following procedures outlined in Section 14 and if deemed necessary may be temporarily suspended during the investigation.
- Maintaining and updating the QA Manual.
- Monitoring and evaluating laboratory certifications; scheduling proficiency testing samples.
- Monitoring and communicating regulatory changes that may affect the laboratory to management.
- Training and advising the laboratory staff on quality assurance/quality control procedures that are pertinent to their daily activities.
- The laboratory QA Manager will maintain records of all ethics-related training, including the type and proof of attendance.

- Maintain, improve, and evaluate the corrective action database and the corrective and preventive action systems.
- Objectively monitor standards of performance in quality control and quality assurance without outside (e.g., managerial) influence.
- Coordinating of document control of SOPs, MDLs, control limits, and miscellaneous forms and information.
- Performing technical data audits and method audits to ensure consistency and compliance with regulatory requirements.
- Review of external audit reports and data validation requests.
- Follow-up with audits to ensure client QAPP requirements are met.
- Establishment of reporting schedule and preparation of various quality reports for the Laboratory Director, clients and/or NDSC QA Team.
- Development of suggestions and recommendations to improve quality systems.
- Research of current state and federal requirements and guidelines.
- Participate in the vendor and supplier approval process, including subcontractors.
- Captains the QA team to enable communication and to distribute duties and responsibilities.
- Communication to the relevant regulatory authorities when there are management or facility changes that impact the laboratory.
- Ensuring communication & monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- Evaluation of the thoroughness and effectiveness of training.
- Compliance with ISO 17025
- Compliance with the DoD/DOE QSM.

4.2.8 Technical Manager or Designee

The Technical Manager(s) report(s) directly to the Laboratory Director. He/she is accountable for all analyses and analysts under their experienced supervision and for compliance with the ISO 17025:2017 Standard. The scope of responsibility ranges from the new-hire process and existing technology through the ongoing training and development programs for existing analysts and new instrumentation. Specific responsibilities include, but are not limited to:

- Exercises day-to-day supervision of laboratory operations for the appropriate field of accreditation and reporting of results. Coordinating, writing, and reviewing preparation of all test methods, i.e., SOPs, with regard to quality, integrity, regulatory and optimum and efficient production techniques, and subsequent analyst training and interpretation of the SOPs for implementation and unusual project samples. He/she insures that the SOPs are properly managed and adhered to at the bench. He/she develops standard costing of SOPs to include supplies, labor, overhead, and capacity (design vs. demonstrated versus first-run yield) utilization.
- Reviewing and approving, proposals from marketing, in accordance with an established procedure for the review of requests and contracts. This procedure addresses the adequate

definition of methods to be used for analysis and any limitations, the laboratory's capability and resources, the client's expectations. Differences are resolved before the contract is signed and work begins. A system documenting any significant changes is maintained, as well as pertinent discussions with the client regarding their requirements or the results of the analyses during the performance of the contract. All work subcontracted by the laboratory must be approved by the client. Any deviations from the contract must be disclosed to the client. Once the work has begun, any amendments to the contract must be discussed with the client and so documented.

- Monitoring the validity of the analyses performed and data generated in the laboratory. This activity begins with reviewing and supporting all new business contracts, insuring data quality, analyzing internal and external non-conformances to identify root cause issues and implementing the resulting corrective and preventive actions, facilitating the data review process (training, development, and accountability at the bench), and providing technical and troubleshooting expertise on routine and unusual or complex problems.
- Providing training and development programs to applicable laboratory staff as new hires and, subsequently, on a scheduled basis. Training includes instruction on calculations, instrumentation management to include troubleshooting and preventive maintenance.
- Enhancing efficiency and improving quality through technical advances and improved LIMS utilization. Capital forecasting and instrument life cycle planning for second generation methods and instruments as well as asset inventory management.
- Coordinating sample management from "cradle to grave," insuring that no time is lost in locating samples.
- Scheduling all QA/QC-related requirements for compliance, e.g., MDLs, etc.
- Captains department personnel to communicate quality, technical, personnel, and instrumental issues for a consistent team approach.
- Compliance with ISO 17025.
- Compliance with the DoD/DOE QSM. (where applicable).

4.2.9 Operations Manager

The Operations Manager manages and directs the analytical production sections of the laboratory. He/She reports directly to the Laboratory Director. He/She assists the Technical Manager in determining the most efficient instrument utilization. More specifically, he/she:

- Evaluates the level of internal/external non-conformances for all departments.
- Continuously evaluates production capacity and improves capacity utilization.
- Continuously evaluates turnaround time and addresses any problems that may hinder meeting the required and committed turnaround time from the various departments.
- Develops and improves the training of all analysts in cooperation with the Technical Manager and QA Manager and in compliance with regulatory requirements.
- Works with the Preventive Maintenance Coordinator to ensure that scheduled instrument maintenance is completed.
- Is responsible for efficient utilization of supplies.

- Constantly monitors and modifies the processing of samples through the departments.
- Fully supports the quality system and, if called upon in the absence of the QA Manager, serves as his substitute in the interim.

4.2.10 Project Manager (PM)

Members of the laboratory Project Management Group are responsible for organizing and managing client projects. Clients are assigned a project manager who serves as their primary contact at the laboratory. It is the PM's responsibility to act as the client advocate by communicating client requirements to laboratory personnel and ensuring that clients provide complete information needed by the laboratory to meet those requirements – including all verbal communications.

With the overall goal of total client satisfaction, the functions of this position are outlined below:

- Scheduling sample submissions, sample container orders and sample pick-up via the laboratory courier service.
- Confirming certification status
- Coordinating and communicating turnaround time (TAT) requirements for high priority samples/projects.
- Answering common technical questions, facilitating problem resolution and coordinating technical details with the laboratory staff.
- Ensuring that client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory.
- Notifying the supervisors of incoming projects and sample delivery schedules.
- Accountable to clients for communicating sample status reports or results prior to receipt of the final report.
- Monitor the status of all data package projects in-house to ensure timely and accurate delivery of reports.
- Inform clients of data package-related problems and resolve service issues.

4.2.11 Department Managers

Managers' report to the Laboratory Director. Each one is responsible to:

- Ensure that analysts in their department adhere to applicable SOPs and the QA Manual. They perform frequent SOP and QA Manual review to determine if analysts are in compliance and if new, modified, and optimized measures are feasible and should be added to these documents.
- With regard to analysts, participates in the selection, training (as documented in Section 5.3), development of performance objectives and standards of performance, appraisal (measurement of objectives), scheduling, counseling, discipline, and motivation of analysts and documents these activities in accordance with systems developed by the QA and Personnel Departments. They evaluate staffing sufficiency and overtime needs. Training consists of familiarization with SOP, QC, Safety, and computer systems.

- Encourage the development of analysts to become cross-trained in various methods and/or operate multiple instruments efficiently while performing maintenance and documentation, self-supervise, and function as a department team.
- Provide guidance to analysts in resolving problems encountered daily during sample prep/analysis in conjunction with the Technical Manager, Operations Manager, and/or QA Manager. Each is responsible for 100% of the data review and documentation, non-conformance and *CPAR* issues, the timely and accurate completion of performance evaluation samples and MDLs, for his department.
- Ensure all logbooks are maintained, current, and properly labeled or archived.
- Report all non-conformance conditions to the QA Manager, Technical Manager, Operations Manager, and/or BU / Laboratory Director.
- Ensure that preventive maintenance is performed on instrumentation as detailed in the QA Manual or SOPs. He is responsible for developing and implementing a system for preventive maintenance, troubleshooting, and repairing or arranging for repair of instruments.
- Maintain adequate and valid inventory of reagents, standards, spare parts, and other relevant resources required to perform daily analysis.
- Achieve optimum turnaround time on analyses and compliance with holding times.
- Conduct efficiency and cost control evaluations on an ongoing basis to determine optimization of labor, supplies, overtime, first-run yield, capacity (designed vs. demonstrated), second- and third-generation production techniques/instruments, and long-term needs for budgetary planning.
- Develop, implement, and enhance calibration programs.
- Provide written responses to external and internal audit issues.

4.2.12 Laboratory Analysts

Laboratory analysts are responsible for conducting analysis and performing all tasks assigned to them by the group leader or supervisor. The responsibilities of the analysts are listed below:

- Perform analyses by adhering to analytical and quality control protocols prescribed by current SOPs, this QA Manual, and project-specific plans honestly, accurately, timely, safely, and in the most cost-effective manner.
- Document standard and sample preparation, instrument calibration and maintenance, data calculations, sample matrix effects, and any observed non-conformance on worklists, benchsheets, lab notebooks and/or the Non-Conformance Database.
- Report all non-conformance situations, instrument problems, matrix problems and QC failures, which might affect the reliability of the data, to their supervisor, the Technical Manager, and/or the QA Manager or member of QA staff.
- Perform 100% review of the data generated prior to entering and submitting for secondary level review.
- Suggest method improvements to their supervisor, the Technical Manager, and the QA Manager. These improvements, if approved, will be incorporated. Ideas for the optimum

performance of their assigned area, for example, through the proper cleaning and maintenance of the assigned instruments and equipment, are encouraged.

- Work cohesively as a team in their department to achieve the goals of accurate results, optimum turnaround time, cost effectiveness, cleanliness, complete documentation, and personal knowledge of environmental analysis.

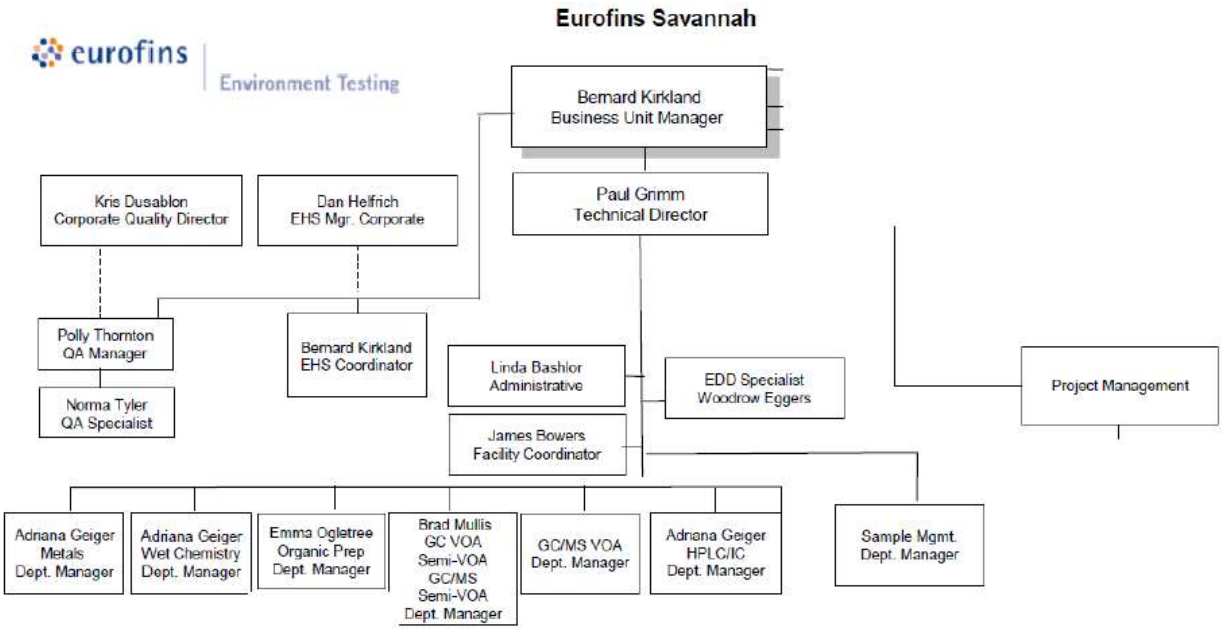
4.3 Business Continuity and Contingency Plans

Various policies and practices are in place to address continuity of business and contingency plans to ensure continued operations or minimal disruption in operations should unplanned events (natural disasters, unexpected management changes, etc.) occur. Deputies are identified for all key management personnel. Deputies would temporarily fill a role if the primary is absent for more than 15 consecutive calendar days. The deputies must meet the same qualifications as the primary person should they be required to take on the responsibilities. The QA Manager communicates to the relevant regulatory authorities when there are management or facility changes that impact the laboratory. Changes in the technical director must be communicated within a period of time and in the manner dictated by each regulatory authority.

The following table defines who assumes the responsibilities of key personnel in their absence:

Key Personnel	**Deputy**
Robert Paul Grimm Laboratory Director	Bernard Kirkland Business Unit Manager
Polly Thornton Quality Manager	Robert Paul Grimm Lab Director
Robert Paul Grimm Technical Manager	Robert Paul Grimm Lab Director
Bernard Kirkland EHS Coordinator	Robert Paul Grimm Lab Director
Bernard Kirkland Business Unit Manager	Robert Paul Grimm Lab Director

Figure 4-1. Laboratory Organization Charts



5.0 PERSONNEL

5.1 Overview

The laboratory's management believes that its highly qualified and professional staff is the single most important aspect in assuring a high level of data quality and service. The staff consists of professionals and support personnel.

All personnel must demonstrate competence in the areas where they have responsibility. Any staff that is undergoing training shall have appropriate supervision until they have demonstrated their ability to perform their job function on their own. Staff shall be qualified for their tasks based on appropriate education, training, experience and/or demonstrated skills as required.

The laboratory employs sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned responsibilities.

All personnel are responsible for complying with all QA/QC requirements that pertain to the laboratory and their area of responsibility. Each staff member must have a combination of experience and education to adequately demonstrate a specific knowledge of their particular area of responsibility. Technical staff must also have a general knowledge of lab operations, test methods, QA/QC procedures and records management.

Laboratory management is responsible for formulating goals for lab staff with respect to education, training and skills and ensuring that the laboratory has a policy and procedures for identifying training needs and providing training of personnel. The training shall be relevant to the present and anticipated responsibilities of the lab staff.

The laboratory only uses personnel that are employed by or under contract to, the laboratory. Contracted personnel, when used, must meet competency standards of the laboratory and work in accordance to the laboratory's quality system.

5.2 Education and Experience Requirements for Technical Personnel

The laboratory makes every effort to hire analytical staffs that possess a college degree (AA, BA, BS) in an applied science with some chemistry in the curriculum. Exceptions can be made based upon the individual's experience and ability to learn. Selection of qualified candidates for laboratory employment begins with documentation of minimum education, training, and experience prerequisites needed to perform the prescribed task. Minimum education and training requirements for laboratory employees are outlined in job descriptions maintained by Eurofins Environment Testing Human Resources.

Experience and specialized training are occasionally accepted in lieu of a college degree (basic lab skills such as using a balance, colony counting, aseptic or quantitation techniques, etc., are also considered)

As a general rule for analytical staff:

Specialty	Education	Experience
Extractions, Digestions, some electrode methods (pH, DO, Redox, etc.), or Titrimetric and Gravimetric Analyses	H.S. Diploma	On the job training (OJT)
GFAA, CVAA, FLAA, Single component or short list Chromatography (e.g., Fuels, BTEX-GC, IC	A college degree in an applied science or 2 years of college and at least 1 year of college chemistry	Or 2 years prior analytical experience is required
ICP, ICPMS, Long List or complex chromatography (e.g., Pesticides, PCB, Herbicides, HPLC, etc.), GCMS	A college degree in an applied science or 2 years of college chemistry	or 5 years of prior analytical experience
Spectra Interpretation	A college degree in an applied science or 2 years of college chemistry	And 2 years relevant experience Or 5 years of prior analytical experience
Technical Managers – **General**	Bachelor's Degree in an applied science or engineering with 24 semester hours in chemistry An advanced (MS, PhD.) degree may substitute for one year of experience	And 2 year's experience in environmental analysis of representative analytes for which they will oversee

Specialty	Education	Experience
Technical Managers – **Wet Chem** only (no advanced instrumentation)	Associates degree in an applied science or engineering or 2 years of college with 16 semester hours in chemistry	And 2 years relevant experience

When an analyst does not meet these requirements, they can perform a task under the direct supervision of a qualified analyst, peer reviewer or Technical Manager, and are considered an analyst in training. The person supervising an analyst in training is accountable for the quality of the analytical data and must review and approve data and associated corrective actions.

5.3 Training

The laboratory is committed to furthering the professional and technical development of employees at all levels.

Orientation to the laboratory's policies and procedures, in-house method training, and employee attendance at outside training courses and conferences all contribute toward employee proficiency. Below are examples of various areas of required employee training:

Required Training	Time Frame	Employee Type
Environmental Health & Safety	Prior to lab work	All
Ethics – New Hires	1 week of hire	All
Ethics – Comprehensive	60 days of hire	All
Data Integrity	60 days of hire	Technical and PMs
Quality Assurance	90 days of hire	All
Ethics – Comprehensive Refresher	Annually	All
Initial Demonstration of Capability (DOC)	Prior to unsupervised method performance	Technical

The laboratory maintains records of relevant authorization/competence, education, professional qualifications, training, skills and experience of technical personnel (including contracted personnel) as well as the date that approval/authorization was given. These records are kept on file at the laboratory. Also refer to "Demonstration of Capability" in Section 19.

The training of technical staff is kept up to date by:

- Each employee must have documentation in their training file that they have read, understood and agreed to follow the most recent version of the laboratory QA Manual and SOPs in their area of responsibility. This documentation is updated as SOPs are updated.
- Documentation from any training courses or workshops on specific equipment, analytical techniques or other relevant topics.
- Documentation of proficiency (refer to Section 19).
- An Ethics Agreement signed by each staff member (renewed each year) and evidence of annual ethics training.

- A Confidentiality Agreement signed by each staff member signed at the time of employment.
- Human Resources maintains documentation and attestation forms on employment status and records; benefit programs; timekeeping/payroll; and employee conduct (e.g., ethics violations). This information is maintained in the employee's secured personnel file.

Evidence of successful training could include such items as:

- Adequate documentation of training within operational areas, including one-on-one technical training for individual technologies, and particularly for people cross-trained.
- Analysts knowledge to refer to QA Manual for quality issues.
- Analysts following SOPs, i.e., practice matches SOPs.
- Analysts regularly communicate to supervisors and QA if SOPs need revision, rather than waiting for auditors to find problems.

Further details of the laboratory's training program are described in the Laboratory Training SOP SA-QA-006.

5.4 Data Integrity and Ethics Training Program

The laboratory's Ethics and Data Integrity Program is discussed in Section 6.2. Employees are trained as to the legal and environmental repercussions that result from data misrepresentation. Key topics covered in the presentation include:

- Organizational mission and its relationship to the critical need for honesty and full disclosure in all analytical reporting.
- Ethics Policy
- How and when to report ethical/data integrity issues. Confidential reporting.
- Record keeping.
- Discussion regarding data integrity procedures.
- Specific examples of breaches of ethical behavior (e.g. peak shaving, altering data or computer clocks, improper macros, etc., accepting/offering kickbacks, illegal accounting practices, unfair competition/collusion)
- Internal monitoring. Investigations and data recalls.
- Consequences for infractions including potential for immediate termination, debarment, or criminal prosecution.
- Importance of proper written narration / data qualification by the analyst and project manager with respect to those cases where the data may still be usable but are in one sense or another partially deficient.

Additionally, a data integrity hotline (1-800-736-9407) is maintained by the NDSC.

6.0 ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS

6.1 Overview

The laboratory is a 55,000 ft^2 secure laboratory facility with controlled access and designed to accommodate an efficient workflow and to provide a safe and comfortable work environment for employees. All visitors sign in and are escorted by laboratory personnel. Access is controlled by various measures.

The laboratory is equipped with structural safety features. Each employee is familiar with the location, use, and capabilities of general and specialized safety features associated with their workplace. The laboratory provides and requires the use of protective equipment including safety glasses, protective clothing, gloves, etc., OSHA and other regulatory agency guidelines regarding required amounts of bench and fume hood space, lighting, ventilation (temperature and humidity controlled), access, and safety equipment are met or exceeded.

Traffic flow through sample preparation and analysis areas is minimized to reduce the likelihood of contamination. Adequate floor space and bench top area is provided to allow unencumbered sample preparation and analysis space. Sufficient space is also provided for storage of reagents and media, glassware, and portable equipment. Ample space is also provided for refrigerated sample storage before analysis and archival storage of samples after analysis. Laboratory HVAC and deionized water systems are designed to minimize potential trace contaminants.

The laboratory is separated into specific areas for sample receiving, sample preparation, volatile organic sample analysis, non-volatile organic sample analysis, inorganic sample analysis, and administrative functions.

6.2 Environment

Laboratory accommodation, test areas, energy sources, and lighting are adequate to facilitate proper performance of tests. The facility is equipped with heating, ventilation, and air conditioning (HVAC) systems appropriate to the needs of environmental testing performed at this laboratory.

The environment in which these activities are undertaken does not invalidate the results or adversely affect the required accuracy of any measurements.

The laboratory provides for the effective monitoring, control and recording of environmental conditions that may affect the results of environmental tests as required by the relevant specifications, methods, and procedures. Such environmental conditions include humidity, voltage, temperature, and vibration levels in the laboratory.

When any of the method or regulatory required environmental conditions change to a point where they may adversely affect test results, analytical testing will be discontinued until the environmental conditions are returned to the required levels.

Environmental conditions of the facility housing the computer network and LIMS are regulated to protect against raw data loss.

When the laboratory performs laboratory activities at sites or facilities outside its permanent control, it shall ensure that the requirements related to facilities and environmental conditions of this document are met.

Specific requirements for facility and environmental conditions, as well as periodic monitoring of conditions, are given in the Environmental Health & Safety Manual plus each laboratory's Facility Addendum.

6.3 Work Areas

There is effective separation between neighboring areas when the activities therein are incompatible with each other. Examples include: .

- Volatile organic chemical handling areas, including sample preparation and waste disposal, and volatile organic chemical analysis areas.

Access to and use of all areas affecting the quality of analytical testing is defined and controlled by secure access to the laboratory building as described below in the Building Security section.

Adequate measures are taken to ensure good housekeeping in the laboratory and to ensure that any contamination does not adversely affect data quality. These measures include regular cleaning to control dirt and dust within the laboratory. Work areas are available to ensure an unencumbered work area. Work areas include:

- Access and entryways to the laboratory.
- Sample receipt areas.
- Sample storage areas.
- Chemical and waste storage areas.
- Data handling and storage areas.
- Sample processing areas.
- Sample analysis areas.

6.4 Responding to Emergencies

Employees must be aware of procedures to respond to all emergencies that might occur in the workplace. Employees must be familiar with the location and proper operation of all emergency equipment, evacuation routes and designated assembly areas for all areas where they work. Refer to the NDSC EH&S Manual Document No. NDSC-US-EHS-QP46060. Sec. 7 and the laboratory's local EH&S addendum for complete details. These documents provide direction for situations where normal operations of the laboratory are not possible (e.g., electrical failures, heating/air conditioning failures, fire/building evacuation, computer failures, hazardous material spills, injury to employees, pandemic flu, disruption of phone service, etc.)

In the event that the building or information technology (IT) systems would be severely challenged, a designated disaster recovery team, which includes Facility Management, Maintenance, Safety, Laboratory/Executive Management, Public Relations, IT, QA and other applicable personnel depending on the scope of the disaster, would assemble at a designated area to assess the situation and formulate a plan.

6.5 Building Security

The laboratory is considered a secure facility. All outside doors are locked during normal business hours to prevent unauthorized entry. Building keys and alarm codes are distributed to

employees as necessary. Employees are issued a building access key card to access the facility.

All visitors to the laboratory must sign in and out in a visitor's logbook that is located in the lobby. A visitor is defined as any person who visits the laboratory who is not an employee of the laboratory. Both visitors and vendors must review and sign specific EH&S forms; and are escorted by laboratory personnel at all times, or the location of the visitor is noted in the visitor's logbook.

7.0 QUALITY SYSTEM

7.1 Quality Policy Statement

The Quality Policy statement gives employees clear requirements for the production of analytical data. As an organization, all personnel are committed to high quality professional practice, testing and data, and service to our clients.

We strive to provide the highest quality data achievable by:

- Reading and understanding all of the quality documents applicable to each position and implementing the process in our work.
- Following all recordkeeping requirements; describing clearly and accurately all activities performed; recording "real time" as the task is carried out; understanding that it is never acceptable to "back date" entries and should additional information be required at a later date, the actual date and by whom the notation is made must be documented.
- Ensuring data integrity through the completeness, consistency, impartiality and accuracy of the data generated. Data is attributable, legible, contemporaneously recorded, original or a true copy, and accurate (ALCOA). This applies to manual paper documentation and electronic records.
- Providing accountability and traceability for each sample analyzed through proper sample handling, labeling, preparation, instrument calibration/qualification/validation, analysis, and reporting; establishing an audit trail (the who, what, when, and why) that identifies date, time, analyst, instrument used, instrument conditions, quality control samples (where appropriate and/or required by the method), and associated standard material.
- Emphasizing a total quality management process which provides impartiality, accuracy, and strict compliance with agency regulations and client requirements, giving the highest degree of confidence; understanding that meeting the requirements of the next employee in the work flow process is just as important as meeting the needs of the external client.
- Providing thorough documentation and explanation to qualify reported data that may not meet all requirements and specifications, but is still of use to the client; understanding this occurs only after discussion with the client on the data limitations and acceptability of this approach.
- Responding immediately to indications of questionable data, out-of-specification occurrences, equipment malfunctions, and other types of laboratory problems, with investigation and applicable corrective action; documenting these activities completely, including the reasons for the decisions made.

- ❖ Providing a work environment that ensures accessibility to all levels of management and encourages questions and expression of concerns on quality issues to management. Eurofins recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff
- ❖ Continually improve systems and manage risk to support quality improvement efforts in laboratory, administrative and managerial activities

7.2 Ethics and Data Integrity

Eurofins Environment Testing is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The laboratory operates our Ethics and Data Integrity program under the guidance of Eurofins Key Guidance Document (KGD). The elements of the program include:

- An Ethics Policy -NDSC Document No.- CW-L-P-004; and Employee Ethics Statements.
- Ethics and Compliance Officer/s (ECOs).
- A Training Program.
- Self-governance through disciplinary action for violations.
- A confidential mechanism for anonymously reporting alleged misconduct and a means for conducting internal investigations of all alleged misconduct. -NDSC Document No. CW-L-S-002,
- Procedures and guidance for recalling data if necessary -NDSC Document No. CW-Q-S-005.
- Effective external and internal monitoring system that includes procedures for internal audits (Section 17).
- Produce results, which are accurate and include QA/QC information that meets client pre-defined Data Quality Objectives (DQOs).
- Present services in a confidential, honest and forthright manner.
- Provide employees with guidelines and an understanding of the Ethical and Quality Standards of our Industry.
- Provide procedures and guidance to ensure the impartiality and confidentiality of all data and customer information.
- Operate our facilities in a manner that protects the environment and the health and safety of employees and the public.
- Obey all pertinent federal, state and local laws and regulations and encourage other members of our industry to do the same.
- Educate clients as to the extent and kinds of services available.
- Assert competency only for work for which adequate personnel and equipment are available and for which adequate preparation has been made.
- Promote the status of environmental laboratories, their employees, and the value of services rendered by them.

7.3 Quality System Documentation

The laboratory's Quality System is communicated through a variety of documents.

- Quality Assurance (QA) Manual – Each laboratory has a lab-specific QA manual.
- NDSC Official Documents – Each laboratory may use the Guidance (instructional use) documents at their discretion. Template documents are process documents that the laboratory's need to implement locally by using the document as is or as an outline to define their internal practices that meet the minimum requirements of the template. Required documents need to be implemented as is and listed in the laboratory's document control list.
- Key Guidance Documents (KGDs) - Documents compiled at the Group Service Centre (GSC) level by Functional Leaders (document owners) aimed at providing specific Eurofins groups of employees with guidelines necessary for the good conduct of their respective work.
- Laboratory SOPs and Policies – General and Technical
- Work Instructions – A subset of procedural steps, tasks or forms associated with an operation of a management system (e.g., checklists, preformatted bench sheets, forms).

7.3.1 Order of Precedence

In the event of a conflict or discrepancy between policies, the order of precedence is as follows:

- Quality Management Plan (QMP)
- NDSC Guidance Documents
- KGDs
- Laboratory Quality Assurance Manual (QA Manual)
- Laboratory SOPs and Policies
- Other (Work Instructions (WI), memos, flow charts, etc.)

NOTE: The laboratory has the responsibility and authority to operate in compliance with regulatory requirements of the jurisdiction in which the work is performed. Where the QMP conflicts with those regulatory requirements, the regulatory requirements of the jurisdiction shall hold primacy. The laboratory's QA Manual shall take precedence over the QMP in those cases.

7.4 QA/QC Objectives for the Measurement of Data

Quality Assurance (QA) is responsible for developing planned activities whose purpose is to provide assurance to all levels of management that a quality program is in place within the laboratory, and that it is functioning in an effective manner that is consistent with the requirements of NELAP, ISO 17025, DoD, and any other regulatory agencies (i.e., states) in which the laboratory maintains accreditation.

Quality Control (QC) is generally understood to be limited to the analyses of samples and to be synonymous with the term *"analytical quality control"*. QC refers to the routine application of statistically based procedures to evaluate and control the accuracy of results from analytical measurements. The QC program includes procedures for estimating and controlling precision and bias and for determining reporting limits.

Request for Proposals (RFPs) and Quality Assurance Project Plans (QAPP) provide a mechanism for the client and the laboratory to discuss the data quality objectives in order to ensure that analytical services closely correspond to client needs. In order to ensure the ability of the laboratory to meet the Data Quality Objectives (DQOs) specified in the QAPP, clients are advised to allow time for the laboratory to review the QAPP before being finalized. The client is responsible for developing the QAPP; however, the laboratory will provide support to the client for developing the sections of the QAPP that concern laboratory activities.

Historically, laboratories have described their QC objectives in terms of precision, accuracy, representativeness, comparability, completeness, selectivity and sensitivity (PARCCSS). Each laboratory SOP defines the required QC indicators.

7.4.1 Precision

The objective is to meet the performance for precision demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Precision is defined as the degree of reproducibility of measurements under a given set of analytical conditions (exclusive of field sampling variability). Precision is documented on the basis of replicate analysis, usually duplicate or matrix spike (MS) duplicate samples.

7.4.2 Accuracy

The objective is to meet the performance for accuracy demonstrated for the methods on similar samples and to meet DQOs of the EPA and/or other regulatory programs. Accuracy is defined as the degree of bias in a measurement system. Accuracy may be documented through the use of laboratory control samples (LCS) and/or MS. A statement of accuracy is expressed as an interval of acceptance recovery about the mean recovery.

7.4.3 Representativeness

The objective is to provide data which is representative of the sampled medium. Representativeness is defined as the degree to which data represent a characteristic of a population or set of samples and is a measurement of both analytical and field sampling precision. The representativeness of the analytical data is a function of the procedures used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical samples or sample aliquots.

The representativeness of the data from the sampling sites depends on both the sampling procedures and the analytical procedures. Refer to laboratory SOPs for subsampling and homogenization techniques appropriate to the analytical method.

7.4.4 Comparability

The objective is to provide analytical data for which the accuracy, precision, representativeness, and reporting limit statistics are similar to these quality indicators generated by other laboratories for similar samples, and data generated by the laboratory over time.

Comparability is documented by inter-laboratory studies carried out by regulatory agencies or carried out for specific projects or contracts, by comparison of periodically generated statements of accuracy, precision, and reporting limits with those of other laboratories.

7.4.5 Completeness

The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid data to the total data over the course of the project. Data will be considered valid if they are adequate for their intended use. Data usability will be defined in a QAPP, project scope, or regulatory requirement. Data validation is the process for reviewing data to determine its usability and completeness. If the completeness objective is not met, actions will be taken internally and with the data user to improve performance. This may take the form of an audit to evaluate the methodology and procedures as possible sources for the difficulty or may result in a recommendation to use a different method.

7.4.6 Selectivity

Selectivity is defined as the capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances. Target analytes are separated from non-target constituents and subsequently identified/detected through one or more of the following, depending on the analytical method: extractions (separation), digestions (separation), interelement corrections (separation), use of matrix modifiers (separation), specific retention times (separation and identification), confirmations with different columns or detectors (separation and identification), specific wavelengths (identification), specific mass spectra (identification), and specific electrodes (separation and identification).

7.4.7 Sensitivity

Sensitivity refers to the amount of analyte necessary to produce a detector response that can be reliably detected (above the Method Detection Limit) or quantified (above the Reporting Limit).

7.5 Criteria for Quality Indicators

The laboratory maintains tables, housed in LIMS that summarize the precision and accuracy acceptability limits for performed analyses. This summary includes an effective date, is updated each time new limits are generated, and are managed by the laboratory's QA department. Unless otherwise noted, limits within these tables are laboratory generated. Some acceptability limits are derived from US EPA methods when they are required. Where US EPA method limits are not required, the laboratory has developed limits from evaluation of data from similar matrices. Criteria for development of control limits is contained in laboratory SOP SA-QA-17 or Section 26.

7.6 Statistical Quality Control

Statistically-derived precision and accuracy limits are required by selected methods (such as SW-846) and programs. The laboratory routinely utilizes statistically-derived limits to evaluate method performance and determine when corrective action is appropriate. The analysts use the current limits entered into LIMS. The QA department maintains an archive of all limits used within the laboratory. If a method defines the QC limits, the method limits are used.

If a method requires the generation of historical limits, the lab develops such limits from recent data in the QC database of the LIMS following the guidelines described in Section 26. All calculations and limits are documented and dated when approved and effective. On occasion, a client requests contract-specified limits for a specific project.

Current QC limits are entered and maintained in the LIMS analyte database. As sample results and the related QC are entered into LIMS, the sample QC values are compared with the limits in LIMS to determine if they are within the acceptable range. The analyst then evaluates if the sample needs to be rerun or re-extracted/rerun or if a comment should be added to the report explaining the reason for the QC outlier.

7.6.1 QC Charts

The QA Manager evaluates these to determine if adjustments need to be made or for corrective actions to methods. All findings are documented and kept on file. Reference SOP SA- QA-017.

7.7 Quality System Metrics

In addition to the QC parameters discussed above, the entire Quality System is evaluated on a monthly basis through the use of specific metrics (refer to Section 18). These metrics are used to drive continuous improvement in the laboratory's Quality System.

8.0 DOCUMENT CONTROL

8.1 Overview

The QA Department is responsible for the control of documents used in the laboratory to ensure that approved, up-to-date documents are in circulation and out-of-date (obsolete) documents are archived or destroyed. The following documents, at a minimum, must be controlled:

- Laboratory Quality Assurance (QA) Manual
- Laboratory Standard Operating Procedures (SOP)
- Laboratory Policies
- Work Instructions and Forms
- NDSC Documents[1]
- KGDs[1]

[1]Includes locally implemented documents that are document controlled within the laboratory's document control system. The NDSC and/or KGD documents are only considered controlled when they are read on the intranet site. Printed copies are considered uncontrolled unless the laboratory physically distributes them as controlled documents. A detailed description of the procedure for issuing, authorizing, controlling, distributing, and archiving NDSC Official Documents is found in Document No. CW-Q-S-001, NDSC Document Control and Archiving. The laboratory's internal document control procedure is defined in SOP No. SA-QA-001.

The laboratory QA Department also maintains access to various references and document sources integral to the operation of the laboratory. This includes reference methods and regulations. Instrument manuals (hard or electronic copies) are also maintained by the laboratory.

The laboratory maintains control of records for raw analytical data and supporting records such as audit reports and responses, logbooks, standard logs, training files, MDL studies, Proficiency Testing (PT) studies, certifications and related correspondence, and corrective action reports).

Raw analytical data consists of bound logbooks, instrument printouts, any other notes, magnetic media, electronic data, and final reports.

8.2 Document Approval and Issue

The pertinent elements of the document control system includes a unique document title and number, pagination, the total number of pages of the item or an 'end of document' page, the effective date, revision number, and the laboratory's name. The QA personnel are responsible for the maintenance of this system.

Controlled documents are authorized by the QA Department. In order to develop a new document, a responsible manager submits an electronic draft to the QA Department for suggestions and approval before use. Upon approval, QA personnel add the identifying version information to the document and retains that document as the official document on file. That document is then provided to all applicable operational units. Controlled documents are identified as such and records of their distribution are kept by the QA Department. Document control may be achieved by either electronic or hardcopy distribution.

The QA Department maintains a list of the official versions of controlled documents.

Quality System Policies and Procedures will be reviewed at a minimum of every year and revised as appropriate. Changes to documents occur when a procedural change warrants.

8.3 Procedures for Document Control Policy

For changes to the QA Manual, refer to SOP SA-QA-001. Uncontrolled copies must not be used within the laboratory. Previous revisions and back-up data are stored by the QA department. Electronic copies are stored on the Public server in the QA folder for the applicable revision.

The SOP identified above also defines the process of changes to SOPs.

Forms, worksheets, work instructions and information are organized by department in the QA office. Electronic versions are kept on a hard drive in the QA department; hard copies are kept in QA files. The procedure for the care of these documents is in SOP SA-QA-001.

8.4 Obsolete Documents

All invalid or obsolete documents are removed, or otherwise prevented from unintended use. The laboratory has specific procedures as described above to accomplish this. In general, obsolete documents are collected from employees according to distribution lists and are marked obsolete on the cover or destroyed. At least one copy of the obsolete document is archived according to SOP SA-QA-001.

9.0 SERVICE TO THE CLIENT

9.1 Overview

The laboratory has established procedures for the review of work requests and contracts, oral or written. The procedures include evaluation of the laboratory's capability and resources to meet the contract's requirements within the requested time period. All requirements, including the methods to be used, must be adequately defined, documented and understood. For many environmental sampling and analysis programs, testing design is site or program specific and

does not necessarily fit into a standard laboratory service or product. It is the laboratory's intent to provide both standard and customized environmental laboratory services to our clients.

A thorough review of technical and QC requirements contained in contracts is performed to ensure project success. The appropriateness of requested methods, and the lab's capability to perform them must be established. Projects, proposals, and contracts are reviewed for adequately defined requirements and the laboratory's capability to meet those requirements. Alternate test methods that are capable of meeting the clients' requirements may be proposed by the lab. A review of the lab's capability to analyze non-routine analytes is also part of this review process.

All projects, proposals and contracts are reviewed for the client's requirements in terms of compound lists, test methodology requested, sensitivity (detection and reporting levels), accuracy, and precision requirements (% Recovery and RPD). The reviewer ensures that the laboratory's test methods are suitable to achieve these requirements and that the laboratory holds the appropriate certifications and approvals to perform the work. The laboratory and any potential subcontract laboratories must be certified, as required, for all proposed tests.

Electronic or hard copy deliverable requirements are evaluated against the laboratory's capacity for production of the documentation.

If the laboratory cannot provide all services but intends to subcontract such services, whether to another Eurofins facility on the same LIMS or to an outside firm, this will be documented and discussed with the client prior to contract approval. (Refer to Section 10 for Subcontracting Procedures.)

The laboratory informs the client of the results of the review if it indicates any potential conflict, deficiency, lack of accreditation, or inability of the lab to complete the work satisfactorily. Any discrepancy between the client's requirements and the laboratory's capability to meet those requirements is resolved in writing before acceptance of the contract. It is necessary that the contract be acceptable to both the laboratory and the client. Amendments initiated by the client and/or Eurofins Savannah are documented in writing.

All contracts, QAPPs, Sampling and Analysis Plans (SAPs), contract amendments, and documented communications become part of the project record.

The same contract review process used for the initial review is repeated when there are amendments to the original contract by the client, and the participating personnel are informed of the changes.

9.2 Review Sequence and Key Personnel

Appropriate personnel will review the work request at each stage of evaluation.

For routine projects and other simple tasks, a review by the Project Manager (PM) is considered adequate. The PM confirms that the laboratory has any required certifications, that it can meet the clients' data quality and reporting requirements and that the lab has the capacity to meet the clients turn. It is recommended that, where there is a sales person assigned to the account, an attempt should be made to contact that sales person to inform them of the incoming samples.

For new, complex or large projects, the proposed contract is given to the Client Relationship Manager or Proposal Team, who will decide which lab will receive the work based on the scope of work and other requirements, including certification, testing methodology, and available

capacity to perform the work. The contract review process is outlined in NDSC Document No. CA-L-P-002**,** Contract Compliance Policy .

This review encompasses all facets of the operation. The scope of work is distributed to the appropriate personnel, as needed based on scope of contract, to evaluate all of the requirements shown above (not necessarily in the order below)

- Contract Administrator
- Laboratory Project Manager
- Laboratory Directors and/or Technical Managers
- Account Executives
- Quality Managers
- Laboratory Environmental Health and Safety Managers/Directors

The Laboratory Director reviews the formal laboratory quote and makes final acceptance for their facility.

The Sales Director, Contract Administrator, Account Executive or Proposal Coordinator then submits the final proposal to the client.

In the event that one of the above personnel is not available to review the contract, his or her back-up will fulfill the review requirements.

9.3 Balancing Laboratory Capacity and Workload

Evaluating laboratory capacity to perform specific projects is the responsibility of the Vice-President, Laboratory Directors and Managers, and the Client Services director and manager. Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in case of malfunctions. This minimizes the need to evaluate small and medium size projects against capacity available to complete them. Large and complex projects are reviewed against capacity estimates before bids are submitted to ensure that the client's analysis schedule is met. Regularly scheduled meetings are held between laboratory management, PMs, Client Services and QA personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory. Laboratory capacity and backlog is tracked on a continuous basis using information from the Laboratory Information Management System (LIMS) including turnaround time, and work in-house.

9.4 Documentation

The Contracts Department maintains copies of all signed contracts**.**

Appropriate records are maintained for every contract or work request. All stages of the contract review process are documented and include records of any significant changes. Documents are stored electronically on a secure drive.

The contract will be distributed to and maintained by the appropriate sales/marketing personnel and the Account Executive. A copy of the contract and formal quote will be filed with the laboratory PM and the Laboratory Director.

Records are maintained of pertinent discussions with a client relating to the client's requirements or the results of the work during the period of execution of the contract.

9.4.1 Project-Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site specific testing programs. To achieve this goal, a PM is assigned to each client. It is the PM's responsibility to ensure that project-specific technical and QC requirements are effectively evaluated and communicated to the laboratory personnel before and during the project. QA department involvement may be needed to assist in the evaluation of custom QC requirements.

PM's are the primary client contact and they ensure resources are available to meet project requirements, they coordinate opportunities and work with laboratory management and supervisory staff to ensure available resources are sufficient to perform work for the client's project.

Prior to work on a new project, the dissemination of project information and/or project opening meetings may occur to discuss schedules and unique aspects of the project. Items to be discussed may include the project technical profile, turnaround times, holding times, methods, analyte lists, reporting limits, deliverables, sample hazards, or other special requirements. The PM introduces new project information to maximize production and client satisfaction, while maintaining quality. Project notes may be associated with each sample batch as a reminder upon sample receipt and analytical processing.

Any change that may occur within an active project is agreed upon between the client/regulatory agency and the PM/laboratory. These changes (e.g., use of a non-standard method or modification of a method) and approvals must be documented prior to implementation. Documentation pertains to any document (e.g., letter, e-mail, variance, contract addendum), which has been signed by both parties.

Such changes are also communicated to the laboratory via email or project notes. The laboratory staff is then introduced to the modified requirements via the PM or the individual laboratory Technical Manager. After the modification is implemented into the laboratory process, documentation of the modification is made in the case narrative of the data report(s).

The laboratory strongly encourages client visits to the laboratory and for formal/informal information sharing session with employees in order to effectively communicate ongoing client needs as well as project specific details for customized testing programs.

9.5 Special Services

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. It is the laboratory's goal to meet all client requirements in addition to statutory and regulatory requirements. The laboratory has procedures to ensure confidentiality to clients (Section 17 and 25).

The laboratory's standard procedures for reporting data are described in Section 25. Special services are also available and provided upon request. These services include:

- Reasonable access for our clients or their representatives to the relevant areas of the laboratory for the witnessing of tests performed for the client.
- Assisting client-specified third party data validators as specified in the client's contract.
- Supplemental information pertaining to the analysis of their samples. Note: An additional charge may apply for additional data/information that was not requested prior to the time of sample analysis or previously agreed upon.

When the client requests a statement of conformity to a specification or standard based on the analysis performed by the laboratory (e.g., pass/fail, in-tolerance/out-of-tolerance), the decision rule shall be clearly defined. Unless inherent in the requested specification or standard, the decision rule selected shall be communicated to the client. Associated reporting requirements are addressed in Section 25.2.18.

9.6 Client Communication

PMs are the primary communication link to the clients. They shall inform their clients of any delays in project completion as well as any non-conformances in either sample receipt or sample analysis. Project management will maintain ongoing client communication throughout the entire client project.

Technical Managers are available to discuss any technical questions or concerns that the client may have.

9.7 Reporting

The laboratory works with our clients to produce any special communication reports required by the contract.

9.8 Client Feedback and Surveys

The laboratory assesses both positive and negative client feedback. The results are used to improve overall laboratory quality and client service. Eurofins Sales and Marketing teams periodically develop lab and client specific surveys to assess client satisfaction. Client satisfaction surveys are sent via email.

When a complaint is received, we determine, to the best of our ability, the extent of the issue and what data is in question. The person receiving the complaint documents this information and promptly forwards it to the appropriate management personnel where the work in question was performed. If a data reporting error is discovered, the final report and/or data must be regenerated with the correct value(s).

The Project Manager is responsible for initiating a non-conformance memo in LIMS to document the complaint received. The QA department is responsible for entering client concerns into iCAT. In some cases, an ICAT / ICAR (Investigation and Corrective Action Report) is initiated to address and document the situation. While an individual issue may not warrant a formal investigation, QA monitors these issues for potential trends and will issue an ICAR/ICAT if a trend is evident.

10.0 SUBCONTRACTING OF TESTS

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10.1 Overview

For the purpose of this quality manual, the phrase subcontract laboratory refers to a laboratory external to the Eurofins Savannah laboratories. The phrase “work sharing” refers to internal transfers of samples between the Eurofins laboratories. The term outsourcing refers to the act of subcontracting tests.

When contracting with our clients, the laboratory makes commitments regarding the services to be performed and the data quality for the results to be generated. When the need arises to outsource testing for our clients because project scope, changes in laboratory capabilities, capacity, or unforeseen circumstances, we must be assured that the subcontractors or work sharing laboratories understand the requirements and will meet the same commitments we have made to the client. Refer to the NDSC Documents on Subcontracting Procedures (CW-L-S-004) and the Work Sharing Process (CA-C-S-001).

When outsourcing analytical services, the laboratory will assure, to the extent necessary, that the subcontract or work sharing laboratory maintains a program consistent with the requirements of this document, the requirements specified in TNI/ISO 17025 and/or the client's Quality Assurance Project Plan (QAPP). All QC guidelines specific to the client's analytical program are transmitted to the subcontractor and agreed upon before sending the samples to the subcontract facility. Additionally, work requiring accreditation will be placed with an appropriately accredited laboratory. The laboratory performing the subcontracted work will be identified in the final report, as will non-TNI accredited work where required.

PMs or other responsible Client Service members, for the Export Lab (i.e., the Eurofins Savannah laboratory that transfers samples to another laboratory) are responsible for obtaining client approval prior to subcontracting any samples. The laboratory will advise the client of a subcontract arrangement in writing and when possible approval from the client shall be obtained and retained in the project folder. Standard Eurofins Savannah Terms & Conditions include the flexibility to subcontract samples within the Eurofins laboratories. Therefore, additional advance notification to clients for intra-laboratory subcontracting is not necessary unless specifically required by a client contract.

Note: In addition to the client, some regulating agencies (e.g., USDA) or contracts (e.g., DoD and DOE projects) require notification prior to placing such work**.**

10.2 Qualifying and Monitoring Subcontractors

Whenever a PM] becomes aware of a client requirement or laboratory need where samples must be outsourced to another laboratory, the other laboratory(s) shall be selected based on the following:

- Subcontractors specified by the client - In these circumstances, the client assumes responsibility for the quality of the data generated from the use of a subcontractor.
- Subcontractors reviewed by Eurofins – Firms which have been reviewed by the company and are known to meet standards for accreditations (e.g., State, TNI and DoD/DOE); technical specifications; legal and financial information.

A listing of vendors is available on the EETA Intranet site.

All Eurofins laboratories are pre-qualified for work sharing provided they hold the appropriate accreditations and can adhere to the project/program requirements. Client approval is not necessary unless specifically required by the contract. In these cases, the client must provide acknowledgement that the samples can be sent to that facility (an e-mail is sufficient documentation or if acknowledgement is verbal, the date, time, and name of person providing acknowledgement must be documented). The originating laboratory is responsible for communicating all technical, quality, and deliverable requirements as well as other contract needs. NDSC Document No. CA-C-S-001, Work Sharing Process.

10.2.1 When the potential subcontract laboratory has not been previously approved, Account Executives or PMs may nominate a laboratory as a subcontractor based on need. The decision to nominate a laboratory must be approved by the Laboratory Director or Business Unit Manager (BUMA). The BUMA or Laboratory Director requests that the QA Manager or PM begin the process of approving the subcontract laboratory. Refer to the NDSC Document No. CW-L-S-004, Subcontracting Procedures.

Once the appropriate accreditation and legal information is received by the laboratory, it is evaluated for acceptability and forwarded to the NDSC Quality Information Manager (QIM) for review. After the NDSC QIM reviews the documents for completeness, the information is forwarded to the Finance Department for formal signature and contracting with the laboratory. The approved vendor will be added to the approved subcontractor list on the intranet site, and the finance group is concurrently notified.

The client will assume responsibility for the quality of the data generated from the use of a subcontractor they have requested the lab to use. The qualified subcontractors on the intranet site are known to meet minimal standards. Eurofins Savannah does not certify laboratories. The subcontractors on our approved list can only be recommended to the extent that we would use them.

10.3 Oversight and Reporting

The status and performance of qualified subcontractors will be monitored by NDSC and includes an annual review process (NDSC Document No. SOP CW-L-S-004.) Any problems identified will be brought to the attention of NDSC and laboratory management..

- Complaints shall be investigated. Documentation of the complaint, investigation, and corrective action will be maintained in the subcontractor's file on the intranet site. Complaints are posted using the Vendor Performance Report.
- Information shall be updated on the intranet when new information is received from the subcontracted laboratories.
- Subcontractors in good standing will be retained on the intranet listing. Client Service personnel will notify all Eurofins laboratories, NDSC, and Corporate Contracts if any laboratory requires removal from the intranet site. This notification will be posted on the intranet site and e-mailed to all Client Service, Personnel, Laboratory Directors, QA Managers, and Sales Personnel.

Prior to initially sending samples to the subcontracted laboratory, the PM confirms their certification status to determine if it's current and scope-inclusive. The information is documented within the project records.

10.3.1 All subcontracted samples must be accompanied by a Eurofins Savannah Chain of Custody (COC). A copy of the original COC sent by the client must be available in LIMS for all samples workshare within Eurofins Savannah. Client COCs are only forwarded to external subcontractors when samples are shipped directly from the project site to the subcontractor lab. Under routine circumstances, client COCs are not provided to external subcontractors.

Through communication with the subcontracted laboratory, the PM monitors the status of the subcontracted analyses, facilitates successful execution of the work, and ensures the timeliness and completeness of the analytical report.

Non-TNI accredited work must be identified in the subcontractor's report as appropriate. If TNI accreditation is not required, the report does not need to include this information.

Reports submitted from subcontractor laboratories are not altered and are included in their original form in the final project report. This clearly identifies the data as being produced by a subcontractor facility. If subcontract laboratory data is incorporated into the laboratory's EDD (i.e., imported), the report must explicitly indicate which lab produced the data for which methods and samples.

Note: The results submitted by a Eurofins Savannah work sharing laboratory may be transferred electronically and the results reported by the Eurofins Savannah work sharing lab are identified on the final report. The report must explicitly indicate which lab produced the data for which methods and samples. The final report must include a copy of the completed COC for all work sharing reports.

10.4 Contingency Planning

The full qualification of a subcontractor may be waived to meet emergency needs. This decision and justification must be documented in the project files, and the 'Purchase Order Terms And Conditions For Subcontracted Laboratory Services' must be sent with the samples and COC.

In the event this provision is utilized, the laboratory (e.g., PM) will be required to verify and document the applicable accreditations of the subcontractor. All other quality and accreditation requirements will still be applicable, but the subcontractor need not have signed a subcontract agreement with Eurofins Savannah at this time.

The use of any emergency subcontractor will require the PM to complete a New Vendor Add Form in order to process payment to the vendor and add them to LIMS. This form requires the user to define the subcontractor's category/s of testing and the reason for testing.

10.5 Use of NELAP and A2LA Logo

It is not laboratory policy to use these logos on any company letterhead, including analytical reports.

11.0 PURCHASING SERVICES AND SUPPLIES

11.1 Overview

Evaluation and selection of suppliers and vendors is performed, in part, on the basis of the quality of their products, their ability to meet the demand for their products on a continuous and short term basis, the overall quality of their services, their past history, and competitive pricing. This is achieved through evaluation of objective evidence of quality furnished by the supplier, which can include certificates of analysis, recommendations, and proof of historical compliance with similar programs for other clients. To ensure that quality critical consumables and equipment conform to specified requirements, which may affect quality, all purchases from specific vendors are approved by a member of the supervisory or management staff. Capital expenditures are made in accordance with NDSC Document No. CW-F-S-007, Eurofins Fixed Asset Acquisition, Retention and Safeguarding.

Contracts will be signed in accordance with NDSC Document No. CW-F-P-002, Company-Wide Authorization Matrix Policy. Request for Proposals (RFP's) will be issued where more

information is required from the potential vendors than just price. Process details are available in NDSC Document No. CW-F-P-004, Guidance on Procurement and Contracts Policy. RFP's allow the laboratory to determine if a vendor is capable of meeting requirements such as supplying all of the laboratory facilities, meeting required quality standards and adhering to necessary ethical and environmental standards. The RFP process also allows potential vendors to outline any additional capabilities they may offer.

11.2 Glassware

Glassware used for volumetric measurements must be Class A or verified for accuracy according to laboratory procedure. Pyrex (or equivalent) glass should be used where possible. For safety purposes, thick-wall glassware should be used where available.

11.3 Reagents, Standards & Supplies

Purchasing guidelines for equipment, consumables, and reagents must meet the requirements of the specific method and testing procedures for which they are being purchased. Solvents and acids are pre-tested in accordance with NDSC Document No. NDSC-US-PUR-SOP46704, Solvent & Acid Lot Testing & Approval. Approval information for the solvents and acids tested under this document is stored on the laboratory's SharePoint site, under Solvent Approvals. A master list of all tested materials, as well as the certificates of analysis for the materials, is stored in the same location.

11.3.1 Purchasing

Chemical reagents, solvents, glassware, and general supplies are ordered as needed to maintain sufficient quantities on hand. Materials used in the analytical process must be of a known quality. The wide variety of materials and reagents available makes it advisable to specify recommendations for the name, brand, and grade of materials to be used in any determination. This information is contained in the method SOP.

The analyst must provide the master item number (from the master item list that has been approved by the Technical Manager), item description, package size, catalogue page number, and the quantity needed. If an item being ordered is not the exact item requested, approval must be obtained from the Technical Manager prior to placing the order. The purchasing manager places the order.

11.3.2 Receiving

It is the responsibility of the requestor to receive the shipment. It is the responsibility of the analyst who ordered the materials to document the date materials were received. Once the ordered reagents or materials are received, the analyst compares the information on the label or packaging to the original order to ensure that the purchase meets the quality level specified. This is documented through the addition of the received date and initials to the information present on the daily order log.

The purchasing manager verifies the lot numbers of received solvents and acids against the pre-approval lists. If a received material is listed as unapproved, or is not listed, it is sequestered and returned to the vendor. Alternatively, the laboratory may test the material for the intended use, and if it is acceptable, document the approval on the approval list. Records of any testing performed locally are maintained on the shared "public" folder on the computer network.

Materials may not be released for use in the laboratory until they have been inspected, verified as suitable for use, and the inspection/verification has been documented.

Safety Data Sheets (SDSs) are available online through the Company's intranet website. Anyone may review these for relevant information on the safe handling and emergency precautions of on-site chemicals.

11.3.3 Specifications

Methods used in the laboratory specify the grade of reagent that must be used in the procedure. If the quality of the reagent is not specified, analytical reagent grade will be used. It is the responsibility of the analyst to check the procedure carefully for the suitability of grade of reagent.

Chemicals must not be used past the manufacturer's expiration date and must not be used past the expiration time noted in a method SOP. If expiration dates are not provided, the laboratory may contact the manufacturer to determine an expiration date.

The laboratory assumes a five year expiration date on inorganic dry chemicals and solvents unless noted otherwise by the manufacturer or by the reference source method. Chemicals/solvents should not be used past the manufacturer's or SOP expiration date unless verified as outlined below.

- An expiration date **cannot** be extended if the dry chemical/solvent is discolored or appears otherwise physically degraded. In this case, the dry chemical/solvent must be discarded.
- Expiration dates can be extended if the dry chemical/solvent is found to be satisfactory based on acceptable performance of quality control samples (Continuing Calibration Verification (CCV), Blanks, Laboratory Control Sample (LCS), etc.).

Wherever possible, standards must be traceable to national or international standards of measurement or to national or international reference materials. Records to that effect are available to the user.

Compressed gases in use are checked for pressure and secure positioning daily. To prevent a tank from going to dryness, or introducing potential impurities, the pressure should be closely watched as it decreases to approximately 15% of the original reading, at which point it should be replaced. For example, a standard sized laboratory gas cylinder containing 3,000 psig of gas should be replaced when it drops to approximately 500 psig. The quality of the gases must meet method or manufacturer specification or be of a grade that does not cause any analytical interference.

Water used in the preparation of samples, standards or reagents must have a specific conductivity of less than 1-µmho/cm (or specific resistivity of greater than 1.0 megohm-cm) at 25^{o}C. The specific conductivity is checked and recorded daily. If the water's specific conductivity is greater than the specified limit, the Facility Manager and appropriate Technical Managers must be notified immediately in order to notify all departments, decide on cessation (based on intended use) of activities, and make arrangements for correction.

The laboratory may purchase reagent grade (or other similar quality) water for use in the laboratory. This water must be certified clean by the supplier for all target analytes or otherwise verified by the laboratory prior to use. This verification is documented.

Standard lots are verified before first time use if the laboratory switches manufacturers or has historically had a problem with the type of standard.

Purchased bottleware used for sampling must be certified clean and the certificates must be maintained. If uncertified sampling bottleware is purchased, all lots must be verified clean prior to use. This verification must be maintained.

Records of manufacturer's certification and traceability statements are maintained in files or binders in each laboratory section. These records include date of receipt, lot number (when applicable), and expiration date (when applicable). Incorporation of the item into the record indicates that the analyst has compared the new certificate with the previous one for the same purpose and that no difference is noted, unless approved and so documented by the Technical Manager or QA Manager.

11.3.4 Storage

Reagent and chemical storage is important from the aspects of both integrity and safety. Light-sensitive reagents may be stored in brown-glass containers. Storage conditions are per the NDSC Environmental Health & Safety Manual, Document No. CW-E-M-001, the local laboratory EH&S manual addendum and method SOPs or manufacturer instructions.

11.4 Purchase of Equipment / Instruments / Software

When a new piece of equipment is needed, either for additional capacity or for replacing inoperable equipment, the analyst or supervisor makes a supply request to the Technical Manager and/or the Laboratory Director. If they agree with the request, the procedures outlined in NDSC Document No. CA-T-P-001 are followed. A decision is made as to which piece of equipment can best satisfy the requirements. The appropriate written requests are completed and purchasing places the order.

Upon receipt of a new or used piece of equipment, an identification name is assigned and added to the equipment list. IT must also be notified so that they can synchronize the instrument for back-ups. Its capability is assessed to determine if it is adequate or not for the specific application. For instruments, a calibration curve is generated, followed by MDLs, Demonstration of Capabilities (DOCs), and other relevant criteria (refer to Section 20). For software, its operation must be deemed reliable and evidence of instrument verification must be retained by the IT Department or QA Department. Software certificates supplied by the vendors are filed with the QA Department and/or IT group. The manufacturer's operation manual is retained at the bench and a copy filed with the QA department and are available on the Public QA directory.

11.5 Services

Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 22. The need for service is determined by analysts and/or Technical Managers. The service providers that perform the services are approved by the Technical Manager.

Analytical balances are serviced and calibrated annually in accordance with SOP SA-AN-100. The calibration and maintenance services are performed on-site, and the balances are returned to use immediately following successful calibration. Calibration certificates are filed for reference. If the calibration was unsuccessful, the balance is immediately removed from service and segregated pending either further maintenance or disposal.

Calibration services for support equipment such as thermometers, weight sets, autopipettors, etc., are obtained from vendors with current and valid ISO 17025 accreditation for calibration of the specific piece of equipment. Prior to utilizing the vendor's services, the vendor's accreditation status is verified. Once the equipment has been calibrated, the calibration certificates are reviewed by the QA department, and documentation of the review is filed with the calibration certificates. The equipment is then returned to service within the laboratory

11.6 Suppliers

The laboratory selects vendors through a competitive proposal / bid process, strategic business alliances or negotiated vendor partnerships (contracts).

This process is defined in the NDSC Document No. CW-F-P-004, Procurement & Contracts Policy. The level of control used in the selection process is dependent on the anticipated spending amount and the potential impact on the laboratory's business. Vendors that provide test and measuring equipment, solvents, standards, certified containers, instrument related service contracts or subcontract laboratory services shall be subject to more rigorous controls than vendors that provide off-the-shelf items of defined quality that meet the end use requirements. The purchasing system includes all suppliers/vendors that have been approved for use.

Evaluation of suppliers is accomplished by ensuring the supplier ships the product or material ordered and that the material is of the appropriate quality. This is documented by signing off on packing slips or other supply receipt documents. The purchasing documents contain the data that adequately describe the services and supplies ordered.

Any issues of vendor performance are to be reported immediately by the laboratory staff to the Purchasing Group by completing a Vendor Performance Report.

The Purchasing Group will work through the appropriate channels to gather the information required to clearly identify the problem and will contact the vendor to report the problem and to make any necessary arrangements for exchange, return authorization, credit, etc.

Suppliers are subject to re-evaluation, as deemed appropriate, through the use of Vendor Performance Reports used to summarize and review to determine corrective action necessary, or service improvements required by vendors

The laboratory has access to a listing of all approved suppliers of critical consumables, supplies and services. This information is provided through the purchasing system.

11.6.1 New Vendor Procedure

Laboratory employees who wish to request the addition of a new vendor must complete a Vendor Add Request Form.

New vendors are evaluated based upon criteria appropriate to the products or services provided as well as their ability to provide those products and services at a competitive cost. Vendors are also evaluated to determine if there are ethical reasons or potential conflicts of interest with laboratory employees that would make it prohibitive to do business with them as well as their financial stability. The QA Department and/or the Technical Services Director are consulted with vendor and product selection that have an impact on quality.

12.0 COMPLAINTS

12.1 Overview

The laboratory considers an effective client complaint handling processes to be of significant business and strategic value. Listening to and documenting client concerns captures client knowledge that enables our operations to continually improve processes and client satisfaction. An effective client complaint handling process also provides assurance to the data user that the laboratory will stand behind its data, service obligations and products.

A client complaint is any expression of dissatisfaction with any aspect of our business services (e.g., communications, responsiveness, data, reports, invoicing and other functions) expressed by any party, whether received verbally or in written form. Client inquiries, complaints or noted discrepancies are documented, communicated to management, and addressed promptly and thoroughly.

The laboratory has procedures for addressing both external and internal complaints with the goal of providing satisfactory resolution to complaints in a timely and professional manner.

The nature of the complaint is identified, documented and investigated, and an appropriate action is determined and taken. In cases where a client complaint indicates that an established policy or procedure was not followed, the QA Department must evaluate whether a special audit must be conducted to assist in resolving the issue. A written confirmation or letter to the client, outlining the issue and response taken is recommended as part of the overall action taken.

The process of complaint resolution and documentation utilizes the procedures outlined in Section 14 (Corrective Actions) and is documented following SOP SA-QA-005. A copy of this procedure will be made available to any interested party on request.

12.2 External Complaints

An employee that receives a complaint initiates the complaint resolution process by first documenting the complaint according to SOP SA-QA-005.

Complaints fall into two categories: correctable and non-correctable. An example of a correctable complaint would be one where a report re-issue would resolve the complaint. An example of a non-correctable complaint would be one where a client complains that their data was repeatedly late. Non-correctable complaints should be reviewed for preventive action measures to reduce the likelihood of future occurrence and mitigation of client impact.

The general steps in the complaint handling process are:

- Receiving and documenting complaints
- Acknowledging receipt of complaint, whenever possible
- Complaint investigation and service recovery
- Process improvement

The laboratory shall inform the initiator of the complaint of the results of the investigation and the corrective action taken, if any.

12.3 Internal Complaints

Internal complaints include, but are not limited to: errors and non-conformances, training issues, internal audit findings, and deviations from methods. Corrective actions may be initiated by any staff member who observes a nonconformance and shall follow the procedures outlined in Section 14. In addition, Executive Management, Sales and Marketing and IT may initiate a complaint by contacting the laboratory or through the corrective action system described in Section 14.

12.4 Management Review

The number and nature of client complaints is reported by the QA Manager to the Laboratory Director and Quality Director in the QA Monthly report. Monitoring and addressing the overall level and nature of client complaints and the effectiveness of the solutions is part of the Annual Management Systems Review (Section 18).

13.0 CONTROL OF NON-CONFORMING WORK

13.1 Overview

When data discrepancies are discovered or deviations and departures from laboratory SOPs, policies and/or client requests have occurred, corrective action is taken immediately. First, the laboratory evaluates the significance of the nonconforming work. Then, a corrective action plan is initiated based on the outcome of the evaluation. If it is determined that the nonconforming work is an isolated incident, the plan could be as simple as adding a qualifier to the final results and/or making a notation in the case narrative. If it is determined that the nonconforming work is a systematic or improper practices issue, the corrective action plan could include a more in depth investigation and a possible suspension of an analytical method. In all cases, the actions taken are documented using the laboratory's corrective action system (refer to Section 14).

Due to the frequently unique nature of environmental samples, sometimes departures from documented policies and procedures are needed. When an analyst encounters such a situation, the problem is presented to the supervisor for resolution. The supervisor may elect to discuss it with the Technical Manager or have a representative contact the client to decide on a logical course of action. Once an approach is agreed upon, the analyst documents it using the laboratories corrective action system described in Section 14. This information can then be supplied to the client in the form of a footnote or a case narrative with the report.

Project Management may encounter situations where a client may request that a special procedure be applied to a sample that is not standard lab practice. Based on a technical evaluation, the lab may accept or opt to reject the request based on technical or ethical merit. An example might be the need to report a compound that the lab does not normally report. The lab would not have validated the method for this compound following the procedures in Section 21. The client may request that the compound be reported based only on the calibration. Such a request would need to be approved by the Technical Manager and QA Manager documented and included in the project folder. Deviations must also be noted on the final report with a statement that the compound is not reported in compliance with TNI (or the analytical method) requirements and the reason. Data being reported to a non-TNI state would need to note the change made to how the method is normally run.

13.2 Responsibilities and Authorities

Under certain circumstances, the Laboratory Director, a Technical Manager, or a member of the QA team may authorize departures from documented procedures or policies. The departures may be a result of procedural changes due to the nature of the sample; a one-time procedure for a client; QC failures with insufficient sample to reanalyze, etc. In most cases, the client will be informed of the departure prior to the reporting of the data. Any departures must be well documented using the laboratory's corrective action procedures. This information may also be documented in logbooks and/or data review checklists as appropriate. Any impacted data must be referenced in a case narrative and/or flagged with an appropriate data qualifier.

Any misrepresentation or possible misrepresentation of analytical data discovered by any laboratory staff member must be reported to facility Senior Management within 24-hours. The Senior Management staff is comprised of the Laboratory Director, the QA Manager, and the Technical Managers. The reporting of issues involving alleged violations of the company's Data Integrity or Manual Integration procedures must be conveyed to an ECO (e.g., the VP-QA/EHS) and the laboratory's Quality Director within 24 hours of discovery.

Whether an inaccurate result was reported due to calculation or quantitation errors, data entry errors, improper practices, or failure to follow SOPs, the data must be evaluated to determine the possible effect.

The Laboratory Director, QA Manager, ECOs, VP of Operations and the Quality Directors have the authority and responsibility to halt work, withhold final reports, or suspend an analysis for due cause as well as authorize the resumption of work.

13.3 Evaluation of Significance and Actions Taken

For each nonconforming issue reported, an evaluation of its significance and the level of management involvement needed is made. This includes reviewing its impact on the final data, whether or not it is an isolated or systematic issue, and how it relates to any special client requirements.

The NDSC Document entitled Data Recalls (CW-Q-S-005) is the procedure to be followed when it is discovered that erroneous or biased data may have been reported to clients or regulatory agencies.

The NDSC Document entitled Internal Investigations (CW-L-S-002) is the procedure to be followed for investigation and correction of situations involved alleged incidents of misconduct or violation of the company's ethics policy.

Laboratory level decisions are documented and approved using the laboratory's standard nonconformance/corrective action reporting in lieu of the data recall determination form contained in NDSC Document No. CW-Q-S-005.

13.4 Prevention of Nonconforming Work

If it is determined that the nonconforming work could recur, further corrective actions must be made following the laboratory's corrective action system. Periodically as defined by the laboratory's preventive action schedule, the QA Department evaluates non-conformances to determine if any nonconforming work has been repeated multiple times. If so, the laboratory's corrective action process may be followed.

13.5 Method Suspension / Restriction (Stop Work Procedures)

In some cases, it may be necessary to suspend/restrict the use of a method or target analyte which constitutes significant risk and/or liability to the laboratory. Suspension/restriction procedures can be initiated by any of the persons noted in Section 13.2, Paragraph 5.

Prior to suspension/restriction, confidentiality will be respected, and the problem with the required corrective and preventive action will be stated in writing and presented to the Laboratory Director.

The Laboratory Director shall arrange for the appropriate personnel to meet with the QA Manager as needed. This meeting shall be held to confirm that there is a problem, that suspension/restriction of the method is required and will be concluded with a discussion of the steps necessary to bring the method/target or test fully back on line. In some cases, that may not be necessary if all appropriate personnel have already agreed there is a problem and there is agreement on the steps needed to bring the method, target or test fully back on line. The QA Manager will also initiate a corrective action report as described in Section 14 if one has not already been started. A copy of any meeting notes and agreed upon steps should be e-mailed by the laboratory to their Business Unit President; VP-QA & EHS. This e-mail acts as notification of the incident.

After suspension/restriction, the lab will hold all reports to clients pending review. No faxing, mailing or distributing through electronic means may occur. The report must not be posted for viewing on the internet. It is the responsibility of the Laboratory Director to hold all reporting and to notify all relevant laboratory personnel regarding the suspension/restriction (e.g., Project Management, Log-in, etc.). Clients will NOT generally be notified at this time. Analysis may proceed in some instances depending on the non-conformance issue.

Within 72 hours, the QA Manager will determine if compliance is now met and reports can be released, OR determine the plan of action to bring work into compliance, and release work. A team, with all principals involved (e.g., Laboratory Director, Technical Manager, QA Manager) can devise a start-up plan to cover all steps from client notification through compliance and release of reports. Project Management and the Directors of Client Services and Sales and Marketing must be notified if clients must be notified or if the suspension/restriction affects the laboratory's ability to accept work. The QA Manager must approve start-up or elimination of any restrictions after all corrective action is complete.

14.0 CORRECTIVE ACTION

14.1 Overview

A major component of the laboratory's (QA) Program is the problem investigation and feedback mechanism designed to keep the laboratory staff informed on quality related issues and to provide insight to problem resolution. When nonconforming work or departures from policies and procedures in the quality system or technical operations are identified, the corrective action procedure provides a systematic approach to assess the issues, restore the laboratory's system integrity, and prevent reoccurrence. The laboratory employs two systems to manage non-conformances. Issues suspected of being systematic in nature and for which root cause analysis and a formal Corrective Action Report (CAR) are documented in the Incident Corrective Action Tracking (ICAT) database. Routine batch non-conformances, events that are understood to be isolated in nature, are documented in the LIMS non-conformance memo (NCM) system.

14.2 General

Problems within the quality system or within analytical operations may be discovered in a variety of ways, such as QC sample failures, internal or external audits, proficiency testing (PT) performance, client complaints, staff observation, etc.

The purpose of a corrective action system is to:

- Identify non-conformance events and assign responsibility for investigating.
- Resolve non-conformance events and assign responsibility for any required corrective action.
- Identify systematic problems before they become serious.
- Identify and track client complaints and provide resolution.

14.2.1 Non-Conformance Memo (NCM)

NCMs are used to document the following types of corrective actions:

- Deviations from an established procedure or SOP
- QC outside of limits
- Isolated reporting / calculation errors
- Client complaints
- Discrepancies in materials / goods received vs. manufacturer packing slips (Forms of documentation other than NCMs in LIMS are also acceptable)

14.2.2 Corrective Actions Documented In the ICAT Database

- Internal and external audit findings
- Failed or unacceptable PT results
- Identified poor process or method performance trends
- Systematic reporting / calculation errors
- Data recall investigations
- Questionable trends that are found in the review of NCMs.
- Client complaints
- Excessive revised reports

The ICAT database is used to document background information, track the results of corrective action investigations and root cause analysis, and to provide reports of corrective action plans.

14.3 Closed Loop Corrective Action Process

Any employee in the company can initiate a corrective action. There are four main components to a closed-loop corrective action process once an issue has been identified: Cause Analysis, Selection and Implementation of Corrective Actions (both short and long term), Monitoring of the Corrective Actions, and Follow-up.

14.3.1 Cause Analysis

- Upon discovery of a non-conformance event, the event must be defined and documented. An entry into the ICAT system must be initiated, someone is assigned to investigate the issue and the event is investigated for cause. Table 14-1 provides some general guidelines on determining responsibility for assessment.
- The cause analysis step is the key to the process as a long term corrective action cannot be determined until the cause is determined.
- If the cause is not readily obvious, the Technical Manager, Laboratory Director, or QA Manager (or QA designee) is consulted.

14.3.2 Selection and Implementation of Corrective Actions

- Where corrective action is needed, the laboratory shall identify potential corrective actions. The action(s) most likely to eliminate the problem and prevent recurrence are selected and implemented. Responsibility for implementation is assigned.
- Corrective actions shall be to a degree appropriate to the magnitude of the problem identified through the cause analysis.
- Whatever corrective action is determined to be appropriate, the laboratory shall document and implement the changes. The ICAT record is used for this documentation.

14.3.3 Root Cause Analysis

Root Cause Analysis is a class of problem solving (investigative) methods aimed at identifying the basic or causal factor(s) that underlie variation in performance or the occurrence of a significant failure. The root cause may be buried under seemingly innocuous events, many steps preceding the perceived failure. At first glance, the immediate response is typically directed at a symptom and not the cause. Typically, root cause analysis would be best with three or more incidents to triangulate a weakness. NDSC Document No. CA-Q-S-009, Root Cause Analysis, provides guidance on this procedure.

Systematically analyze and document the root causes of the more significant problems that are reported. Identify, track, and implement the corrective actions required to reduce the likelihood of recurrence of significant incidents. Trend the root cause data from these incidents to identify root causes that, when corrected, can lead to dramatic improvements in performance by eliminating entire classes of problems.

Identify the one event associated with problem and ask why this event occurred. Brainstorm the root causes of failures; for example, by asking why events occurred or conditions existed; and then why the cause occurred consecutive times until you get to the root cause. For each of these sub events or causes, ask why it occurred. Repeat the process for the other events associated with the incident.

Root cause analysis does not mean the investigation is over. Look at technique or other systems outside the normal indicators. Often creative thinking will find root causes that ordinarily would be missed and continue to plague the laboratory or operation.

14.3.4 Monitoring of the Corrective Actions

- The Technical Manager and QA Manager are responsible to ensure that the corrective action taken was effective.

- Ineffective actions are documented and re-evaluated until acceptable resolution is achieved. Technical Managers are accountable to the Laboratory Director to ensure final acceptable resolution is achieved and documented appropriately.
- The QA Manager reviews monthly NCM and ICAT records for trends. Highlights are included in the QA monthly report (refer to Section 18). If a significant trend develops that adversely affects quality, an audit of the area is performed and corrective action implemented.
- Any out-of-control situations that are not addressed acceptably at the laboratory level may be reported to the NDSC Quality Director by the QA Manager, indicating the nature of the out-of-control situation and problems encountered in solving the situation.

14.3.5 Follow-up Audits

- Follow-up audits may be initiated by the QA Manager and shall be performed as soon as possible when the identification of a nonconformance casts doubt on the laboratory's compliance with its own policies and procedures, or on its compliance with state or federal requirements.
- These audits often follow the implementation of the corrective actions to verify effectiveness. An additional audit would only be necessary when a critical issue or risk to business is discovered.

(Also refer to Section 17.1.4, Special Audits.)

14.4 Technical Corrective Actions

In addition to providing acceptance criteria and specific protocols for technical corrective actions in the method SOPs, the laboratory has general procedures to be followed to determine when departures from the documented policies and procedures and quality control have occurred (refer to Section 13). The documentation of these procedures is through the use of an NCM or record in the ICAT system.

Table 14-1 includes examples of general technical corrective actions. For specific criteria and corrective actions, refer to the analytical methods or specific method SOPs. The laboratory may also maintain Work Instructions on these items that are available upon request.

Table 14-1 provides some general guidelines for identifying the individual(s) responsible for assessing each QC type and initiating corrective action. The table also provides general guidance on how a data set should be treated if associated QC measurements are unacceptable. Specific procedures are included in Method SOPs, Work Instructions, QA Manual Sections 19 and 20. All corrective actions are reviewed monthly, at a minimum, by the QA Manager and highlights are included in the QA monthly report.

To the extent possible, samples shall be reported only if all quality control measures are acceptable. If the deficiency does not impair the usability of the results, data will be reported with an appropriate data qualifier and/or the deficiency will be noted in the case narrative. Where sample results may be impaired, the PM is notified by an NCM and appropriate corrective action (e.g., reanalysis) is taken and documented**.**

14.5 Basic Corrections

When mistakes occur in records, each mistake shall be crossed-out, [not obliterated (e.g. no white-out)], and the correct value entered alongside. All such corrections shall be initialed (or signed) and dated by the person making the correction. In the case of records stored electronically, the original uncorrected file must be maintained intact and a second corrected file is created. This same process applies to adding additional information to a record. All additions made later than the initial must also be initialed (or signed) and dated. When corrections are due to reasons other than obvious transcription errors, the reason for the corrections (or additions) shall also be documented.

Table 14-1. Example – General Corrective Action Procedures

QC Activity *(Individual Responsible for Initiation/Assessment)*	**Acceptance Criteria**	**Recommended Corrective Action**
Initial Instrument Blank *(Analyst)*	- Instrument response < MDL.	- Prepare another blank. - If same response, determine cause of contamination: reagents, environment, instrument equipment failure, etc..
Initial Calibration Standards *(Analyst, Technical Manager(s))*	- Correlation coefficient > 0.99 or standard concentration value. - % Recovery within acceptance range. - See details in Method SOP.	- Reanalyze standards. - If still unacceptable, remake standards and recalibrate instrument.
Independent Calibration Verification (Second Source) *(Analyst, Technical Manager(s))*	- % Recovery within control limits.	- Remake and reanalyze standard. - If still unacceptable, then remake calibration standards or use new primary standards and recalibrate instrument.
Continuing Calibration Standards *(Analyst, Data Reviewer)*	% Recovery within control limits.	- Reanalyze standard. - If still unacceptable, then recalibrate and rerun affected samples.
Matrix Spike / Matrix Spike Duplicate (MS/MSD) *(Analyst, Data Reviewer)*	- % Recovery within limits documented in ***(state where limits are maintained)***.	- If the acceptance criteria for duplicates or matrix spikes are not met because of matrix interferences, the acceptance of the analytical batch is determined by the validity of the LCS. - If the LCS is within acceptable limits the batch is acceptable. - The results of the duplicates, matrix spikes and the LCS are reported with the data set. - For matrix spike or duplicate results outside criteria the data for that sample shall be reported with qualifiers.

QC Activity *(Individual Responsible for Initiation/Assessment)*	Acceptance Criteria	Recommended Corrective Action
Laboratory Control Sample (LCS) *(Analyst, Data Reviewer)*	- % Recovery within limits specified in ***(state where limits are maintained).***	- Batch must be re-prepared and re-analyzed. This includes any allowable marginal exceedance. When not using marginal exceedances, the following exceptions apply: 1) when the acceptance criteria for the positive control are exceeded high (i.e., high bias) and there are associated samples that are non-detects, then those non-detects may be reported with data qualifying codes; 2) when the acceptance criteria for the positive control are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level with data qualifying codes. **Note:** If there is insufficient sample or the holding time cannot be met, contact client and report with flags.
Surrogates *(Analyst, Data Reviewer)*	- % Recovery within limits of method or within three standard deviations of the historical mean.	- Individual sample must be repeated. Place comment in LIMS. - Surrogate results outside criteria shall be reported with qualifiers.
Method Blank (MB) *(Analyst, Data Reviewer)*	< ½ Reporting Limit [1]	- Reanalyze blank. - If still positive, determine source of contamination. If necessary, reprocess (i.e. digest or extract) entire sample batch. Report blank results. - Qualify the result(s) if the concentration of a targeted analyte in the MB is at or above the reporting limit AND is > 1/10 of the amount measured in the sample.
Proficiency Testing (PT) Samples *(QA Manager, Technical Manager(s))*	- Criteria supplied by PT Supplier.	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat a PT sample to show the problem is corrected.
Internal / External Audits *(QA Manager, Technical Manager(s), Laboratory Director)*	- Defined in Quality System documentation such as SOPs, QAM, etc..	- Non-conformances must be investigated through CAR system and necessary corrections must be made.

QC Activity *(Individual Responsible for Initiation/Assessment)*	Acceptance Criteria	Recommended Corrective Action
Reporting / Calculation Errors (Depends on issue – possible individuals include: Analysts, Data Reviewers, Project Managers, Technical Managers, QA Manager, NDSC QA, Executive Management)	- NDSC Document No. CW-Q-S-005, Data Recall **or** local SOP No.	- Corrective action is determined by type of error. Follow the procedures in NDSC Document No. CW-L-S-002 **or** your lab's CA SOP.
Client Complaints *(Project Managers, Lab Director/Manager, Sales and Marketing)*	-	- Corrective action is determined by the type of complaint. For example, a complaint regarding an incorrect address on a report will result in the report being corrected and then follow-up must be performed on the reasons the address was incorrect (e.g., database needs to be updated).
QA Monthly Report (Refer to Section 16 for an example) (QA Manager, Lab Director/Manager, *Technical Manager(s)*)	- QAM, SOPs.	- Corrective action is determined by the type of issue. For example, CARs for the month are reviewed and possible trends are investigated.
Health and Safety Violation (Safety Officer, Lab Director/Manager, *Technical Manager(s)*)	- Environmental Health and Safety (EHS) Manual.	- Non-conformance is investigated and corrected through Velocity system.

Note:
1. Except as noted below for certain compounds, the method blank should be below ½ the detection limit Concentrations up to five times the reporting limit will be allowed for the ubiquitous laboratory and reagent contaminants: methylene chloride, toluene, acetone, 2-butanone and phthalates **provided** they appear in similar levels in the reagent blank and samples. This allowance presumes that the detection limit is significantly below any regulatory limit to which the data are to be compared and that blank subtraction will not occur. For benzene and ethylene dibromide (EDB) and other analytes for which regulatory limits are extremely close to the detection limit, the method blank must be below the method detection limit.

15.0 PREVENTIVE ACTION / IMPROVEMENT

15.1 Overview

The laboratory's preventive action programs improve or eliminate potential causes of nonconforming product and/or nonconformance to the quality system. This preventive action process is a proactive and continuous process of improvement activities that can be initiated through feedback from clients, employees, business providers, and affiliates. The QA Department has the overall responsibility to ensure that the preventive action process is in place, and that relevant information on actions is submitted for management review.

Dedicating resources to an effective preventive action system emphasizes the laboratory's commitment to its QA Program. It is beneficial to identify and address negative trends before they develop into complaints, problems and corrective actions. Additionally, the laboratory continually strives to improve customer service and client satisfaction through continuous improvements to laboratory systems.

Opportunities for improvement may be discovered through any of the following:

- review of the monthly QA Metrics Report,
- trending NCMs,
- review of control charts and QC results,
- trending proficiency testing (PT) results,
- performance of management system reviews,
- trending client complaints,
- review of processing operations, or
- staff observations.

The monthly Management Systems Metrics Report shows performance indicators in all areas of the laboratory and quality system. These areas include revised reports, corrective actions, audit findings, internal auditing and data authenticity audits, client complaints, PT samples, holding time violations, SOPs, ethics training, etc. The metrics report is reviewed monthly by the laboratory management, NDSC QA Team Local and Executive Management. These metrics are used in evaluating the management and quality system performance on an ongoing basis and provide a tool for identifying areas for improvement.

Items identified as continuous improvement opportunities to the management system may be issued as goals from the annual management systems review, recommendations from internal audits, white papers, Lessons Learned, Technical Services audit report, Technical Best Practices, or as Executive or management initiatives.

The laboratory's corrective action process is integral to implementation of preventive actions. A critical piece of the corrective action process is the implementation of actions to prevent further occurrence of a non-compliance event. Historical review of corrective action and non-conformances provides a valuable mechanism for identifying preventive action opportunities.

15.1.1 The following elements are part of a preventive action/process improvement system:

- Identification of an opportunity for preventive action or process improvement.
- Process for the preventive action or improvement.

- Define the measurements of the effectiveness of the process once undertaken.
- Execution of the preventive action or improvement.
- Evaluation of the plan using the defined measurements.
- Verification of the effectiveness of the preventive action or improvement.
- Close-Out by documenting any permanent changes to the Quality System as a result of the Preventive Action or Process Improvement. Documentation of Preventive Action/process Improvement is incorporated into the monthly QA reports, corrective action process and management review.

15.1.2 Any preventive actions/process improvement undertaken or attempted shall be taken into account during the annual Management Systems Review (Section 18). A highly detailed report is not required; however, a summary of successes and failures within the preventive action program is sufficient to provide management with a measurement for evaluation.

16.0 CONTROL OF RECORDS

The laboratory maintains a records management system appropriate to its needs and that complies with applicable standards or regulations as required. The system produces unequivocal, accurate records that document all laboratory activities. The laboratory retains all original observations, calculations and derived data, calibration records and a copy of the analytical report for a minimum of five years after it has been issued. Exceptions for programs with longer retention requirements are discussed in Section 16.2.

16.1 Overview

The laboratory has established procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. A record index is listed in Table 16-1. More detailed information on retention of specific records is provided in NDSC Document Nos. CW-L-P-001, Records Retention Policy and CW-L-WI-001, Records Retention/Storage Schedule and SOP SA-QA-001. Quality records are maintained by the QA department in a database, which is backed up as part of the regular laboratory backup. Records are of two types; either electronic or hard copy paper formats depending on whether the record is computer or hand generated (some records may be in both formats). Technical records are maintained by LIMs and QA department.

Table 16-1. Record Index

	Record Types [1]:	**Retention Time:**
Technical Records	- Raw Data - Logbooks[2] - Standards - Certificates - Analytical Records - MDLs/IDLs/DOCs - Lab Reports	5 Years from analytical report issue*

	Record Types [1]:	Retention Time:
Official Documents	- Quality Assurance Manual (QAM) - Work Instructions - Policies - SOPs - Policy Memorandums - Manuals - Published Methods	Indefinitely
QA Records	- Certifications - Method and Software Validation / Verification Data	Indefinitely
QA Records	- Internal & External Audits/Responses - Corrective/Preventive Actions - Management Reviews - Data Investigation	5 Years from archival* **Data Investigation:** 5 years or the life of the affected raw data storage whichever is greater (beyond 5 years if ongoing project or pending investigation)
Project Records	- Sample Receipt & COC Documents - Contracts and Amendments - Correspondence - QAPP - SAP - Telephone Logbooks - Lab Reports	5 Years from analytical report issue*
Administrative Records	Financial and Business Operations	Refer to NDSC Doc. No. CW-L-WI-001.
	EH&S Manual, Permits	Indefinitely
	Disposal Records	Indefinitely
	Employee Handbook	Indefinitely
	Personnel files, Employee Signature & Initials, Administrative Training Records (e.g., Ethics)	Refer to HR Manual
	Administrative Policies	Indefinitely
	Technical Training Records	7 years
	Legal Records	Indefinitely
	HR Records	Refer to NDSC Doc. No. CW-L-WI-001.
	IT Records	Refer to NDSC Doc. No. CW-L-WI-001
	NDSC Governance Records	Refer to NDSC Doc. No. CW-L-WI-001
	Sales & Marketing	5 years
	Real Estate	Indefinitely

[1] Record Types encompass hardcopy and electronic records.
[2] Examples of Logbook types: Maintenance, Instrument Run, Preparation (standard and samples), Standard and Reagent Receipt, Archiving, Balance Calibration, Temperature (hardcopy or electronic records).
* Exceptions listed in Table 16-2.

16.1.1 All records are stored and retained in such a way that they are secure and readily retrievable at the laboratory facility that provides a suitable environment to prevent damage or deterioration and to prevent loss All records shall be protected against fire, theft, loss,

environmental deterioration, and vermin. In the case of electronic records, electronic or magnetic sources, storage media are protected from deterioration caused by magnetic fields and/or electronic deterioration.

Access to the data is limited to laboratory and company employees. Retention of records are maintained on-site at the laboratory or electronically for at least 10 year after their generation.

For raw data and project records, record retention shall be calculated from the date the project report is issued. For other records, such as NDSC Documents, QA, or Administrative Records, the retention time is calculated from the date the record is formally retired. Records related to the programs listed in Table 16-2 have lengthier retention requirements and are subject to the requirements in Section 16.1~~.3~~.

16.2 Programs with Longer Retention Requirements

Some regulatory programs have longer record retention requirements than the standard record retention time. These are detailed in Table 16-2 with their retention requirements. In these cases, the longer retention requirement is enacted. If special instructions exist such that client data cannot be destroyed prior to notification of the client, the container or box containing that data is marked as to who to contact for authorization prior to destroying the data.

Table 16-2. Example: Special Record Retention Requirements

Program	[1]Retention Requirement
Drinking Water – All States	10 years (lab reports and raw data) 10 years - Radiochemistry (project records)
Drinking Water Lead and Copper Rule	12 years (project records)
Commonwealth of MA – All environmental data 310 CMR 42.14	10 years
FIFRA – 40 CFR Part 160	Retain for life of research or marketing permit for pesticides regulated by EPA
Housing and Urban Development (HUD) Environmental Lead Testing	10 years
Alaska	10 years
Louisiana – All	10 years
Michigan Department of Environmental Quality – all environmental data	10 years
Navy Facilities Engineering Service Center (NFESC)	10 years
Ohio VAP	10 years and State contacted prior to disposal
OSHA	30 years

[1]Note: Extended retention requirements must be noted with the archive documents or addressed in facility-specific records retention procedures.

16.2.1 The laboratory has procedures to protect and back-up records stored electronically and to prevent unauthorized access to or amendment of these records. All analytical data is maintained as hard copy or in a secure readable electronic format. For analytical reports that are maintained as copies in PDF format, refer to Section 19.15.1 for more information

16.2.2 The record keeping system allows for historical reconstruction of all laboratory activities

that produced the analytical data, as well as rapid recovery of historical data The history of the sample from when the laboratory took possession of the samples must be readily understood through the documentation. This shall include inter-laboratory transfers of samples and/or extracts.

- The records include the identity of personnel involved in sampling, sample receipt, preparation, or testing. All analytical work contains the initials (at least) of the personnel involved. The laboratory's copy of the COC is stored with the invoice and the work order sheet generated by LIMS. The chain of custody would indicate the name of the sampler. If any sampling notes are provided with a work order, they are kept with this package.
- All information relating to the laboratory facilities' equipment, analytical test methods, and related laboratory activities, such as sample receipt, sample preparation, or data verification are documented.
- The record keeping system facilitates the retrieval of all working files and archived records for inspection and verification purposes (e.g., set format for naming electronic files, set format for what is included with a given analytical data set. Instrument data is stored sequentially by instrument. A given day's analyses are maintained in the order of the analysis. Run logs are maintained for each instrument or method; a copy of each day's run log or instrument sequence is stored with the data to aid in re-constructing an analytical sequence. Where an analysis is performed without an instrument, bound logbooks or bench sheets are used to record and file data. Standard and reagent information is recorded in LIMS for each method as required.
- Changes to hardcopy records shall follow the procedures outlined in Section 14. Changes to electronic records in LIMS or instrument data are recorded in audit trails.
- The reason for a signature or initials on a document is clearly indicated in the records such as "sampled by," "prepared by," "reviewed by", or "analyzed by".
- All generated data except those that are generated by automated data collection systems, are recorded directly, promptly and legibly in permanent dark ink.
- Hard copy data may be scanned into PDF format for record storage as long as the scanning process can be verified in order to ensure that no data is lost and the data files and storage media must be tested to verify the laboratory's ability to retrieve the information prior to the destruction of the hard copy that was scanned.
- Also refer to Section 19.15.1 'Computer and Electronic Data Related Requirements'**.**

16.3 Technical and Analytical Records

16.3.1 The laboratory retains records of original observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each analytical report issued, for a minimum of five years unless otherwise specified by a client or regulatory requirement. The records for each analysis shall contain sufficient information to enable the analysis to be repeated under conditions as close as possible to the original. The records shall include the identity of laboratory personnel responsible for the sampling, performance of each analysis and reviewing results.

16.3.2 Observations, data and calculations are recorded real-time and are identifiable to the specific task.

16.3.3 Changes to hardcopy records shall follow the procedures outlined in Section 14.

Changes to electronic records in LIMS or instrument data are recorded in audit trails.

The essential information to be associated with analysis, such as strip charts, tabular printouts, computer data files, analytical notebooks, and run logs, include:

- Laboratory sample ID code;
- Date of analysis; time of analysis is also required if the holding time is seventy-two (72) hours or less, or when time critical steps are included in the analysis (e.g., drying times, incubations, etc.); instrumental analyses have the date and time of analysis recorded as part of their general operations. Where a time critical step exists in an analysis, location for such a time is included as part of the documentation in a specific logbook or on a benchsheet.
- Instrumentation identification and instrument operating conditions/parameters. Operating conditions/parameters are typically recorded in instrument maintenance logs where available.
- analysis type**;**
- all manual calculations and manual integrations**;**
- analyst's or operator's initials/signature**;**
- sample preparation including cleanup, separation protocols, incubation periods or subculture, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents**;**
- test results**;**
- standard and reagent origin, receipt, preparation, and use**;**
- calibration criteria, frequency and acceptance criteria**;**
- data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions**;**
- quality control protocols and assessment**;**
- electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries; and
- Method performance criteria including expected quality control requirements. These are indicated both in LIMS and on specific analytical report formats**.**

16.3.4 All logbooks used during receipt, preparation, storage, analysis, and reporting of samples or monitoring of support equipment shall undergo a periodic, documented supervisory or peer review.

16.4 Laboratory Support Activities

In addition to documenting all the above-mentioned activities, the following are retained QA records and project records (previous discussions in this section relate where and how these data are stored):

- all original raw data, whether hard copy or electronic, for calibrations, samples and quality control measures, including analysts' work sheets and data output records (chromatograms, strip charts, and other instrument response readout records)**;**

- a written description or reference to the specific test method used which includes a description of the specific computational steps used to translate parametric observations into a reportable analytical value**;**
- copies of final reports**;**
- archived SOPs**;**
- correspondence relating to laboratory activities for a specific project**;**
- all corrective action reports, audits and audit responses**;**
- proficiency test results and raw data; and
- results of data review, verification, and crosschecking procedures

16.4.1 Sample Handling Records

Records of all procedures to which a sample is subjected while in the possession of the laboratory are maintained. These include but are not limited to records pertaining to:

- sample preservation including appropriateness of sample container and compliance with holding time requirement;
- sample identification, receipt, acceptance or rejection and login;
- sample storage and tracking including shipping receipts, sample transmittal / COC forms; and
- procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.

16.5 Administrative Records

The laboratory also maintains the administrative records in either electronic or hard copy form. Refer to Table 16-1.

16.6 Records Management, Storage and Disposal

All records (including those pertaining to test equipment), certificates and reports are safely stored, held secure and in confidence to the client. Certification related records are available upon request.

All information necessary for the historical reconstruction of data is maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval.

Records that are stored or generated by computers or personal computers have hard copy, write-protected backup copies, or an electronic audit trail controlling access**.**

The laboratory has a record management system (a.k.a., document control) for control of laboratory notebooks, instrument logbooks, standards logbooks, and records for data reduction, validation, storage and reporting. Laboratory notebooks are issued on a per analysis basis, and are numbered sequentially. All data are recorded sequentially within a series of sequential notebooks. Bench sheets are filed sequentially. Standards are maintained in LIMS – no logbooks are used to record that data**.** Records are considered archived when noted as such in the records management system (a.k.a., document control.)

16.6.1 Transfer of Ownership

In the event that the laboratory transfers ownership or goes out of business, the laboratory shall ensure that the records are maintained or transferred according to client's instructions. Upon ownership transfer, record retention requirements shall be addressed in the ownership transfer agreement and the responsibility for maintaining archives is clearly established. In addition, in cases of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed. In the event of the closure of the laboratory, all records will revert to the control of NDSC. Should the entire company cease to exist, as much notice as possible will be given to clients and the accrediting bodies who have worked with the laboratory during the previous 5 years of such action.

16.6.2 Records Disposal

Records are removed from the archive and destroyed after 5 years unless otherwise specified by a client or regulatory requirement. On a project specific or program basis, clients may need to be notified prior to record destruction. Records are destroyed in a manner that ensures their confidentiality such as shredding, mutilation or incineration. (Refer to Tables 14-1 and 14-2).

Electronic copies of records must be destroyed by erasure or physically damaging off-line storage media so no records can be read.

If a third party records management company is hired to dispose of records, a "Certificate of Destruction" is required.

17.0 AUDITS

17.1 Internal Audits

Internal audits are performed to verify that laboratory operations comply with the requirements of the lab's quality system and with the external quality programs under which the laboratory operates. Audits are planned and organized by the QA staff. Personnel conducting the audits should be independent of the area being evaluated. Auditors will have sufficient authority, access to work areas, and organizational freedom necessary to observe all activities affecting quality and to report the assessments to laboratory management and**,** when requested**,** to Executive Management.

Audits are conducted and documented as described in the NDSC Document. Performing Internal Auditing, SOP No. NDSC-IA-SOP5260. The types and frequency of routine internal audits are described in Table 17-1. Special or ad hoc assessments may be conducted as needed under the direction of the QA staff.

Table 17-1. Types of Internal Audits and Frequency

Description	Performed by	Frequency
Quality Systems Audits	QA Department, QA approved designee, or NDSC QA	All areas of the laboratory annually
Method Audits QA Technical Audits	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to NDSC CW-Q-S-003)	QA Technical Audits Frequency: 50% of methods annually
SOP Method Compliance	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to NDSC CW-Q-S-003)	SOP Compliance Review Frequency: • Every 2 years • Every 1 year (Drinking Water Methods) • 100% of SOPs annually DOD
Special	QA Department or Designee	Surveillance or spot checks performed as needed, e.g., to confirm corrective actions from other audits.
Performance Testing	Analysts with QA oversight	Two successful per year for each TNI-field of testing or as dictated by regulatory requirements

17.1.1 Annual Quality Systems Audit

An annual quality systems audit is required to ensure compliance to analytical methods and SOPs, Eurofins Data Integrity and Ethics Policies (see Sec. 7.2), TNI quality systems, client and state requirements, and the effectiveness of the internal controls of the analytical process, including but not limited to data review, quality controls, preventive action and corrective action. The completeness of earlier corrective actions is assessed for effectiveness & sustainability. The audit is divided into sections for each operating or support area of the lab, and each section is comprehensive for a given area. The area audits may be performed on a rotating schedule throughout the year to ensure adequate coverage of all areas. This schedule may change as situations in the laboratory warrant.

17.1.2 QA Technical Audits

QA technical audits assess data authenticity and analyst integrity. These audits are based on client projects, associated sample delivery groups, and the methods performed. Reported results are compared to raw data to verify the authenticity of results. The validity of calibrations and QC results are compared to data qualifiers, footnotes, and case narratives. Documentation is assessed by examining run logs and records of manual integrations. Manual calculations are checked. Where possible, electronic audit miner programs (e.g., Chrom AuditMiner) are used to identify unusual manipulations of the data deserving closer scrutiny. QA technical audits will include all methods within a two-year period.

17.1.3 SOP Method Compliance

Compliance of all SOPs with the source methods and compliance of the operational groups with the SOPs will be assessed by the Technical Manager or qualified designee at least every two years. Assessment is made annually for methods and administrative SOPs related to DoD programs and DW compliance methods.

17.1.4 Special Audits

Special audits are conducted on an as needed basis, generally as a follow up to specific issues such as client complaints, corrective actions, PT results, data audits, system audits, validation comments, regulatory audits or suspected ethical improprieties. Special audits are focused on a specific issue, and report format, distribution, and timeframes are designed to address the nature of the issue.

17.1.5 Performance Testing

The laboratory participates semi-annually in performance audits conducted through the analysis of PT samples provided by a third party. The laboratory generally participates in the following types of PT studies: Potable Water, Non-Potable water and Solid Hazardous Waste.

It is Eurofins policy that PT samples be treated as typical samples in the production process. Furthermore, where PT samples present special or unique problems, in the regular production process they may need to be treated differently, as would any special or unique request submitted by any client. The QA Manager must be consulted and in agreement with any decisions made to treat a PT sample differently due to some special circumstance.

Written investigations for unacceptable PT results are required. In some cases it may be necessary for blind QC samples to be submitted to the laboratory to show a return to control.

17.2 External Audits

External audits are performed when certifying agencies or clients conduct on-site inspections or submit performance testing samples for analysis. It is Eurofins policy to cooperate fully with regulatory authorities and clients. The laboratory makes every effort to provide the auditors with access to personnel, documentation, and assistance. Laboratory supervisors are responsible for providing corrective actions to the QA Manager who coordinates the response. Audit responses are due in the time allotted by the client or agency performing the audit.

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. The client may only view data and systems related directly to the client's work. All efforts are made to keep other client information confidential.

17.2.1 Confidential Business Information (CBI) Considerations

During on-site audits, auditors may come into possession of information claimed as business confidential. A business confidentiality claim is defined as "a claim or allegation that business information is entitled to confidential treatment for reasons of business confidentiality or a request for a determination that such information is entitled to such treatment." When information is claimed as business confidential, the laboratory must place on (or attach to) the information at the time it is submitted to the auditor, a cover sheet, stamped or typed legend or other suitable form of notice, employing language such as "trade secret", "proprietary" or

"company confidential". Confidential portions of documents otherwise non-confidential must be clearly identified. CBI may be purged of references to client identity by the responsible laboratory official at the time of removal from the laboratory. However, sample identifiers may not be obscured from the information. Additional information regarding CBI can be found in within the 2009 and 2016 TNI standards.

17.3 Audit Findings

Audit findings are documented using the corrective action process and database (see Section 14). The laboratory's corrective action responses may include action plans that could not be completed within a predefined timeframe. In these instances, a completion date must be set and agreed to by operations management and the QA Manager.

Developing and implementing corrective actions to findings is the responsibility of the Technical Manager where the finding originated. Findings that are not corrected by specified due dates are reported monthly to management in the QA monthly report.

If any audit finding casts doubt on the effectiveness of the operations or on the correctness or validity of the laboratory's test results, the laboratory shall take timely corrective action, and shall notify clients in writing if the investigations show that the laboratory results have been affected. Once corrective action is implemented, a follow-up audit is scheduled to ensure that the problem has been corrected.

Clients must be notified promptly in writing of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any test report or amendment to a test report. The investigation must begin within 24 hours of discovery of the problem and all efforts are made to notify the client within two weeks after the completion of the investigation.

18.0 MANAGEMENT REVIEWS

18.1 Quality Assurance Report

The QA Department is responsible for preparing a comprehensive monthly metrics report to Management to keep them apprised of current quality issues. This report fosters communication, review, and refinement of the QA system to evaluate the suitability of policies and procedures to meet both regulatory and laboratory quality objectives.

The NDSC QA team compiles information from all of the Environment Testing laboratories monthly metrics reports for the Executive Management team. This report includes notable information and concerns regarding the laboratories QA program and a listing of new regulations that may potentially impact the laboratories.

18.2 Annual Management Review

The Laboratory Management team (Laboratory Director, Technical Managers, QA Manager) conducts a review annually of its quality systems to ensure its continuing suitability and effectiveness in meeting client and regulatory requirements and to introduce any necessary changes or improvements. It will also provide a platform for defining goals, objectives and action items that feed into the laboratory planning system. NDSC personnel is be included in this meeting at the discretion of the Laboratory Director. The LIMS review consists of examining any audits, complaints or concerns that have been raised through the year that are related to

LIMS. The laboratory will summarize any critical findings that cannot be solved by the lab and report them to Corporate IT.

This management systems review (NDSC Document No. IA-QP38702 and Work Instruction No. NDSC-IA-FRM43453) uses information generated during the preceding year to assess the "big picture" by ensuring that routine actions taken and reviewed on a monthly basis are not components of larger systematic concerns. The monthly review should keep the quality systems current and effective, therefore, the annual review is a formal senior management process to review specific existing documentation. Significant issues from the following documentation are compiled or summarized by the QA Manager prior to the review meeting:

- Matters arising from the previous annual review.
- Prior Monthly QA Reports issues.
- Laboratory QA Metrics.
- Review of report reissue requests.
- Review of client feedback and complaints.
- Issues arising from any prior management or staff meetings.
- Minutes from prior senior lab management meetings. Issues that may be raised from these meetings include:
    - Adequacy of staff, equipment and facility resources.
    - Adequacy of policies and procedures.
    - Future plans for resources and testing capability and capacity.
- The annual internal double blind PT program sample performance (if performed),
- Compliance to the Ethics Policy and Data Integrity Plan. Including any evidence/incidents of inappropriate actions or vulnerabilities related to data Integrity.
- For labs analyzing radioactive samples, also include the following:
    - Radiation health and safety
    - Radioactive hazardous waste management
    - Radioactive materials management
- Evaluation of overall risk, including risks to impartiality, confidentiality, reporting statements of conformity, and nonconforming work.

A report is generated by the QA Manager and management. The report is distributed to the Laboratory Manager, Business Unit Manager, and Department Mangers. The report includes, but is not limited to:

- The date of the review and the names and titles of participants.
- A reference to the existing data quality related documents and topics that were reviewed.
- Quality system or operational changes or improvements that will be made as a result of the review [e.g., an implementation schedule including assigned responsibilities for the changes (Action Table)].

Changes to the quality systems requiring update to the laboratory QA Manual shall be included in the next revision of the QA Manual.

18.3 Potential Integrity Related Managerial Reviews

Potential integrity issues (data or business related) must be handled and reviewed in a confidential manner until such time as a follow-up evaluation, full investigation, or other appropriate actions have been completed and issues clarified. The NDSC Document No. CW-L-S-002, Internal Investigations shall be followed All investigations that result in finding of inappropriate activity are documented and include any disciplinary actions involved, corrective actions taken, and all appropriate notifications of clients.

The Eurofins Environment Testing Presidents, Business Unit Managers, Laboratory Directors, NDSC Team are informed of any current data integrity or data recall investigations via the monthly metrics report.

19.0 TEST METHODS AND METHOD VALIDATION

19.1 Overview

The laboratory uses methods that are appropriate to meet our clients' requirements and that are within the scope of the laboratory's capabilities. These include sampling, handling, transport, storage and preparation of samples, and, where appropriate, an estimation of the measurement of uncertainty as well as statistical techniques for analysis of environmental data.

Instructions are available in the laboratory for the operation of equipment as well as for the handling and preparation of samples. All instructions, Standard Operating Procedures (SOPs), reference methods and manuals relevant to the working of the laboratory are readily available to all staff. Deviations from published methods are documented (with justification) in the laboratory's approved SOPs. SOPs are submitted to clients for review at their request. Significant deviations from published methods require client approval and regulatory approval where applicable.

19.2 Standard Operating Procedures (SOPs)

The laboratory maintains SOPs that accurately reflect all phases of the laboratory such as assessing data integrity, corrective actions, handling customer complaints as well as all analytical methods and sampling procedures. The method SOPs are derived from the most recently promulgated/approved, published methods and are specifically adapted to the laboratory facility. Modifications or clarifications to published methods are clearly noted in the SOPs. All SOPs are controlled in the laboratory.

- All SOPs contain a revision number, effective date, and appropriate approval signatures. Controlled copies are available to all staff.
- Procedures for writing an SOP are incorporated by reference to NDSC Document No. CW-Q-S-002, Writing a Standard Operating Procedure.
- SOPs are reviewed at a minimum of every 2 years (annually for Drinking Water and DoD/DOE SOPs), and where necessary, revised to ensure continuing suitability and compliance with applicable requirements.

19.3 Laboratory Methods Manual

For each test method, the laboratory shall have available the published referenced method as well as the laboratory developed SOP.

Note: If more stringent standards or requirements are included in a mandated test method or regulation than those specified in this manual, the laboratory shall demonstrate that such requirements are met. If it is not clear which requirements are more stringent, the standard from the method or regulation is to be followed. Any exceptions or deviations from the referenced methods or regulations are noted in the specific analytical SOP.

The laboratory maintains an SOP Index for both technical and non-technical SOPs. Technical SOPs are maintained to describe a specific test method. Non-technical SOPs are maintained to describe functions and processes not related to a specific test method.

19.4 Selection of Methods

Since numerous methods and analytical techniques are available, continued communication between the client and laboratory is imperative to assure the correct methods are utilized. Once client methodology requirements are established, this and other pertinent information is summarized by the PM. These mechanisms ensure that the proper analytical methods are applied when the samples arrive for log-in. For non-routine analytical services (e.g., special matrices, non-routine compound lists), the method of choice is selected based on client needs and available technology. The methods selected should be capable of measuring the specific parameter of interest, in the concentration range of interest, and with the required precision and accuracy.

19.4.1 Sources of Methods

Routine analytical services are performed using standard EPA-approved methodology. In some cases, modification of standard approved methods may be necessary to provide accurate analyses of particularly complex matrices. When the use of specific methods for sample analysis is mandated through project or regulatory requirements, only those methods shall be used.

When clients do not specify the method to be used or methods are not required, the methods used will be clearly validated and documented in an SOP and available to clients and/or the end user of the data. Refer to Appendix 6 for a list of the currently accepted U.S. EPA analytical method references used by the laboratory.

The laboratory reviews updated versions to all the aforementioned references for adaptation based upon capabilities, instrumentation, etc., and implements them as appropriate. As such, the laboratory strives to perform only the latest versions of each approved method as regulations allow or require.

Other reference procedures for non-routine analyses may include methods established by specific states (e.g., Underground Storage Tank methods), ASTM or equipment manufacturers. Sample type, source, and the governing regulatory agency requiring the analysis will determine the method utilized.

The laboratory shall inform the client when a method proposed by the client may be inappropriate or out of date. After the client has been informed, and they wish to proceed contrary to the laboratory's recommendation, it will be documented.

19.4.1.1 Client Supplied Methods

Most of the client-supplied method requirements presented to us involve achieving specific quality control criteria, limits of quantitation (LOQ), and/or method detection limits (MDL) using standard EPA methods. These requirements are communicated to the appropriate technical

groups prior to the project start up. Each technical group evaluates the scope of work and the requirements to ensure the criteria can be met using the standard EPA method. The data is monitored to ensure the criteria are met throughout the project. The PM notifies the client if there is a more appropriate method available or if the client's criteria cannot be achieved on a certain sample matrix (i.e., due to matrix or dilutions).

Occasionally, we are asked to transfer a non-standardized method from a client into our lab or to develop a new method, when one is not available. In the case of a method transfer, we set up the client's method and perform some initial evaluation. After the initial evaluation, we may make recommendations on how to improve method performance. If the method appears to be adequate, we determine linearity, specificity, precision, accuracy, MDL, and LOQ by performing calibrations, analyzing method blanks, and carrying out method detection limit and IDOC studies.

In the case of method development, we work with the client and/or data user to determine the level of validation required ensuring that the method meets its intended purpose. In addition to the elements above, we also determine standard and sample stability and robustness depending on the scope of the project. Typically, a standard operating procedure is written and submitted to the client with the results of the validation. These steps are completed prior to analysis of field samples. Data related to the setup of the method are archived.

19.4.1.2 Procedural Deviations

Analysts are required to follow a documented method for all tests performed; and any deviations from analytical methods must be documented, approved, and justified in an appropriate and consistent manner. We classify method deviations as either being a planned deviation or an unplanned deviation. In general, the following information is captured to document both types of situations:

- Description of the situation
- Reason or justification for the deviation
- Impact the deviation had on the testing
- Signature/date of analyst performing the test
- Signature/date of QA and Laboratory management approving the deviation
- Signature/date of client approval, if necessary

Deviations to written procedures are documented in raw data records, ICAT or through the ICAR (Investigation and Corrective Action Report) system. Both types of documentation require management and QA review and approval.

19.4.2 Demonstration of Capability

Before the laboratory may institute a new method and begin reporting results, the laboratory shall confirm that it can properly operate the method. In general, this demonstration does not test the performance of the method in real world samples, but in an applicable and available clean matrix sample. If the method is for the testing of analytes that are not conducive to spiking, demonstration of capability may be performed on quality control samples.

A demonstration of capability (DOC, Lab SOP SA-QA-006) is performed whenever there is a change in instrument type (e.g., new instrumentation), matrix, method or personnel (e.g., analyst has not performed the test within the last 12 months).

Note: The laboratory shall have a DOC for all analytes included in the methods that the laboratory performs, and proficiency DOCs for each analyst shall include all analytes that the laboratory routinely performs. Addition of non-routine analytes does not require new DOCs for all analysts if those analysts are already qualified for routine analytes tested using identical chemistry and instrument conditions.

The initial demonstration of capability must be thoroughly documented and approved by the Technical Manager and QA Manager prior to independently analyzing client samples. All associated documentation must be retained in accordance with the laboratory's archiving procedures.

The laboratory must have an approved SOP, demonstrate satisfactory performance, and conduct an MDL study (when applicable). There may be other requirements as stated within the published method or regulations (e.g., retention time window study).

Note: In some instances, a situation may arise where a client requests that an unusual analyte be reported using a method where this analyte is not normally reported. If the analyte is being reported for regulatory purposes, the method must meet all procedures outlined within this QA Manual (SOP, MDL, and Demonstration of Capability). If the client states that the information is not for regulatory purposes, the result may be reported as long as the following criteria are met:

- The instrument is calibrated for the analyte to be reported using the criteria for the method and ICV/CCV criteria are met (unless an ICV/CCV is not required by the method or criteria are per project DQOs).
- The laboratory's nominal or default reporting limit (RL) is equal to the quantitation limit (QL), must be at or above the lowest non-zero standard in the calibration curve and must be reliably determined. Project RLs are client specified reporting levels which may be higher than the QL. Results reported below the QL must be qualified as estimated values. Also see Section 19.6.1.3, Relationship of Limit of Detection (LOD) to Quantitation Limit (QL).
- The client request is documented and the lab informs the client of its procedure for working with unusual compounds. The final report must be footnoted: *Reporting Limit based on the low standard of the calibration curve.*

19.4.3 Initial Demonstration of Capability (IDOC) Procedures

The analyte(s) shall be diluted in a volume of clean matrix sufficient to prepare four aliquots at the concentration specified by a method or the laboratory SOP.

19.4.3.1 At least four aliquots shall be prepared (including any applicable clean-up procedures) and analyzed according to the test method (either concurrently or over a period of days).

19.4.3.2 Using all of the results, calculate the mean recovery in the appropriate reporting units and the standard deviations for each parameter of interest.

19.4.3.3 When it is not possible to determine the mean and standard deviations, such as for presence, absence and logarithmic values, the laboratory will assess performance against criteria described in the Method SOP.

19.4.3.4 Compare the information obtained above to the corresponding acceptance criteria for precision and accuracy in the test method (if applicable) or in laboratory generated acceptance criteria (LCS or interim criteria) if there is no mandatory criteria established. If any one of the

parameters do not meet the acceptance criteria, the performance is unacceptable for that parameter.

19.4.3.5 When one or more of the tested parameters fail at least one of the acceptance criteria, the analyst must proceed according to either option listed below:

- Locate and correct the source of the problem and repeat the test for all parameters of interest beginning with 19.4.3.3 above.
- Beginning with 19.4.3.3 above, repeat the test for all parameters that failed to meet criteria. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, locate and correct the source of the problem and repeat the test for all compounds of interest beginning with 19.4.3.1 above.

Note: Results of successive LCS analyses can be used to fulfill the DOC requirement.

Methods on line prior to the effective date of this Section shall be updated to the procedures outlined above as new analysts perform their demonstration of capability. A copy of the new record will replace that which was used for documentation in the past. At a minimum, the precision and accuracy of four mid-level laboratory control samples must have been compared to the laboratory's quality control acceptance limits.

19.5 Laboratory Developed Methods and Non-Standard Methods

Any new method developed by the laboratory must be fully defined in an SOP and validated by qualified personnel with adequate resources to perform the method. Method specifications and the relation to client requirements must be clearly conveyed to the client if the method is a non-standard method (not a published or routinely accepted method). The client must also be in agreement to the use of the non-standard method.

19.6 Validation of Methods

Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

All non-standard methods, laboratory designed/developed methods, standard methods used outside of their scope, and major modifications to published methods must be validated to confirm they are fit for their intended use. The validation will be as extensive as necessary to meet the needs of the given application. The results are documented with the validation procedure used and contain a statement as to the fitness for use.

19.6.1 Method Validation and Verification Activities for All New Methods

While method validation can take various courses, the following activities can be required as part of method validation. Method validation records are designated QC records and are archived accordingly.

When changes are made to any validated methods, the influence of such changes shall be documented and, if appropriate, a new validation shall be performed.

19.6.1.1 **Determination of Method Selectivity** – Method selectivity is the demonstrated ability to discriminate the analyte(s) of interest from other compounds in the specific matrix or matrices from other analytes or interference. In some cases to achieve the required selectivity for an analyte, a confirmation analysis is required as part of the method.

19.6.1.2 **Determination of Method Sensitivity** – Sensitivity can be both estimated and demonstrated. Whether a study is required to estimate sensitivity depends on the level of method development required when applying a particular measurement system to a specific set of samples. Detection limit studies are conducted as described in Section 19.7. Where other protocols for estimations and/or demonstrations of sensitivity are required by regulation or client agreement, these shall be followed.

19.6.1.3 **Relationship of Limit of Detection (LOD) to the Limit of Quantitation (LOQ)** – An important characteristic of expression of sensitivity is the distinction between the LOD and the LOQ. The LOD is the minimum level at which the presence of an analyte can be reliably concluded. The LOQ is the minimum concentration of analyte that can be quantitatively determined with acceptable precision and bias, equivalent to the laboratory's routine reporting limit (RL). For most instrumental measurement systems, there is a region where semi-quantitative data is generated around the LOD (both above and below the estimated MDL or LOD) and below the LOQ. In this region, detection of an analyte may be confirmed but quantification of the analyte is unreliable within the accuracy and precision guidelines of the measurement system. When an analyte is detected below the LOQ, and the presence of the analyte is confirmed by meeting the qualitative identification criteria for the analyte, the analyte can be reliably reported, but the amount of the analyte can only be estimated. If data is to be reported in this region, it must be done so with a qualification that denotes the semi-quantitative nature of the result.

19.6.1.4 **Determination of Interferences** – A determination that the method is free from interferences in a blank matrix is performed.

19.6.1.5 **Determination of Range** – Where appropriate to the method, the quantitation range is determined by comparison of the response of an analyte in a curve to established or targeted criteria. Generally the upper quantitation limit is defined by highest acceptable calibration concentration. The lower quantitation limit or QL cannot be lower than the lowest non-zero calibration level, and can be constrained by required levels of bias and precision.

19.6.1.6 **Determination of Accuracy and Precision** – Accuracy and precision studies are generally performed using replicate analyses, with a resulting percent recovery and measure of reproducibility (standard deviation, relative standard deviation) calculated and measured against a set of target criteria.

19.6.1.7 **Documentation of Method** – The method is formally documented in an SOP. If the method is a minor modification of a standard laboratory method that is already documented in an SOP, an SOP Attachment describing the specific differences in the new method is acceptable in place of a separate SOP.

19.6.1.8 **Continued Demonstration of Method Performance** – Continued demonstration of method performance is addressed in the SOP. Continued demonstration of method performance is generally accomplished by batch specific QC samples such as LCS, method blanks or PT samples.

19.7 Method Detection Limit (MDL) / Limits of Detection (LOD)

The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017. The MDL is equivalent to the TNI LOD or DL, and is also equivalent to the DoD/DOE Quality Systems Manual (QSM) DL. The working or final MDL is the higher of the MDL value determined from spikes (MDLs) and the MDL value determined from

blanks (MDLb). An initial MDL study shall be performed during the method validation process and when the method is altered in a way that can reasonably be expected to change its sensitivity. On-going data are collected during each quarter in which samples are being analyzed. At least once every 13 months the MDLs and MDLb are re-calculated and re-evaluated using data collected during the preceding period. Details of the laboratory's procedure for conducting MDL studies are given in NDSC Document No. CA-Q-S-006.

19.8 Verification of Detection Limits

If it is found during the re-evaluation of detection limit results that more than 5% of the spiked samples do not return positive numeric results that meet all method qualitative identification criteria, then then spiking level shall be increased and the initial MDL study pre-performed at the new spiking concentration. For DoD/DOE labs, additional guidance provided in NDSC Document No. No. CA-Q-S-006 - Attachment 2.

19.9 Instrument Detection Limits (IDL)

The IDL is sometimes used to assess the reasonableness of the MDL or in some cases required by the analytical method or program requirements. IDLs are most commonly used in metals analyses but may be useful in demonstration of instrument performance in other areas.

IDLs are calculated to determine an instrument's sensitivity independent of any preparation method. IDLs are calculated either using 7 replicate spike analyses, like MDL but without sample preparation, or by the analysis of 10 instrument blanks and calculating 3 x the absolute value of the standard deviation.

19.10 Limit of Quantitation

The LOQ shall be at a concentration equivalent to the lowest calibration standard concentration, with the exception of methods using a single-point calibration, and shall be greater than the MDL. The LOQ is verified by preparing and analyzing spikes at concentrations 1-2X the selected LOQ, employing the complete analytical process. For DoD/DOE labs, additional requirements provided in NDSC Document No. CA-Q-S-006.

When the laboratory establishes a quantitation limit, it must be initially verified by the analysis of a low level standard or QC sample at 1-2 times the reporting limit or by a DL check samples at or below the LOQ. The LOQ is verified annually thereafter. The annual requirement is waived for methods that have an annually verified MDL. The laboratory will comply with any regulatory requirements.

19.11 Retention Time Windows

Most organic analyses and some inorganic analyses use chromatography techniques for qualitative and quantitative determinations. For every chromatography analysis or as specified in the reference method, each analyte will have a specific time of elution from the column to the detector. This is known as the analyte's retention time. The variance in the expected time of elution is defined as the retention time window. As the key to analyte identification in chromatography, retention time windows must be established on every column for every analyte used for that method. These records are kept on-file and available for review. Complete details are available in the laboratory SOPs.

19.12 Evaluation of Selectivity

The laboratory evaluates selectivity by following the checks within the applicable analytical methods, which include mass spectral tuning, second column confirmation, ICP interelement interference checks, chromatography retention time windows, sample blanks, spectrochemical, atomic absorption or fluorescence profiles, co-precipitation evaluations and specific electrode response factors.

19.13 Estimation of Uncertainty of Measurement

19.13.1 Uncertainty is “a parameter associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand” (as defined by the International Vocabulary of Basic and General Terms in Metrology, ISO Geneva, 1993, ISBN 92-67-10175-1). Knowledge of the uncertainty of a measurement provides additional confidence in a result’s validity. Its value accounts for all the factors which could possibly affect the result, such as adequacy of analyte definition, sampling, matrix effects and interferences, climatic conditions, variances in weights, volumes, and standards, analytical procedure, and random variation. Some national accreditation organizations require the use of an “expanded uncertainty” defined as the range within which the value of the measured and is believed to lie within at least a 95% confidence level with the coverage factor k=2.

19.13.2 Uncertainty is not error. Error is a single value (i.e., the difference between the true result and the measured result). On environmental samples, the true result is never known. The measurement is the sum of the unknown true value and the unknown error. Unknown error is a combination of systematic error, or bias, and random error. Bias varies predictably, constantly, and independently from the number of measurements. Random error is unpredictable, assumed to be Gaussian in distribution, and reducible by increasing the number of measurements.

19.13.3 The minimum uncertainty associated with results generated by the laboratory can be determined by using the Laboratory Control Sample (LCS) accuracy range for a given analyte. The LCS limits are used to assess the performance of the measurement system since they take into consideration all of the laboratory variables associated with a given test over time (except for variability associated with the sampling and the variability due to matrix effects). The percent recovery of the LCS is compared either to the method-required LCS accuracy limits or to the statistical, historical, in-house LCS accuracy limits.

19.13.4 To calculate the uncertainty for the specific result reported, multiply the result by the decimal of the lower end of the LCS range percent value for the lower end of the uncertainty range, and multiply the result by the decimal of the upper end of the LCS range percent value for the upper end of the uncertainty range. These calculated values represent uncertainties at approximately the 99% confidence level with a coverage factor of k = 3. As an example, for a reported result of 1.0 mg/L with an LCS recovery range of 50 to 150%, the estimated uncertainty in the result would be 1.0 +/- 0.5 mg/L.

19.13.5 In the case where a well-recognized test method specifies limits to the values of major sources of uncertainty of measurement (e.g., 524.2, 525, etc.) and specifies the form of presentation of calculated results, no further discussion of uncertainty is required.

19.14 Sample Reanalysis Guidelines

Because there is a certain level of uncertainty with any analytical measurement, a sample re-preparation (where appropriate) and subsequent analysis (hereafter referred to as ‘reanalysis’)

may result in either a higher or lower value from an initial sample analysis. There are also variables that may be present (e.g., sample homogeneity, analyte precipitation over time, etc.) that may affect the results of a reanalysis. Based on the above comments, the laboratory will reanalyze samples at a client's request with the following caveats. **Client specific Contractual Terms & Conditions for reanalysis protocols may supersede the following items.**

Homogenous samples: If a reanalysis agrees with the original result to within the RPD limits for MS/MSD or Duplicate analyses, or within ± 1 reporting limit for samples ≤ 5x the reporting limit, the original analysis will be reported. At the client's request, both results may be reported on the same report but not on two separate reports.

- If the reanalysis does not agree (as defined above) with the original result, then the laboratory will investigate the discrepancy and reanalyze the sample a third time for confirmation if sufficient sample is available.
- Any potential charges related to reanalysis are discussed in the contract terms and conditions or discussed at the time of the request. The client will typically be charged for reanalysis unless it is determined that the lab was in error.
- Due to the potential for increased variability, reanalysis may not be applicable to Non-homogenous, Encore, and Sodium Bisulfate preserved samples. See the Area Supervisor *or* Laboratory Director if unsure.

19.15 Control of Data

The laboratory has policies and procedures in place to ensure the authenticity, integrity, and accuracy of the analytical data generated by the laboratory.

19.15.1 Computer and Electronic Data Related Requirements

The three basic objectives of our computer security procedures and policies are shown below.

The laboratory is currently using the Eurofins LIMS system, which has been highly customized to meet the needs of the laboratory.

19.15.1.1 Maintain the Database Integrity – Assurance that data is reliable and accurate through data verification (review) procedures, password-protecting access, anti-virus protection, data change requirements, as well as an internal LIMS permissions procedure.

- LIMS Database Integrity is achieved through data input validation, internal user controls, documentation of system failures and corrective actions taken, and data change requirements.
- Spreadsheets and other software developed in-house must be verified with documentation through hand calculations prior to use. Cells containing calculations must be lock-protected and controlled.
- Instrument hardware and software adjustments are safeguarded through maintenance logs, audit trails and controlled access.

19.15.1.2 Ensure Information Availability – Protection against loss of information or service is ensured through scheduled back-ups, stable file server network architecture, secure storage of media, line filter, Uninterruptible Power Supply (UPS), and maintaining older versions of software as revisions are implemented.

19.15.1.3 Maintain Confidentiality – Ensure data confidentiality through physical access controls such as password protection or website access approval when electronically transmitting data.

19.15.2 Data Reduction

The complexity of the data reduction depends on the analytical method and the number of discrete operations involved (e.g., extractions, dilutions, instrument readings and concentrations). The analyst calculates the final results from the raw data or uses appropriate computer programs to assist in the calculation of final reportable values.

For manual data entry, e.g., Wet Chemistry, the data is reduced by the analyst and then verified by the Department Manager or alternate analyst prior to updating the data in LIMS. The spreadsheets, or any other type of applicable documents, are attached as a batch document in LIMs for review.

Manual integration of peaks will be documented and reviewed and the raw data will be flagged using NDSC Document No. NDSC-EDI-SOP43862, Acceptable Manual Integration Practices as the guideline for our internal SOP SA-QA-008.

Analytical results are reduced to appropriate concentration units specified by the analytical method, taking into account factors such as dilution, sample weight or volume, etc. Blank correction will be applied only when required by the method or per manufacturer's indication; otherwise, it should not be performed. Calculations are independently verified by appropriate laboratory staff. Calculations and data reduction steps for various methods are summarized in the respective analytical SOPs or program requirements.

19.15.2.1 All raw data must be retained in the worklist folder, computer file (if appropriate), and/or runlog. All criteria pertinent to the method must be recorded. The documentation is recorded at the time observations or calculations are made.

19.15.2.2 In general, concentration results are reported in milligrams per liter (mg/l) or micrograms per liter (µg/l) for liquids and milligrams per kilogram (mg/kg) or micrograms per kilogram (µg/kg) for solids. For values greater than 10,000 mg/l, results can be reported in percent, i.e., 10,000 mg/l = 1**%.** Units are defined in each lab SOP.

19.15.2.3 In reporting, the analyst or the instrument output records the raw data result using values of known certainty plus one uncertain digit. If final calculations are performed external to LIMS, the results should be entered in LIMS with at least three significant figures. In general, results are reported to 2 significant figures on the final report.

19.15.2.4 For those methods that do not have an instrument printout or an instrumental output compatible with the LIMS, the raw results and dilution factors are entered directly into LIMS by the analyst, and the software calculates the final result for the analytical report. LIMS has a formatter for significant figure criterion for each analyte.

19.15.2.5 The laboratory strives to import data directly from instruments or calculation spreadsheets to ensure that the reported data are free from transcription and calculation errors. For those analyses with an instrumental output compatible with the LIMS, the raw results and dilution factors are transferred into LIMS, electronically after reviewing the quantitation report, and removing unrequested or poor spectrally-matched compounds. The instrument's printout of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained as raw data in LIMs.

19.15.3 Logbook / Worksheet Use Guidelines

Logbooks and worksheets are filled out 'real time' and have enough information on them to trace the events of the applicable analysis/task. (e.g. calibrations, standards, analyst, sample ID, date, time on short holding time tests, temperatures when applicable, calculations are traceable, etc.)

- Corrections are made following the procedures outlined in Section 14.
- Logbooks are controlled by the QA department. A record is maintained of all logbooks in the lab.
- Unused portions of pages must be "Z"'d out, signed and dated.
- Worksheets are created with the approval of the Technical Manager/QA Manager at the facility. The QA Manager controls all worksheets following the procedures in Section 6.

19.15.4 Review / Verification Procedures

Review procedures are outlined in several SOPs to ensure that reported data are free from calculation and transcription errors, that QC parameters have been reviewed and evaluated before data is reported. The laboratory also has an SOP discussing Manual Integrations to ensure the authenticity of the data. The general review concepts are discussed below, more specific information can be found in the SOPs.

19.15.4.1 Log-In Review - The data review process starts at the sample receipt stage. Sample control personnel review chain-of-custody forms and project instructions from the project management group. This is the basis of the sample information and analytical instructions entered into the LIMS. The log-in instructions are reviewed by the personnel entering the information, and a second level review is conducted by the project management staff.

19.15.4.2 First Level Data Review - The next level of data review occurs with the analysts. As data are generated, analysts review their work to ensure that the results meet project and SOP requirements. First level reviews include inspection of all raw data (e.g., instrument output for continuous analyzers, chromatograms, spectra, and manual integrations), evaluation of calibration/calibration verification data in the day's analytical run, evaluation of QC data, and reliability of sample results. The analyst transfers data into LIMS, data qualifiers are added as needed. All first level reviews are documented.

19.15.4.3 Second Level Data Review – All analytical data are subject to review by a second qualified analyst or supervisor. Second level reviews include inspection of all raw data (e.g., instrument output, chromatograms, and spectra) including 100% of data associated with any changes made by the primary analyst, such as manual integrations or reassignment of peaks to different analytes, or elimination of false negative analytes. The second review also includes evaluation of initial calibration/calibration verification data in the day's analytical run, evaluation of QC data, reliability of sample results, qualifiers and NCM narratives. Manual calculations are checked in second level review. All second level reviews are documented.

Issues that deem further review include the following:

- QC data are outside the specified control limits for accuracy and precision
- Reviewed sample data does not match with reported results
- Unusual detection limit changes are observed
- Samples having unusually high results

- Samples exceeding a known regulatory limit
- Raw data indicating some type of contamination or poor technique
- Inconsistent peak integration
- Transcription errors
- Results outside of calibration range

19.15.4.4 Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Laboratory Director, Project Manager, Quality Director/Manager, Technical Manager, or Supervisor for further investigation. Corrective action is initiated whenever necessary.

19.15.4.5 The results are then entered or directly transferred into the computer database and a report is printed for the client.

19.15.4.6 As a final review prior to the release of the report, the Project Manager reviews the results for appropriateness and completeness. This review and approval ensures that client requirements have been met and that the final report has been properly completed. The process includes, but is not limited to, verifying that the COC is followed, cover letters / narratives are present, flags are appropriate, and project specific requirements are met. The Project Manager may also evaluate the validity of results for different test methods given expected chemical relationships.

19.15.4.7 Any project that requires a data package is subject to a tertiary data review for transcription errors and acceptable quality control requirements. The Project Manager then signs the final report. The accounting personnel also check the report for any clerical or invoicing errors. When complete, the report is sent out to the client.

19.15.4.8 A brief overview of sample flow and information through the laboratory, as well as data review and validation, is presented in Figure 19-1.

19.15.5 Manual Integrations

Computerized data systems provide the analyst with the ability to re-integrate raw instrument data in order to optimize the interpretation of the data. Though manual integration of data is an invaluable tool for resolving variations in instrument performance and some sample matrix problems, when used improperly, this technique would make unacceptable data appear to meet quality control acceptance limits. Improper re-integrations lead to legally indefensible data, a poor reputation, or possible laboratory decertification. Because guidelines for re-integration of data are not provided in the methods and most methods were written prior to widespread implementation of computerized data systems, the laboratory trains all analytical staff on proper manual integration techniques using NDSC Document No.CA-Q-S-002, Acceptable Manual Integration Practices and laboratory SOP SA-QA-008.

19.15.5.1 The analyst must adjust baseline or the area of a peak in some situations, for example when two compounds are not adequately resolved or when a peak shoulder needs to be separated from the peak of interest. The analyst must use professional judgment to determine when manual integrating is required. Analysts are encouraged to ask for assistance from a senior analyst or manager when in doubt.

19.15.5.2 Analysts shall not increase or decrease peak areas for the sole purpose of achieving acceptable QC recoveries that would have otherwise been unacceptable. The intentional

recording or reporting of incorrect information (or the intentional omission of correct information) is against company principles and policy and is grounds for immediate termination.

19.15.5.3 Client samples, performance evaluation samples, and quality control samples are all treated equally when determining whether or not a peak area or baseline should be manually adjusted.

19.15.5.4 All manual integrations receive a second level review. Manual integrations must be indicated on expanded scale "before" and "after" chromatograms such that the integration performed can be easily evaluated during data review. Expanded scale "before" chromatograms are also required for all manual integrations on QC parameters (calibrations, calibration verifications, laboratory control samples, internal standards, surrogates, etc.) unless the laboratory has another documented NDSC approved procedure in place that can demonstrate an active process for detection and deterrence of improper integration practices.

Figure 19-1. Example – Work Flow

Action	Personnel Involved
Bottle orders generated upon request - Bottles packed and shipped to the client under CoC	- Project Management Group - Bottle Preparation Personnel
Samples received at laboratory - Unpacked and reconciled against client paperwork or CoC - Samples acceptance documented against completed (CoC)[1]	Sample Login Personnel
Samples are entered into LIMS - Job # assigned - Methods/Analytes linked from project - Sample labels generated - LIMS backlogs updated immediately	Sample Login Personnel
Sample Storage - Short TATs and hold-time samples are delivered directly to the laboratory for analysis - Samples stored in assigned locations (refrigerated walk-in coolers, freezers, VOA refrigerators; etc.)	Sample Login Personnel
Sample Receipt Acknowledgement sent to client (when requested)	Sample Login Personnel
Sample Acquisition/Testing - Analysts collect samples from assigned storage. - Legal CoC samples are signed in-and-out of storage - Remaining sample returned to storage.	Analysts / Login Personnel
Preparation and analysis is performed according to selected analytical method and applicable Project notes - Raw data recorded/reviewed[2] - Data imported to LIMS	Analysts
LIMS performs calculations: - Data reviewed by primary/secondary analyst - Data approved as final	Data Process (LIMS / Analyst)
Generation/review/release of reports (automated through LIMS) - Electronic copy saved in LIMS	Project Management Group
Electronic Data Deliverables (EDDs) generated (as applicable)	Project Management Group.

Action	Personnel Involved
Hard copy and electronic batch raw data is archived according to data archiving procedures.	Analysts / IT

[1]Refer to Sec. 23.3.
[2]Analyses requiring the analyst's interpretation may involve manual data reduction before entry into LIMS.

20.0 EQUIPMENT and CALIBRATIONS

20.1 Overview

The laboratory purchases the most technically advanced analytical instrumentation for sample analyses. Instrumentation is purchased on the basis of accuracy, dependability, efficiency and sensitivity. Each laboratory is furnished with all items of sampling, preparation, analytical testing and measurement equipment necessary to correctly perform the tests for which the laboratory has capabilities. Each piece of equipment is capable of achieving the required accuracy and complies with specifications relevant to the method being performed. Before being placed into use, the equipment (including sampling equipment) is calibrated and checked to establish that it meets its intended specification. The calibration routines for analytical instruments establish the range of quantitation. Calibration procedures are specified in laboratory SOPs. A list of available laboratory instrumentation is presented in Table 20-1.

Equipment is only operated by authorized and trained personnel. Manufacturer's instructions for equipment use are readily accessible to all appropriate laboratory personnel.

20.2 Préventive Maintenance

The laboratory follows a well-defined maintenance program to ensure proper equipment operation and to prevent the failure of laboratory equipment or instrumentation during use. This program of preventive maintenance helps to avoid delays due to instrument failure.

Routine preventive maintenance procedures and frequency, such as cleaning and replacements, should be performed according to the procedures outlined in the manufacturer's manual. Qualified personnel must also perform maintenance when there is evidence of degradation of peak resolution, a shift in the calibration curve, loss of sensitivity, or failure to continually meet one of the quality control criteria.

Scheduled routine maintenance is defined in each method SOP. It is the responsibility of each Technical Manager to ensure that instrument maintenance logs are kept for all equipment in his/her department. Preventative maintenance procedures are also outlined in analytical SOPs or instrument manuals. (Note: for some equipment, the log used to monitor performance is also the maintenance log. Multiple pieces of equipment may share the same log as long as it is clear as to which instrument is associated with an entry.)

Instrument maintenance logs are controlled and are used to document instrument problems, instrument repair and maintenance activities. Maintenance logs shall be kept for all major pieces of equipment. Instrument maintenance logs may also be used to specify instrument parameters.

- Documentation must include all major maintenance activities such as contracted preventive maintenance and service and in-house activities such as the replacement of electrical components, lamps, tubing, valves, columns, detectors, cleaning and adjustments.

- Each entry in the instrument log includes the analyst's initials, the date, a detailed description of the problem (or maintenance needed/scheduled), a detailed explanation of the solution or maintenance performed, and a verification that the equipment is functioning properly (state what was used to determine a return to control. e.g. CCV run on *'date'* was acceptable, or instrument recalibrated on 'date' with acceptable verification, etc.) must also be documented in the instrument records.
- When maintenance or repair is performed by an outside agency, service receipts detailing the service performed can be saved by department in the Public QA folder.

If an instrument requires repair (subjected to overloading or mishandling), gives suspect results, or otherwise has shown to be defective or outside of specified limits it shall be taken out of operation and tagged as out-of-service or otherwise isolated until such a time as the repairs have been made and the instrument can be demonstrated as operational by calibration and/or verification or other test to demonstrate acceptable performance. The laboratory shall examine the effect of this defect on previous analyses.

In the event of equipment malfunction that cannot be resolved, service shall be obtained from the instrument vendor manufacturer, or qualified service technician, if such a service can be tendered. If on-site service is unavailable, arrangements shall be made to have the instrument shipped back to the manufacturer for repair. Back up instruments, which have been approved, for the analysis shall perform the analysis normally carried out by the malfunctioning instrument. If the back-up is not available and the analysis cannot be carried out within the needed timeframe, the samples shall be subcontracted.

At a minimum, if an instrument is sent out for service or transferred to another facility, it must be recalibrated and the laboratory MDL verified (using an MDLV) prior to return to lab operations.

20.3 Support Equipment

This section applies to all devices that may not be the actual test instrument, but are necessary to support laboratory operations. These include but are not limited to: balances, ovens, refrigerators, freezers, water baths, temperature measuring devices, thermal/pressure sample preparation devices and volumetric dispensing devices if quantitative results are dependent on their accuracy, as in standard preparation and dispensing or dilution into a specified volume. All raw data records associated with the support equipment are retained to document instrument performance.

20.3.1 Weights and Balances

The accuracy of the balances used in the laboratory is checked every working day, before use. All balances are placed on stable counter tops.

Each balance is checked prior to initial serviceable use with at least two certified ASTM type 1 weights spanning its range of use (weights that have been calibrated to ASTM type 1 weights may also be used for daily verification). ASTM type 1 weights used only for calibration of other weights (and no other purpose) are inspected for corrosion, damage or nicks at least annually and if no damage is observed, they are calibrated at least every 5 years by an outside calibration laboratory. Any weights (including ASTM Type 1) used for daily balance checks or other purposes are recalibrated/recertified annually to NIST standards (this may be done internally if laboratory maintains "calibration only" ASTM type 1 weights).

All balances are serviced annually by a qualified service representative, who supplies the laboratory with a certificate that identifies traceability of the calibration to the NIST standards.

All of this information is recorded in logs, and the recalibration/recertification certificates are kept on file. Refer to SOP SA-AN-100.

20.3.2 pH, Conductivity, and Turbidity Meters

The pH meters used in the laboratory are accurate to ± 0.1 pH units, and have a scale readability of at least 0.05 pH units. The meters automatically compensate for the temperature, and are calibrated with at least two working range buffer solutions before each use.

Conductivity meters used in the laboratory are capable of measuring conductivity with an error not exceeding 1% or one umhos/cm, whichever is greater. The meters are also calibrated before each use with a known standard.

Turbidity meters are also calibrated before each use. All of this information is documented in logs.

Consult pH, Conductivity, and Turbidity SOPs for further information.

20.3.3 Thermometers

All thermometers are calibrated on an annual basis with a NIST-traceable thermometer.

- If the temperature measuring device is used over a range of 10°C or less, then a single point verification within the range of use is acceptable;
- If the temperature measuring device is used over a range of greater than 10°C, then the verification must bracket the range of use.

IR thermometers, digital probes and thermocouples are calibrated quarterly. IR Thermometers should be calibrated over the full range of use, including ambient, iced (4°C) and frozen (0°C to -5°C), per the Drinking Water Manual.

The mercury NIST thermometer is recalibrated every three years (unless thermometer has been exposed to temperature extremes or apparent separation of internal liquid) by an approved outside service and the provided certificate of traceability is kept on file. The NIST thermometer(s) have increments of 1 degree (0.5 degree or less increments are required for drinking water microbiological laboratories), and have ranges applicable to method and certification requirements. The NIST traceable thermometer is used for no other purpose than to calibrate other thermometers.

All of this information is documented in logbooks. Monitoring method-specific temperatures, including heating blocks, water baths, and ovens, is documented in method-specific logbooks. More information on this subject can be found in the SOP SA-AN-100.

20.3.4 Refrigerators/Freezer Units, Water baths, Ovens and Incubators

The temperatures of all refrigerator units and freezers used for sample and standard storage are monitored each day.

Ovens and water baths are monitored on days of use.

All of this equipment has a unique identification number, and is assigned a thermometer for monitoring.

Sample storage refrigerator temperatures are kept between > 0ºC and ≤ 6 ºC.

Specific temperature settings/ranges for other refrigerators, ovens, water baths, and incubators can be found in method specific SOPs.

All of this information is documented in Daily Temperature Logbooks and method-specific logbooks and discussed in SOP SA-AN-100.

20.3.5 Autopipettors, Dilutors, and Syringes

Mechanical volumetric dispensing devices including burettes (except Class A Glassware and glass microliter syringes) are given unique identification numbers and the delivery volumes are verified gravimetrically, at a minimum, on day of use.

For those dispensers that are not used for measurements, a label shall be applied to the device stating that it is not calibrated. Any device not regularly verified cannot be used for any quantitative measurements.

Micro-syringes are purchased from Hamilton Company. Each syringe is traceable to NIST. The laboratory keeps on file an “Accuracy and Precision Statement of Conformance” from Hamilton attesting established accuracy.

20.4 Instrument Calibrations

Calibration of analytical instrumentation is essential to the production of quality data. Strict calibration procedures are followed for each method. These procedures are designed to determine and document the method detection limits, the working range of the analytical instrumentation and any fluctuations that may occur from day to day.

Sufficient raw data records are retained to allow an outside party to reconstruct all facets of the initial calibration. Records contain, but are not limited to, the following: calibration date, method, instrument, analyst(s) initials or signatures, analysis date, analytes, concentration, response, and type of calibration (Avg RF, curve, or other calculations that may be used to reduce instrument responses to concentration.)

Sample results must be quantitated from the initial calibration and may not be quantitated from any continuing instrument calibration verification unless otherwise required by regulation, method or program.

If the initial calibration results are outside of the acceptance criteria, corrective action is performed and any affected samples are reanalyzed if possible. If the reanalysis is not possible, any data associated with an unacceptable initial calibration will be reported with appropriate data qualifiers (refer to Section 14).

Note: Instruments are calibrated initially and as needed after that and at least annually.

20.4.1 Calibration Standards

Calibration standards are prepared using the procedures indicated in the Reagents and Standards section of the determinative method SOP. If a reference method does not specify the number of calibration standards, a minimum of 3 calibration points will be used.

Standards for instrument calibration are obtained from a variety of sources. All standards are traceable to national or international standards of measurement, or to national or international standard reference materials.

The lowest concentration calibration standard that is analyzed during an initial calibration must be at or below the stated reporting limit for the method based on the final volume of extract (or sample).

The other concentrations define the working range of the instrument/method or correspond to the expected range of concentrations found in actual samples that are also within the working range of the instrument/method. Results of samples not bracketed by initial instrument calibration standards (within calibration range to at least the same number of significant figures used to report the data) must be reported as having less certainty, e.g., defined qualifiers or flags (additional information may be included in the case narrative). The exceptions to these rules. ICP and ICPMS methods which define the working range with periodic linear dynamic range studies, rather than through the range of concentrations of daily calibration standards.

All initial calibrations are verified with a standard obtained from a second source and traceable to a national standard, when available (or vendor certified different lot if a second source is not available). For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst at a different time or a different preparation would be considered a second source. This verification occurs immediately after the calibration curve has been analyzed, and before the analysis of any samples.

20.4.1.1 Calibration Verification

The calibration relationship established during the initial calibration must be verified initially and at least daily as specified in the laboratory method SOPs in accordance with the referenced analytical methods and in the 2009 and 2016 TNI Standard. The process of calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models. Initial calibration verification (ICV) is with a standard source secondary (second source standard) to the calibration standards, but continuing calibration verifications (CCV) may use the same source standards as the calibration curve.

Note: The process of calibration verification referred to here is fundamentally different from the approach called "calibration" in some methods. As described in those methods, the calibration factors or response factors calculated during calibration are used to update the calibration factors or response factors used for sample quantitation. This approach, while employed in other EPA programs, amounts to a daily single-point calibration.

All target analytes and surrogates, including those reported as non-detects, must be included in periodic calibration verifications for purposes of retention time confirmation and to demonstrate that calibration verification criteria are being met, i.e., RPD, per 2009 and 2016 TNI Std. EL-V1M4 Sec. 1.7.2.

All samples must be bracketed by periodic analyses of standards that meet the QC acceptance criteria (e.g., calibration and retention time). The frequency is found in the determinative methods or SOPs.

Note: If an internal standard calibration is being used then bracketing calibration verification standards may not be are not required, only daily verifications are needed. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

Generally, the calibrations must be verified by an ICV analyzed immediately following initial calibration and before sample analysis. The ICV may be used as the first bracketing CCV, if criteria for both are met.

A continuing instrument calibration verification (CCV) is generally analyzed at the beginning of each 12-hour analytical shift during which samples are analyzed. The 12-hour analytical shift begins with the injection of the calibration verification standard (or the MS tuning standard in MS methods). The shift ends after the completion of the analysis of the last sample, QC, or standard that can be injected within 12-hours of the beginning of the shift. For methods that have quantitation by external calibration models, a CCV is analyzed at the end of each analytical sequence. Some methods have more frequent CCV requirements. See specific SOPs. Most inorganic methods require the CCV to be analyzed after ever 10 samples or injections, including matrix or batch QC samples.

Note: If an internal standard calibration is being used (e.g., GCMS) then bracketing standards are not required, only daily verifications are needed, except as specified by program or method requirements.

If the results of a CCV are outside the established acceptance criteria and analysis of a second consecutive (and immediate) CCV fails to produce results within acceptance criteria, corrective action shall be performed. Once corrective actions have been completed and documented, the laboratory shall demonstrate acceptable instrument / method performance by analyzing two consecutive CCVs, or a new initial instrument calibration shall be performed.

Sample analyses and reporting of data may not occur or continue until the analytical system is calibrated or calibration verified. However, data associated with an unacceptable calibration verification may be fully useable reported based upon discussion and approval of the client under the following special conditions:

a). when the acceptance criteria for the CCV are exceeded high (i.e., high bias) and the associated samples within the batch are non-detects, then those non-detects may be reported case narrative comment explaining the high bias. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted; or

b). when the acceptance criteria for the CCV are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted.

Samples reported by the 2 conditions identified above will be appropriately flagged.

20.4.1.2 Verification of Linear and Non-Linear Calibrations

Calibration verification for calibrations involves the calculation of the percent drift or the percent difference of the instrument response between the initial calibration and each subsequent analysis of the verification standard. (These calculations are available in the laboratory method SOPs.) Verification standards are evaluated based on the % Difference from the average CF or RF of the initial calibration or based on % Drift or % Recovery if a linear or quadratic curve is used.

Regardless of whether a linear or non-linear calibration model is used, if initial verification criterion is not met, then no sample analyses may take place until the calibration has been verified or a new initial calibration is performed that meets the specifications listed in the method SOPs. If the calibration cannot be verified after the analysis of a single verification standard, then adjust the instrument operating conditions and/or perform instrument maintenance, and analyze another aliquot of the verification standard. If the calibration cannot be verified with the second standard, then a new initial calibration is performed.

- When the acceptance criteria for the calibration verification are exceeded high, i.e., high bias, and there are associated samples that are non-detects, then those non-detects may be reported. Otherwise, the samples affected by the unacceptable calibration verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted.
- When the acceptance criteria for the calibration verification are exceeded low, i.e., low bias, those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise, the samples affected by the unacceptable verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted. Alternatively, a reporting limit standard may be analyzed to demonstrate that the laboratory can still support non-detects at their reporting limit.

20.5 Tentatively Identified Compounds (TICs) – GC/MS Analysis

For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the purpose of the analyses being conducted. For example, the RCRA permit or waste delisting requirements may require the reporting of non-target analytes. Only after visual comparison of sample spectra with the nearest library searches may the analyst assign a tentative identification. Data system library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. Additional details are provided in NDSC Document No. CA-Q-QM-001, Tentatively Identified Compounds (TICS) - GCMS Analysis or list local SOP SA-QA-008.

Note: If the TIC compound is not part of the client target analyte list but is calibrated by the laboratory and is both qualitatively and/or quantitatively identifiable, it should not be reported as a TIC. If the compound is reported on the same form as true TICs, it should be qualified and/or narrated that the reported compound is qualitatively and quantitatively (if verification in control) reported compared to a known standard that is in control (where applicable).

20.6 GC/MS Tuning

Prior to any GC/MS analytical sequence, including calibration, the instrument parameters for the tune and subsequent sample analyses within that sequence must be set.

Prior to tuning/auto-tuning the mass spectrometer, the parameters may be adjusted within the specifications set by the manufacturer or the analytical method. These generally do not need any adjustment but it may be required based on the current instrument performance. If the tune verification does not pass it may be necessary to clean the source or perform additional maintenance. Any maintenance is documented in the maintenance log.

21.0 MEASUREMENT TRACEABILITY

21.1 Overview

Traceability of measurements shall be assured using a system of documentation, calibration, and analysis of reference standards. Laboratory equipment that are peripheral to analysis and whose calibration is not necessarily documented in a test method analysis or by analysis of a reference standard shall be subject to ongoing certifications of accuracy. At a minimum, these must include procedures for checking specifications of ancillary equipment: balances,

thermometers, temperature, Deionized (DI) and Reverse Osmosis (RO) water systems, automatic pipettes and other volumetric measuring devices. (Refer to Section 20.3). With the exception of Class A Glassware and glass microliter syringes, quarterly accuracy checks are performed for all mechanical volumetric devices. Wherever possible, subsidiary or peripheral equipment is checked against standard equipment or standards that are traceable to national or international standards. Class A Glassware and glass microliter syringes should be routinely inspected for chips, acid etching or deformity (e.g., bent needle). If the Class A glassware or syringe is suspect, the accuracy of the glassware will be assessed prior to use.

21.2 NIST-Traceable Weights and Thermometers

Reference standards of measurement shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

For NIST-traceable weights and thermometers, the laboratory requires that all calibrations be conducted by a calibration laboratory accredited by A2LA, NVLAP (National Voluntary Laboratory Accreditation Program), or another accreditation organization that is a signatory to a MRA (Mutual Recognition Arrangement) of one or more of the following cooperations – ILAC (International Laboratory Accreditation Cooperation) or APLAC (Asia–Pacific Laboratory Accreditation Cooperation). A calibration certificate and scope of accreditation is kept on file at the laboratory.

Calibration laboratory's policy for achieving measurement traceability is defined and includes the subsequent elements of uncertainty.

The uncertainty calculations of the calibration laboratory are supported by uncertainty budgets and are represented by expanded uncertainties typically using a coverage factor of k=2 to approximate the 95% confidence level. This explanation accompanies the measurement result and the associated uncertainty.

The tolerance uncertainty ratio (TUR) is calculated using the expanded uncertainty of the measurement, not the collective uncertainty of the measurement standards. A statement to this effect accompanies the TUR along with the coverage factor and confidence level.

The calibration report or certificate submitted to Eurofins Savannah contains, in a well-designed format, a traceability statement, the conditions under which the calibrations were made in the context of any potential influence, a compliance statement with an identified metrological specification and the pertinent clauses, a clearly identified record of the quantities and functional test results before and after re-calibration, and no recommendation on the calibration interval. Opinions and interpretations of results are presented along with the basis upon which they were made and identified as such. The report may be submitted by facsimile or other electronic means as long as the requirements of the International Standard are achieved. If significant amendments are made to a calibration certificate, a supplemental certificate for the serial-number-specified piece of equipment is so identified. When a new certificate is offered, it uniquely identifies and references the one it replaces. All calibration reports are filed in the QA Office.

The calibration laboratory supports in-house calibration systems: documented procedures for in-house calibrations, evidence by a report, certificate, or sticker, for an appropriate amount of time; training records of calibration personnel; certificates from accreditation services demonstrating traceability to national or international standards of measurement; procedures for evaluating measurement uncertainty; timely and documented recalibration of reference

standards. When subcontracting to a calibration laboratory, Eurofins Savannah does not use a firm who subcontracts the work.

An external certified service engineer services laboratory balances on an annual basis. This service is documented on each balance with a signed and dated certification sticker. Balance calibrations are checked each day of use. All mercury thermometers are calibrated annually against a traceable reference thermometer. Temperature readings of ovens, refrigerators, and incubators are checked on each day of use.

21.3 Reference Standards / Materials

Reference standards/materials, where commercially available, are traceable to certified reference materials. Commercially prepared reference standards, to the extent available, are purchased from vendors that are accredited to ISO Guide 34 and ISO/IEC Guide 17025. All reference standards from commercial vendors shall be accompanied with a certificate that includes at least the following information:

- Manufacturer
- Analytes or parameters calibrated
- Identification or lot number
- Calibration method
- Concentration with associated uncertainties
- Purity

If a standard cannot be purchased from a vendor that supplies a Certificate of Analysis, the purity of the standard is documented by analysis. The receipt of all reference standards must be documented. Reference standards are labeled with a unique Standard Identification Number and expiration date. All documentation received with the reference standard is retained as a QC record and references the Standard Identification Number.

All reference, primary and working standards/materials, whether commercially purchased or laboratory prepared, must be checked regularly to ensure that the variability of the standard or material from the true value does not exceed method requirements. The accuracy of calibration standards is checked by comparison with a standard from a second source. In cases where a second standard manufacturer is not available, a vendor certified different lot is acceptable for use as a second source. For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst would be considered a second source. The appropriate Quality Control (QC) criteria for specific standards are defined in laboratory SOPs. In most cases, the analysis of an Initial Calibration Verification (ICV) or LCS (where there is no sample preparation) is used as the second source confirmation. These checks are generally performed as an integral part of the analysis method (e.g. calibration checks, laboratory control samples).

All standards and materials must be stored and handled according to method or manufacturer's requirements in order to prevent contamination or deterioration. Refer to the Environmental Health & Safety Manual or laboratory SOPs. For safety requirements, please refer to method SOPs and the laboratory's Environmental Health and Safety Manual.

Standards and reference materials shall not be used after their expiration dates unless their reliability is verified by the laboratory and their use is approved by the Quality Assurance

Manager. The laboratory must have documented contingency procedures for re-verifying expired standards.

21.4 Documentation and Labeling of Standards, Reagents, and Reference Materials

Reagents must be at a minimum the purity required in the test method. The date of reagent receipt and the expiration date are documented. The lots for most of the common solvents and acids are tested for acceptability prior to company-wide purchase. Refer to NDSC Document No. CA-Q-S-001, Solvent and Acid Lot Testing and Approval.

All manufacturer or vendor supplied Certificate of Analysis or Purity must be retained, stored appropriately, and readily available for use and inspection. These records are maintained within LIMS. Records must be kept of the date of receipt and date of expiration of standards, reagents and reference materials. In addition, records of preparation of laboratory standards, reagents, and reference materials must be retained, stored appropriately, and be readily available for use and inspection. For detailed information on documentation and labeling, please refer to method specific SOPs.

Commercial materials purchased for preparation of calibration solutions, spike solutions, etc.., are usually accompanied with an assay certificate or the purity is noted on the label. If the assay purity is 96% or better, the weight provided by the vendor may be used without correction. If the assay purity is less than 96% a correction will be made to concentrations applied to solutions prepared from the stock commercial material.. Blended gas standard cylinders use a nominal concentration if the certified value is within +/-15%, otherwise the certified values is used for the canister concentration.

21.4.1 All standards, reagents, and reference materials must be labeled in an unambiguous manner. Standards are logged into the laboratory's LIMS, and are assigned a unique identification number. The following information is typically recorded in the electronic database within the LIMS.

- Standard ID
- Description of Standard
- Department
- Preparer's name
- Final volume and number of vials prepared
- Solvent type and lot number
- Preparation Date
- Expiration Date
- Standard source type (stock or daughter)
- Standard type (spike, surrogate, other)
- Parent standard ID (if applicable)
- Parent Standard Analyte Concentration (if applicable)
- Parent Standard Amount used (if applicable)
- Component Analytes

- Final concentration of each analyte
- Comment box (text field)

Records are maintained electronically for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

21.4.2 All standards, reagents, and reference materials must be clearly labeled with a minimum of the following information:

- Expiration Date (include prep date for reagents)
- Standard ID
- Special Health/Safety warnings if applicable

Records must also be maintained of the date of receipt for commercially purchased items or date of preparation for laboratory prepared items. Special Health/Safety warnings must also be available to the analyst. This information is maintained on the EETA website.

21.4.3 In addition, the following information may be helpful:

- Date opened (for multi-use containers, if applicable)
- Description of standard (if different from manufacturer's label or if standard was prepared in the laboratory)
- Recommended Storage Conditions
- Concentration (if applicable)
- Initials of analyst preparing standard or opening container

All containers of prepared reagents must include an expiration date and an ID number to trace back to preparation.

Procedures for preparation of reagents can be found in the Method SOPs.

Standard ID numbers must be traceable through associated logbooks, worksheets and preparation/analytical batch records.

All reagents and standards must be stored in accordance to the following priority: 1) with the manufacturer's recommendations; 2) with requirements in the specific analytical methods as specified in the laboratory SOP.

22.0 SAMPLING

22.1 Overview

The laboratory does not provide sampling services. The laboratory's responsibility in the sample collection process lies in supplying the sampler with the necessary coolers, reagent water, sample containers, preservatives, sample labels, custody seals, COC forms, ice, and packing materials required to properly preserve, pack, and ship samples to the laboratory

22.2 Sampling Containers

The laboratory offers clean sampling containers for use by clients. These containers are obtained from reputable container manufacturers and meet EPA specifications as required. Certificates of cleanliness for bottles and preservatives are provided by the supplier and are maintained at the laboratory. Alternatively, the certificates may be maintained by the supplier and available to the laboratory on-line.

22.2.1 Preservatives

Upon request, preservatives are provided to the client in pre-cleaned sampling containers. In some cases containers may be purchased pre-preserved from the container supplier. Whether prepared by the laboratory or bought pre-preserved, the grades of the preservatives are at a minimum:

- Hydrochloric Acid – Reagent ACS (Certified VOA Free) or equivalent
- Methanol – Purge and Trap grade
- Nitric Acid – Instra-Analyzed or equivalent
- Sodium Bisulfate – ACS Grade or equivalent
- Sodium Hydroxide – Instra-Analyzed or equivalent
- Sulfuric Acid – Instra-Analyzed or equivalent
- Sodium Thiosulfate – ACS Grade or equivalent

22.3 Definition of Holding Time

The date and time of sampling documented on the COC form establishes the day and time zero. As a general rule, when the maximum allowable holding time is expressed in days (e.g., 14 days, 28 days), the holding time is based on calendar day measured. Holding times expressed in hours (e.g., 6 hours, 24 hours, etc.) are measured from date and time zero. Holding times for analysis include any necessary reanalysis. However, there are some programs that determine holding time compliance based on the date and specific time of analysis compared to the time of sampling regardless of how long the holding time is.

22.4 Sampling Containers, Preservation Requirements, Holding Times

The preservation and holding time criteria specified in the laboratory SOPs are derived from the source documents for the methods. If method required holding times or preservation requirements are not met, the reports will be qualified using a flag, footnote or case narrative. As soon as possible or “ASAP” is an EPA designation for tests for which rapid analysis is advised, but for which neither EPA nor the laboratory have a basis for a holding time.

22.5 Sample Aliquots / Subsampling

Taking a representative sub-sample from a container is necessary to ensure that the analytical results are representative of the sample collected in the field. The size of the sample container, the quantity of sample fitted within the container, and the homogeneity of the sample need consideration when sub-sampling for sample preparation. It is the laboratory’s responsibility to take a representative subsample or aliquot of the sample provided for analysis.

Analysts should handle each sample as if it is potentially dangerous. At a minimum, safety glasses, gloves, and lab coats must be worn when preparing aliquots for analysis.

Guidelines on taking sample aliquots and subsampling are located SOP SA-QA-015.

23.0 HANDLING OF SAMPLES

It is the responsibility of the client to send us representative and/or homogeneous and properly preserved samples of the system from which they are drawn. The laboratory assumes that all multiple sample containers with the same designator/description and bottle type contain a homogeneous, representative sample.

The laboratory provides the appropriate sample containers, required preservative, chain-of-custody (COC) forms, shipping containers, labels, and custody seals. The laboratory also provides trip blanks and analyte-free water for field blanks. Preparation of methanol containers for field preservation of volatile soil samples is available.

Sample management procedures at the laboratory ensure that sample integrity and custody are maintained and documented from sampling/receipt through disposal.

23.1 Chain of Custody (COC)

The COC form is the written documented history of any sample and is initiated when bottles are sent to the field, or at the time of sampling. This form is completed by the sampling personnel and accompanies the samples to the laboratory where it is received and stored under the laboratory's custody. The purpose of the COC form is to provide a legal written record of the handling of samples from the time of collection until they are received at the laboratory. It also serves as the primary written request for analyses from the client to the laboratory. The COC form acts as a purchase order for analytical services when no other contractual agreement is in effect.

23.1.1 Field Documentation

The information the sampler needs to provide at the time of sampling on the container label is:

- Sample identification
- Date and time
- Preservative

During the sampling process, the COC form is completed and must be legible. This form includes information such as:

- Client name, address, phone number and fax number (if available)
- Project name and/or number
- The sample identification
- Date, time and location of sampling
- Sample collectors name
- The matrix description
- The container description

- The total number of each type of container
- Preservatives used
- Analysis requested
- Requested turnaround time (TAT)
- Any special instructions
- Purchase Order number or billing information (e.g. quote number) if available
- The date and time that each person received or relinquished the sample(s), including their signed name.

When the sampling personnel deliver the samples directly to the laboratory personnel, the samples are stored in a cooler with ice, as applicable, and remain solely in the possession of the client's field technician until the samples are delivered to the laboratory personnel. The sample collector must assure that each container is in his/her physical possession or in his/her view at all times, or stored in such a place and manner to preclude tampering. The field technician relinquishes the samples in writing on the COC form to the sample control personnel at the laboratory or to a laboratory courier. When sampling personnel deliver the samples through a common carrier (Fed-Ex, UPS), the CoC relinquished date/time is completed by the field personnel and samples are released to the carrier. Samples are only considered to be received by the laboratory when personnel at the fixed laboratory facility have physical contact with the samples.

Note: Independent couriers are not required to sign the COC form. The COC is usually kept in the sealed sample cooler. The receipt from the courier is stored in log-in by date; it lists all receipts each date.

23.2 Sample Receipt

Samples are received at the laboratory by designated sample receiving personnel and a unique laboratory project identification number is assigned. Each sample container shall be assigned a unique sample identification number that is cross-referenced to the client identification number such that traceability of test samples is unambiguous and documented. Each sample container is affixed with a durable sample identification label. Sample acceptance, receipt, tracking and storage procedures are detailed in the laboratory's SOP SA-CU-001 and summarized in the following sections.

23.2.1 Laboratory Receipt

When samples arrive at the laboratory, sample receiving personnel inspect the coolers and samples. The integrity of each sample must be determined by comparing sample labels or tags with the COC and by visual checks of the container for possible damage. Any non-conformance, irregularity, or compromised sample receipt must be documented in LIMS and brought to the immediate attention of the client. The COC, shipping documents, documentation of any non-conformance, irregularity, or compromised sample receipt, record of client contact, and resulting instructions become part of the project record.

23.3 Sample Acceptance Policy

The laboratory has a written sample acceptance policy (Figure 23-1) that clearly outlines the circumstances under which samples shall be accepted or rejected. These include:

- a COC filled out completely;
- samples must be properly labeled;
- proper sample containers with adequate volume for the analysis (Sampling Guide) and necessary QC;
- samples must be preserved according to the requirements of the requested analytical method (Sampling Guide);
- sample holding times must be adhered to (Sampling Guide);
- the project manager will be notified if any sample is received in damaged condition.

Data from samples which do not meet these criteria are flagged and the nature of the variation from policy is defined.

23.3.1 After inspecting the samples, the sample receiving personnel sign and date the COC form, make any necessary notes of the samples' conditions within LIMS and store them in appropriate refrigerators or storage locations.

23.3.2 Any deviations from these checks that question the suitability of the sample for analysis, or incomplete documentation as to the tests required will be resolved by consultation with the client. If the sample acceptance policy criteria are not met, the laboratory shall either:

- Retain all correspondence and/or records of communications with the client regarding the disposition of rejected samples, or
- Fully document any decision to proceed with sample analysis that does not meet sample acceptance criteria.

> Note: North Carolina requires that they be notified when samples are processed that do not meet sample acceptance criteria.

Once sample acceptance is verified, the samples are logged into LIMS according SOP SA-CU-001.

23.4 Sample Storage

In order to avoid deterioration, contamination or damage to a sample during storage and handling, from the time of receipt until all analyses are complete, samples are stored in refrigerators, freezers or protected locations suitable for the sample matrix. Samples submitted for Metals analysis are not stored in refrigeration. In addition, samples to be analyzed for volatile organic parameters are stored in separate refrigerators designated for volatile organic parameters only. Samples are never to be stored with reagents, standards or materials that may create contamination.

To ensure the integrity of the samples during storage, refrigerator blanks are maintained in the volatile sample refrigerators and analyzed every two weeks.

Analysts and technicians retrieve the sample container allocated to their analysis from the designated refrigerator and place them on carts, analyze the sample, and return the remaining sample or empty container to the refrigerator from which it originally came. All unused portions of samples, including empty sample containers, are returned to the secure sample control area. All samples are kept in the refrigerators until holding time has expired. The samples are moved to dry room temperature, sample archive area where they are stored for 30 days after invoicing. Special arrangements may be made to store samples for longer periods of time. This extended holding period allows additional metal analyses to be performed on the archived sample and assists clients in dealing with legal matters or regulatory issues.

Access to the laboratory is controlled such that sample storage need not be locked at all times unless a project specifically demands it. Samples are accessible to laboratory personnel only. Visitors to the laboratory are prohibited from entering the refrigerator and laboratory areas unless accompanied by an employee of Eurofins Savannah.

23.5 Hazardous Samples and Foreign Soils

To minimize exposure to personnel and to avoid potential accidents, hazardous and foreign soil samples are stored in an isolated area designated for hazardous waste only. For any sample that is known to be hazardous at the time of receipt or, if after completion of analysis the result exceeds the acceptable regulatory levels, the sample is routed the main waste storage area. For foreign soils, the sample itself is clearly marked with a green label on the sample container reading “FOREIGN SOIL” and placed in a secondary container to easily identify the sample. Hazardous samples are either returned to the client or disposed of appropriately through a hazardous waste disposal firm that lab-packs all hazardous samples and removes them from the laboratory. Foreign soil samples are sent out for incineration by a USDA-approved waste disposal facility.

23.6 Sample Shipping

In the event that the laboratory needs to ship samples, the samples are placed in a cooler with enough ice to ensure the samples remain just below 6.0°C during transit. The samples are carefully surrounded by packing material to avoid breakage (yet maintain appropriate temperature). A trip blank is enclosed for those samples requiring water/solid volatile organic analyses (see Note). The chain-of-custody form is signed by the sample control technician and attached to the shipping paperwork. Samples are generally shipped overnight express or hand-delivered by a Eurofins Savannah courier to maintain sample integrity. All personnel involved with shipping and receiving samples must be trained to maintain the proper chain-of-custody documentation and to keep the samples intact and on ice. The laboratory’s Environmental, Health and Safety Manual contains additional shipping requirements.

Note: If a client does not request trip blank analysis on the COC or other paperwork, the laboratory will not analyze the trip blanks that were supplied. However, in the interest of good client service, the laboratory will advise the client at the time of sample receipt that it was noted that they did not request analysis of the trip blank; and that the laboratory is providing the notification to verify that they are not inadvertently omitting a key part of regulatory compliance testing.

23.7 Sample Disposal

Samples should be retained for a minimum of 30 days after the project report is sent, however, provisions may be made for earlier disposal of samples once the holding time is exceeded. Some samples are required to be held for longer periods based on regulatory or client requirements (e.g., 60 days after project report is sent). The laboratory must follow the longer sample retention requirements where required by regulation or client agreement. Several possibilities for sample disposal exist: the sample may be consumed completely during analysis, the sample may be returned to the customer or location of sampling for disposal, or the sample may be disposed of in accordance with the laboratory's waste disposal procedures. All procedures in the laboratory's Environmental Health and Safety Manual are followed during disposal. Samples are normally maintained in the laboratory no longer than two months from receipt unless otherwise requested. Unused portions of samples found or suspected to be hazardous according to state or federal guidelines may be returned to the client upon completion of the analytical work.

If a sample is part of a known litigation, the affected legal authority, sample data user, and/or submitter of the sample must participate in the decision about the sample's disposal. All documentation and correspondence concerning the disposal decision process must be kept on file. Pertinent information includes the date of disposal, nature of disposal (such as sample depletion, hazardous waste facility disposal, return to client), names of individuals who conducted the arrangements and physically completed the task. The laboratory will remove or deface sample labels prior to disposal unless this is accomplished through the disposal method (e.g., samples are incinerated). A Waste Disposal Record should be completed.

Figure 23-1. Example: Sample Acceptance Policy

All incoming work will be evaluated against the criteria listed below. Where applicable, data from any samples that do not meet the criteria listed below will be noted on the laboratory report defining the nature and substance of the variation. In addition the client will be notified either by telephone, fax or e-mail ASAP after the receipt of the samples.

Per State and/or Federal Regulation, the client is responsible to ensure that samples are shipped in accordance with DOT/IATA requirements, and that radioactive materials may only be delivered to licensed facilities. Any samples containing (or suspected to contain) Source, Byproduct, or Special Nuclear Material as defined by 10 CFR should be delivered directly to facilities licensed to handle such radioactive material. Natural material or ores containing naturally occurring radionuclides may be delivered to any Eurofins Savannah facility or courier as long as the activity concentration of the material does not exceed 270 pCi/g alpha or 2700 pCi/g beta (49 CFR Part 173).

1) Samples should arrive with labels intact with a Chain of Custody filled out completely. The following information must be recorded.

- *Client name, address, phone number and fax number (if available)*
- *Project name and/or number*
- *The sample identification*
- *Date, time and location of sampling*
- *The collectors name*
- *The matrix description*
- *The container description*
- *The total number of each type of container*
- *Preservatives used*
- *Analysis requested*
- *Requested turnaround time (TAT)*
- *Any special instructions*
- *Purchase Order number or billing information (e.g. quote number) if available*
- *The date and time that each person received or relinquished the sample(s), including their signed name.*
- *The date and time of receipt must be recorded between the last person to relinquish the samples and the person who receives the samples in the lab, and they must be exactly the same.*
- Information must be legible

2) Samples must be properly labeled.
   - Use durable labels (labels provided by Eurofins Savannah are preferred)
   - Include a unique identification number
   - Include sampling date and time & sampler ID
   - Include preservative used.
   - Use indelible ink
   - Information must be legible

3) Proper sample containers with adequate volume for the analysis and necessary QC are required for each analysis requested. See Lab Sampling Guide.

4) Samples must be preserved according to the requirements of the requested analytical method (See Sampling Guide**.**

5) Most analytical methods require chilling samples to 4° C (other than water samples for metals analysis). For these methods, the criteria are met if the samples are chilled to below 6° C and above freezing (0°C). For methods with other temperature criteria (e.g. some bacteriological methods require $\leq$ 10 °C), the samples must arrive within $\pm$ 2° C of the required temperature or within the method specified range.

   5i.) Samples that are delivered to the laboratory on the same day they are collected may not meet the requirements of Section 5. In these cases, the samples shall be considered acceptable if the samples were received on ice.

   5ii.) If sample analysis is begun within fifteen (15) minutes of collection, thermal preservation is not required.

5iii.)Thermal preservation is not required in the field if the laboratory receives and refrigerates the sample within fifteen (15) minutes of collection.

- Chemical preservation (pH) will be verified prior to analysis and documented, either in sample control or at the analyst's level. The project manager will be notified immediately if there is a discrepancy. If analyses will still be performed, all affected results will be flagged to indicate improper preservation.
- For Organic analyses in drinking water residual chlorine must be neutralized prior to preservation. If there is prior knowledge that the samples are not chlorinated, state it on the COC and use the VOA vials pre-preserved with HCl. The following are other options for a sampler and laboratory where the presence of chlorine is not known:
    - 1. Test for residual chlorine in the field prior to sampling.
        - If no chlorine is present, the samples are to be preserved using HCl as usual.
        - If chlorine is present, add either ascorbic acid or sodium thiosulfate prior to adding HCl.
    - 2. Use VOA vials pre-preserved with sodium thiosulfate or ascorbic acid and add HCl after filling the VOA vial with the sample.
- **FOR WATER SAMPLES TESTED FOR CYANIDE (by Standard Methods or EPA 335)**
    - In the Field: Samples are to be tested for Sulfide using lead acetate paper prior to the addition of Sodium Hydroxide (NaOH). If sulfide is present, the sample must be treated with Cadmium Chloride and filtered prior to the addition of NaOH.
        - If the sulfide test and treatment is not performed in the field, the lab will test the samples for sulfide using lead acetate paper at the time of receipt and if sulfide is present in the sample, the client will be notified and given the option of retaking the sample and treating in the field per the method requirements or the laboratory can analyze the samples as delivered and qualify the results in the final report.
    - It is the responsibility of the client to notify the laboratory if thiosulfate, sulfite, or thiocyanate are known or suspected to be present in the sample. This notification may be on the chain of custody. The samples may need to be subcontracted to a laboratory that performs a UV digestion. If the lab does not perform the UV digestion on samples that contain these compounds, the results must be qualified in the final report.
    - The laboratory must test the sample for oxidizing agents (e.g. Chlorine) prior to analysis and treat according to the methods prior to distillation. (ascorbic acid or sodium arsenite are the preferred choice).

Sample Holding Times

- Eurofins Savannah will make every effort to analyze samples within the regulatory holding time. Samples must be received in the laboratory with enough time to perform the sample analysis. Except for short holding time samples (< 48hr HT) sample must be received with at least 48 hrs (2 working days) remaining on the holding time for us to ensure analysis.
- Analyses that are designated as "field" analyses (Odor, pH, Dissolved Oxygen, Disinfectant Residual; a.k.a. Residual Chlorine, and Redox Potential) should be analyzed ASAP by the field sampler prior to delivering to the lab (within 15 minutes). However, if the analyses are to be performed in the laboratory, Eurofins Savannah will make every effort to analyze the samples within 24 hours from receipt of the samples in the testing laboratory. Samples for "field" analyses received after 4:00 pm on Friday or on the weekend will be analyzed no later than the next business day after receipt (Monday unless a holiday). Samples will remain refrigerated and sealed until the time of analysis. The actual times of all "field" sample analyses are noted on the

"Short Hold Time Detail Report" in the final report. Samples analyzed in the laboratory will be qualified on the final report with an 'H' to indicate holding time exceedance.

6) All samples submitted for Volatile Organic analyses must have a Trip Blank submitted at the same time. Eurofins Savannah will supply a blank with the bottle order.

7) The project manager will be notified if any sample is received in damaged condition. Eurofins Savannah will request that a sample be resubmitted for analysis.

8) Recommendations for packing samples for shipment.

- Pack samples in Ice rather than "Blue" ice packs.
- Soil samples should be placed in plastic zip-lock bags. The containers often have dirt around the top and do not seal very well and are prone to intrusion from the water from melted ice.
- Water samples would be best if wrapped with bubble-wrap or paper (newspaper, or paper towels work) and then placed in plastic zip-lock bags.
- Fill extra cooler space with bubble wrap.

24.0 ASSURING THE QUALITY OF TEST RESULTS

24.1 Overview

In order to assure our clients of the validity of their data, the laboratory continuously evaluates the quality of the analytical process. The analytical process is controlled not only by instrument calibration as discussed in Section 20, but also by routine process quality control measurements (e.g. Blanks, Laboratory Control Samples (LCS), Matrix Spikes (MS), duplicates (DUP), surrogates, Internal Standards (IS)). These quality control checks are performed as required by the method or regulations to assess precision and accuracy. Quality control samples are to be treated in the exact same manner as the associated field samples being tested. In addition to the routine process quality control samples, Proficiency Testing (PT) Samples (concentrations unknown to laboratory) are analyzed to help ensure laboratory performance.

24.2 Controls

Sample preparation or pre-treatment is commonly required before analysis. Typical preparation steps include homogenization, grinding, solvent extraction, sonication, microwave, acid digestion, distillation, reflux, evaporation, drying and ashing. During these pre-treatment steps, samples are arranged into discreet manageable groups referred to as preparation (prep) batches. Prep batches provide a means to control variability in sample treatment. Control samples are added to each prep batch to monitor method performance and are processed through the entire analytical procedure with investigative/field samples.

24.3 Negative Controls

Table 24-1. Example – Negative Controls

Control Type	Details
Method Blank (MB)	are used to assess preparation and analysis for possible contamination during the preparation and processing steps.

Table 24-1. Example – Negative Controls

Control Type	Details
	The specific frequency of use for method blanks during the analytical sequence is defined in the specific standard operating procedure for each analysis. Generally it is 1 for each batch of samples; not to exceed 20 environmental samples.
	The method blank is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (e.g., Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The method blank goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.).
	Reanalyze or qualify associated sample results when the concentration of a targeted analyte in the blank is at or above the reporting limit as established by the method or by regulation, AND is greater than 1/10 of the amount measured in the sample.
Calibration Blanks	are prepared and analyzed along with calibration standards where applicable. They are prepared using the same reagents that are used to prepare the standards. In some analyses the calibration blank may be included in the calibration curve.
Instrument Blanks	are blank reagents or reagent water that may be processed during an analytical sequence in order to assess contamination in the analytical system. In general, instrument blanks are used to differentiate between contamination caused by the analytical system and that caused by the sample handling or sample prep process. Instrument blanks may also be inserted throughout the analytical sequence to minimize the effect of carryover from samples with high analyte content.
Trip Blank [1]	are required to be submitted by the client with each shipment of samples requiring aqueous and solid volatiles analyses (or as specified in the client's project plan). Additionally, trip blanks may be prepared and analyzed for volatile analysis of air samples, when required by the client. A trip blank may be purchased (certified clean) or is prepared by the laboratory by filling a clean container with pure deionized water that has been purged to remove any volatile compounds. Appropriate preservatives are also added to the container. The trip blank is sent with the bottle order and is intended to reflect the environment that the containers are subjected to throughout shipping and handling and help identify possible sources if contamination is found. The field sampler returns the trip blank in the cooler with the field samples.
Field Blanks [1]	are sometimes used for specific projects by the field samplers. A field blank prepared in the field by filling a clean container with pure reagent water and appropriate preservative, if any, for the specific sampling activity being undertaken. (EPA OSWER)
Equipment Blanks [1]	are also sometimes created in the field for specific projects. An equipment blank is a sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures. (TNI)
Holding Blanks	also referred to as refrigerator or freezer blanks, are used to monitor the sample storage units for volatile organic compounds during the storage of VOA samples in the laboratory

[1] When known, these field QC samples should not be selected for matrix QC as it does not provide information on the behavior of the target compounds in the field samples. Usually, the client sample ID will provide information to identify the field blanks with labels such as "FB", "EB", or "TB."

Evaluation criteria and corrective action for these controls are defined in the specific standard operating procedure for each analysis.

24.4 Positive Controls

Control samples (e.g., QC indicators) are analyzed with each batch of samples to evaluate data based upon (1) Method Performance (Laboratory Control Sample (LCS) or Blank Spike (BS)), which entails both the preparation and measurement steps; and (2) Matrix Effects (Matrix Spike (MS) (Matrix spikes are not applicable to air) or Sample Duplicate (MD, DUP), which evaluates field sampling accuracy, precision, representativeness, interferences, and the effect of the matrix on the method performed. Each regulatory program and each method within those programs specify the control samples that are prepared and/or analyzed with a specific batch

Note that frequency of control samples vary with specific regulatory, methodology and project specific criteria. Complete details on method control samples are as listed in each analytical SOP.

24.4.1 Method Performance Control - Laboratory Control Sample (LCS)

The LCS measures the accuracy of the method in a blank matrix and assesses method performance independent of potential field sample matrix affects in a laboratory batch.

The LCS is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (for example: Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The LCS is spiked with verified known amounts of analytes or is made of a material containing known and verified amounts of analytes, taken through all preparation and analysis steps along with the field samples. Where there is no preparation taken for an analysis (such as in aqueous volatiles), or when all samples and standards undergo the same preparation and analysis process a calibration verification standard is reported as the LCS. In some instances where there is no practical clean solid matrix available, aqueous LCS's may be processed for solid matrices; final results may be calculated as mg/kg or ug/kg, assuming 100% solids and a weight equivalent to the aliquot used for the corresponding field samples, to facilitate comparison with the field samples.

Certified pre-made reference material purchased from a NIST/A2LA accredited vendor may also be used for the LCS when the material represents the sample matrix or the analyte is not easily spiked (e.g. solid matrix LCS for metals, TDS, etc.).

The specific frequency of use for LCS during the analytical sequence is defined in the specific standard operating procedure for each analysis. It is generally 1 for each batch of samples; not to exceed 20 environmental samples.

If the mandated or requested test method, or project requirements, do not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample (and Matrix Spike) where applicable (e.g. no spike of pH). However, in cases where the components interfere with accurate assessment (such as simultaneously spiking chlordane, Toxaphene and PCBs in Method 608), the test method has an extremely long list of components or components are incompatible, at a minimum, a representative number of the listed components (see below) shall be used to control the test method. The selected components of each spiking mix shall represent all chemistries, elution patterns and masses, permit specified analytes and other client requested components. However, the laboratory shall ensure that all reported components are used in the spike mixture within a two-year time period.

- For methods that have 1-10 target analytes, spike all components.

- For methods that include 11-20 target analytes, spike at least 10 or 80%, whichever is greater.
- For methods with more than 20 target analytes, spike at least 16 components.
- Exception: Due to analyte incompatibility in pesticides, Toxaphene and Chlordane are only spiked at client request based on specific project needs.
- Exception: Due to analyte incompatibility between the various PCB aroclors, aroclors 1016 and 1260 are used for spiking as they cover the range of all of the aroclors. Specific aroclors may be used by request on a project specific basis.

24.5 Sample Matrix Controls

Table 24-3. Sample Matrix Control

Control Type	Details	
Matrix Spikes (MS)	Use	used to assess the effect sample matrix of the spiked sample has on the precision and accuracy of the results generated by the method used;
	Typical Frequency [1]	At a minimum, with each matrix-specific batch of samples processed, an MS is carried through the complete analytical procedure. Unless specified by the client, samples used for spiking are randomly selected and rotated between different client projects. If the mandated or requested test method does not specify the spiking components, the laboratory shall spike all reportable components to be reported in the Laboratory Control Sample and Matrix Spike. Refer to the method SOP for complete details
	Description	essentially a sample fortified with a known amount of the test analyte(s).
Surrogate	Use	Measures method performance to sample matrix (organics only).
	Typical Frequency [1]	Are added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. The recovery of the surrogates is compared to the acceptance limits for the specific method. Poor surrogate recovery may indicate a problem with sample composition and shall be reported, with data qualifiers, to the client whose sample produced poor recovery.
	Description	Are similar to matrix spikes except the analytes are compounds with properties that mimic the analyte of interest and are unlikely to be found in environment samples.
Duplicates[2]	Use	For a measure of analytical precision, with each matrix-specific batch of samples processed, a matrix duplicate (MD or DUP) sample, matrix spike duplicate (MSD), or LCS duplicate (LCSD) is carried through the complete analytical procedure.
	Typical Frequency [1]	Duplicate samples are usually analyzed with methods that do not require matrix spike analysis.
	Description	Performed by analyzing two aliquots of the same field sample independently or an additional LCS.
Internal Standards	Use	Are spiked into all environmental and quality control samples (including the initial calibration standards) to monitor the qualitative aspect of organic and some inorganic analytical measurements.
	Typical Frequency [1]	All organic and ICP methods as required by the analytical method.
	Description	Used to correct for matrix effects and to help troubleshoot variability in analytical response and are assessed after data acquisition. Possible sources of poor internal standard response are sample matrix, poor analytical technique or instrument performance.

[1] See the specific analytical SOP for type and frequency of sample matrix control samples.

[2] LCSD's are normally not performed except when regulatory agencies or client specifications require them. The recoveries for the spiked duplicate samples must meet the same laboratory established recovery limits as the accuracy QC samples. If an LCSD is analyzed both the LCS and LCSD must meet the same recovery criteria and be

included in the final report. The precision measurement is reported as "Relative Percent Difference" (RPD). Poor precision between duplicates (except LCS/LCSD) may indicate non-homogeneous matrix or sampling.

24.6 Acceptance Criteria (Control Limits)

As mandated by the test method and regulation, each individual analyte in the LCS, MS, or Surrogate Spike is evaluated against the control limits published in the test method. Where there are no established acceptance criteria, the laboratory calculates in-house control limits with the use of control charts or, in some cases, utilizes client project specific control limits. When this occurs, the regulatory or project limits will supersede the laboratory's in-house limits.

Note: For methods, analytes and matrices with very limited data (e.g., unusual matrices not analyzed often), interim limits are established using available data or by analogy to similar methods or matrices.

Once control limits have been established, they are verified, reviewed, and updated if necessary on an annual basis unless the method requires more frequent updating. Control limits are established per method (as opposed to per instrument) regardless of the number of instruments utilized.

Laboratory generated % Recovery acceptance (control) limits are generally established by taking $\pm$ 3 Standard Deviations (99% confidence level) from the average recovery of a minimum of 20-30 data points (more points are preferred).

- Regardless of the calculated limit, the limit should be no tighter than the Calibration Verification (ICV/CCV). (Unless the analytical method specifies a tighter limit).
- In-house limits cannot be any wider than those mandated in a regulated analytical method. Client or contract required control limits are evaluated against the laboratory's statistically derived control limits to determine if the data quality objectives (DQOs) can be achieved. If laboratory control limits are not consistent with DQOs, then alternatives must be considered, such as method improvements or use of an alternate analytical method.
- The lowest acceptable recovery limit will be 10% (the analyte must be detectable and identifiable). Exception: The lowest acceptable recovery limit for Benzidine will be 5% and the analyte must be detectable and identifiable.
- The maximum acceptable recovery limit will be 150%.
- The maximum acceptable RPD limit will be 35% for waters and 40% for soils. The minimum RPD limit is 10%.
- If either the high or low end of the control limit changes by $\leq$ 5% from previous, the control chart is visually inspected and, using professional judgment, they may be left unchanged if there is no effect on laboratory ability to meet the existing limits.

24.6.1 The lab must be able to generate a current listing of their control limits and track when the updates are performed. LIMs is utilized to track historical limits.

24.6.2 A LCS that is within the acceptance criteria establishes that the analytical system is in control and is used to validate the process. Samples that are analyzed with an LCS with recoveries outside of the acceptance limits may be determined as out of control and should be reanalyzed if possible. If reanalysis is not possible, then the results for all affected analytes for samples within the same batch must be qualified when reported. The internal corrective action

process (see Section 12) is also initiated if an LCS exceeds the acceptance limits. Sample results may be qualified and reported without reanalysis if:

- The analyte results are below the reporting limit and the LCS is above the upper control limit.
- If the analytical results are above the relevant regulatory limit and the LCS is below the lower control limit.

For TNI and DoD/DOE work, there are an allowable number of Marginal Exceedances (ME):

<11 analytes	0 marginal exceedances are allowed.
11 – 30 Analytes	1 marginal exceedance is allowed
31-50 Analytes	2 marginal exceedances are allowed
51-70 Analytes	3 marginal exceedances are allowed
71-90 Analytes	4 marginal exceedances are allowed
> 90 Analytes	5 marginal exceedances are allowed

- Marginal exceedances are recovery exceedances between 3 SD and 4 SD from the mean recovery limit (TNI).
- Marginal exceedances must be random. If the same analyte exceeds the LCS control limit repeatedly, it is an indication of a systematic problem. The source of the error must be located and corrective action taken. The laboratory has a system to monitor marginal exceedances to ensure that they are random.

Though marginal exceedences may be allowed, the data must still be qualified to indicate it is outside of the normal limits.

24.6.3 If the MS/MSDs do not meet acceptance limits, the MS/MSD and the associated spiked sample is reported with a qualifier for those analytes that do not meet limits. If obvious preparation errors are suspected, or if requested by the client, unacceptable MS/MSDs are reprocessed and reanalyzed to prove matrix interference. A more detailed discussion of acceptance criteria and corrective action can be found in the lab's method SOPs and in Section 12.

24.6.4 If a surrogate standard falls outside the acceptance limits, and if there is not obvious chromatographic matrix interference, reanalyze the sample to confirm a possible matrix effect. If the recoveries confirm or there was obvious chromatographic interference, results are reported from the original analysis and a qualifier is added. If the reanalysis meets surrogate recovery criteria, the second run is reported (or both are reported if requested by the client). Under certain circumstances, where all of the samples are from the same location and share similar chromatography, the reanalysis may be performed on a single sample rather than all of the samples and if the surrogate meets the recovery criteria in the reanalysis, all of the affected samples would require reanalysis.

24.7 Additional Procedures to Assure Quality Control

The laboratory has written and approved method SOPs to assure the accuracy of the test method including calibration (see Section 20), use of certified reference materials (see Section 21) and use of PT samples (see Section 17).

A discussion regarding MDLs, Limit of Detection (LOD) and Limit of Quantitation (LOQ) can be found in Section 19.

- Use of formulae to reduce data is discussed in the method SOPs and in Section 20.
- Selection of appropriate reagents and standards is included in Section 11 and 21.
- A discussion on selectivity of the test is included in Section 7.
- Constant and consistent test conditions are discussed in Section 6.
- The laboratories sample acceptance policy is included in Section 23.

25.0 REPORTING RESULTS

25.1 Overview

The results of each test are reported accurately, clearly, unambiguously, and objectively in accordance with State and Federal regulations as well as client requirements. Analytical results are issued in a format that is intended to satisfy customer and laboratory accreditation requirements as well as provide the end user with the information needed to properly evaluate the results. Where there is conflict between client requests and laboratory ethics or regulatory requirements, the laboratory's ethical and legal requirements are paramount, and the laboratory will work with the client during project set up to develop an acceptable solution. Refer to Section 9.

A variety of report formats are available to meet specific needs.

In cases where a client asks for simplified reports, there must be a written request from the client. There still must be enough information that would show any analyses that were out of conformance (QC out of limits) and there should be a reference to a full report that is made available to the client. Review of reported data is included in Section 19.

25.2 Test Reports

Analytical results are reported in a format that is satisfactory to the client and meets all requirements of applicable accrediting authorities and agencies. A variety of report formats are available to meet specific needs. The report is printed on laboratory letterhead, reviewed, and signed by the appropriate project manager. At a minimum, the standard laboratory report shall contain the following information:

25.2.1 A report title (e.g., Analytical Report)

25.2.2 The cover page shall include the laboratory name, address and telephone number.

25.2.3 A unique identification of the report (e.g., Eurofins Savannah Job ID #) and on each page an identification in order to ensure the page is recognized as part of the report and a clear identification of the end.

Note: Page numbers of report are represented as page # of ##. Where the first number is the page number and the second is the total number of pages.

25.2.4 A copy of the chain of custody (COC).

- Any COCs involved with Subcontracting are included.

25.2.5 The name and address of client and a project name/number, if applicable.

25.2.6 Client project manager or other contact

25.2.7 Description and unambiguous identification of the tested sample(s) including the client identification code.

25.2.8 Date of receipt of sample, date and time of collection, and date(s) of test preparation and performance, and time of preparation or analysis if the required holding time for either activity is less than or equal to 72 hours.

25.2.9 Date reported or date of revision, if applicable.

25.2.10 Method of analysis including method code (EPA, Standard Methods, etc.).

25.2.11 Practical quantitation limits or reporting limit.

25.2.12 Method detection limits (if requested)

25.2.13 Definition of Data qualifiers and reporting acronyms (e.g. ND).

25.2.14 Sample results.

25.2.15 QC data consisting of method blank, surrogate, LCS, and MS/MSD recoveries and control limits.

25.2.16 Condition of samples at receipt including temperature. This may be accomplished in a narrative or by attaching sample login sheets (Refer to Sec. 25.2.4 – Item 3 regarding additional addenda).

25.2.17 A statement expressing the validity of the results, that the source methodology was followed and all results were reviewed for error.

25.2.18 A statement to the effect that the results relate only to the items tested and the sample as received by the laboratory, except when information is provided by the client. When data is provided by the client there shall be a clear identification of it, and a disclaimer shall be put in the report when the client supplied data can affect the validity of the test.

25.2.19 A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory coordinator.

25.2.20 A signature and title of the person(s) accepting responsibility for the content of the report and date of issue. Authorized signatories are qualified Project Managers appointed by the Manager of Project Managers.

25.2.21 When TNI accreditation is required, the lab shall certify that the test results meet all requirements of TNI or provide reasons and/or justification if they do not.

25.2.22 The laboratory includes a cover letter.

25.2.23 Where applicable, a narrative to the report that explains the issue(s) and corrective action(s) taken in the event that a specific accreditation or certification requirement was not met.

25.2.24 When soil samples are analyzed, a specific identification as to whether soils are reported on a “wet weight” or “dry weight” basis.

25.2.25 Appropriate laboratory certification number for the state of origin of the sample, if applicable.

25.2.26 If only part of the report is provided to the client (client requests some results before all of it is complete), it must be clearly indicated on the report (e.g., partial report, or how your lab identifies it). A complete report must be sent once all of the work has been completed.

25.2.27 Any non-Eurofins subcontracted analysis results are provided as a separate report on the official letterhead of the subcontractor. All Eurofins Savannah subcontracting is clearly identified on the report as to which laboratory performed a specific analysis.

25.2.28 A Certification Summary Report, where required, will document that, unless otherwise noted, all analytes tested and reported by the laboratory were covered by the noted certifications.

Note: Refer to the NDSC Document No. CA-I-P-002, Electronic Reporting and Signature Policy, for details on internally applying electronic signatures of approval.

25.2.29 Reports for Ohio VAP work require a VAP affidavit be completed and included with the report.

25.2.30 Where the laboratory is responsible for the sampling stage, in addition to the requirements listed above, reports containing the results of sampling shall include the following, where necessary for the interpretation of test results:

- the date of sampling;
- unambiguous identification of the material sampled;
- the location of sampling plan and procedures, and deviations, addition to or exclusions from the sample procedures;
- a reference to the sampling plan and procedure, and deviations, additions to or exclusions from the sample procedures;
- details of any environmental conditions during sampling that affect the interpretation of test results;
- information required to evaluate measurement uncertainty for subsequent testing

25.3 Reporting Level or Report Type

The laboratory offers four levels of quality control reporting. Each level, in addition to its own specific requirements, contains all the information provided in the preceding level. The packages provide the following information in addition to the information described above:

- Level 1 is a report with all of the elements outlined in Section 25.2 above, excluding 25.2.15 (QC data).
- Level II is a Level I report plus summary information, including results for the method blank reported to the laboratory MDL, percent recovery for laboratory control samples and matrix spike samples, and the RPD values for all MSD and sample duplicate analyses.
- Level III contains all the information supplied in Level II, but presented on the CLP-like summary forms, and relevant calibration information. A Level II report is not included, unless specifically requested. No raw data is provided.
- Level IV is the same as Level III with the addition of all raw supporting data.

In addition to the various levels of QC packaging, the laboratory also provides reports in EDD (see below). Initial reports may be provided to clients by facsimile. Procedures used to ensure client confidentiality are outlined in Section 25.6.

25.4 Electronic Data Deliverables (EDDs)

EDDs are routinely offered as part of Eurofins Savannah services in addition to the test report as described in Section 25.2. When NELAP accreditation is required and both a test report and EDD are provided to the client, the official version of the test report will be the combined information of the report and the EDD. Eurofins Savannah offers a variety of EDD formats including Environmental Restoration Information Management System (ERPIMS), Staged Electronic Data Deliverable (SEDD) Environmental Quality Information System (EQuIS), Electronic Deliverable Format (EDF), Excel and custom files.

EDD specifications are submitted to the IT department by the PM for review and undergo the contract review process. Once the facility has committed to providing data in a specific electronic format, the coding of the format may need to be performed. This coding is documented and validated. The validation of the code is retained by the IT staff coding the EDD.

EDDs shall be subject to a review to ensure their accuracy and completeness. If EDD generation is automated, review may be reduced to periodic screening if the laboratory can demonstrate that it can routinely generate that EDD without errors. Any revisions to the EDD format must be reviewed until it is demonstrated that it can routinely be generated without errors. If the EDD can be reproduced accurately and if all subsequent EDDs can be produced error-free, each EDD does not necessarily require a review.

25.5 Supplemental Information for Test

The lab identifies any unacceptable QC analyses or any other unusual circumstances or observations such as environmental conditions and any non-standard conditions that may have affected the quality of a result. This is typically in the form of a footnote or a qualifier and/or a narrative explaining the discrepancy in the front of the report.

Numeric results with values outside of the calibration range, either high or low are qualified as estimated.

Where quality system requirements are not met, a statement of compliance/non-compliance with requirements and/or specifications is required, including identification of test results derived from any sample that did not meet TNI sample acceptance requirements such as improper container, holding time, or temperature.

Where applicable, a statement on the estimated uncertainty of measurements; information on uncertainty is needed when a client's instructions so require.

When, as requested by the client and agreed to by Eurofins Savannah the report includes a statement of conformity to specification or standard (see Special Services, Section 7.4), the report shall clearly identify:

- to which results the statement applies,
- which specifications, standard or parts thereof are met or not, and
- the decision rule that was applied (unless the decision rule is inherent in the requested specification or standard, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule.

Opinions and Interpretations - The test report contains objective information, and generally does not contain subjective information such as opinions and interpretations. If such information is required by the client, the Laboratory Director will determine if a response can be prepared. If

so, the Laboratory Director will designate the appropriate member of the management team to prepare a response. The response will be fully documented, and reviewed by the Laboratory Director, before release to the client. There may be additional fees charged to the client at this time, as this is a non-routine function of the laboratory.

Note: Review of data deliverable packages for submittal to regulatory authorities requires responses to non-conforming data concerning potential impact on data quality. This necessitates a limited scope of interpretation, and this work is performed by the QA Department. This is the only form of "interpretation" of data that is routinely performed by the laboratory.

When opinions or interpretations are included in the report, the laboratory provides an explanation as to the basis upon which the opinions and interpretations have been made. Opinions and interpretations are clearly noted as such and where applicable, a comment should be added suggesting that the client verify the opinion or interpretation with their regulator.

25.6 Environmental Testing Obtained From Subcontractors

If the laboratory is not able to provide the client the requested analysis, the samples would be subcontracted following the procedures outlined in the NDSC Document No. NDSC-US-SUB-SOP44936, Subcontracting.

Data reported from analyses performed by a subcontractor laboratory are clearly identified as such on the analytical report provided to the client. Results from a subcontract laboratory outside of Eurofins Savannah are reported to the client on the subcontract laboratory's original report stationary and the report includes any accompanying documentation.

25.7 Client Confidentiality

The laboratory will ensure the highest standards of quality and integrity of the data and services provided to our clients

The laboratory is responsible for maintaining in confidence all client information obtained or created. In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

The laboratory will not intentionally divulge to any person (other than the client or any other person designated by the client in writing) any information regarding the services provided by the laboratory or any information disclosed to the laboratory by the client. Furthermore, information known to be potentially endangering to national security or an entity's proprietary rights will not be released.

Information about the client obtained from sources other than the client (e.g., complainant, regulators) shall be confidential between client and the laboratory. The source of this information shall be confidential to the laboratory and shall not be shared with the client, unless agreed by the source.

Note: This shall not apply to the extent that the information is required to be disclosed by the laboratory under the compulsion of legal process. The laboratory will, to the extent feasible, provide reasonable notice to the client before disclosing the information.

Note: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

25.7.1 Report deliverable formats are discussed with each new client. If a client requests that reports be e-mailed, the reports are to meet all requirements of this document.

25.8 Format of Reports

The format of reports is designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse.

25.9 Amendments to Test Reports

Corrections, additions, or deletions to reports are only made when justification arises through supplemental documentation. Justification is documented using the laboratory's corrective action system (refer to Section 12).

The revised report is retained on the data server, as is the original report. The revised report is stored in the Archive data server under the sample number followed by "R". The revised report will have the word "revised" or "amended" next to the date rather than the word "reported".

When the report is re-issued, a notation of "report re-issue" is placed on the cover/signature page of the report or case narrative with a brief explanation of reason for the re-issue and a reference back to the last final report generated.

25.10 Policies on Client Requests for Amendments

25.10.1 Policy on Data Omissions or Reporting Limit Increases

Fundamentally, our policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND. This policy has few exceptions. Exceptions are:

- Laboratory error.
- Sample identification is indeterminate (confusion between COC and sample labels).
- An incorrect analysis (not analyte) was requested (e.g., COC lists 8315 but client wanted 8310). A written request for the change is required.
- Incorrect limits reported based on regulatory requirements.
- The requested change has absolutely *no possible* impact on the interpretation of the analytical results and there is *no possibility* of the change being interpreted as misrepresentation by anyone inside or outside of our company.

25.10.2 Multiple Reports

The laboratory does not issue multiple reports for the same work order where there is different information on each report (this does not refer to copies of the same report) unless required to meet regulatory needs and approved by QA.

Appendix 1. List of Governing Documents applicable to the QA Manual

(NDSC, KDG and Laboratory SOPs and Policies)

NDSC Doc. No.	Title
CA-C-S-001	Work Sharing Process
CA-I-P-002	Electronic Reporting and Signature Policy
CA-L-P-002	Contract Compliance Policy
CA-Q-M-002	Quality Management Plan
CA-Q-QM-001	Guidance on Tentatively Identified Compounds (TICs) – GC/MS Analysis
CA-Q-S-001	Acid and Solvent-Lot Testing and Approval Program
CA-Q-S-002	Manual Integrations
CA-Q-S-006	Detection and Quantitation Limits
CA-Q-S-009	Root Cause Analysis
CA-T-P-001	Qualified Products List
CW-E-M-001	Environmental Health & Safety Manual
CW-F-P-002	Company-Wide Authorization Matrix
CW-F-P-004	Procurement and Contracts Policy
CW-F-S-007	Fixed Asset Acquisition, Retention and Safeguarding
CW-I-M-001	IT Change Control Procedure Manual
CW-L-P-001	Records Retention Policy
CW-L-P-004	Ethics Policy
CW-L-S-002	Internal Investigation
CW-L-S-004	Subcontracting
CW-Q-S-001	Document Control and Archiving
CW-Q-S-002	Writing a Standard Operating Procedure (SOPs)
CW-Q-S-003	Internal Auditing
CW-Q-S-004	Management Systems Review
CW-Q-S-005	Data Recall Process
CW-Q-S-001	Document Control and Archiving
Local Laboratory Document No.	**Title**
SA-QA-001	Document Control Program
SA-QA-002	Data Generation and Review
SA-QA-005	Preventive and Corrective Action
SA-QA-006	Training
SA-QA-008	Evaluation of Chromatographic Data
SA-QA-015	Homogenization, Compositing and Segregation of Samples
SA-QA-017	Evaluation of Batch QC

Appendix 2. List of Laboratory Certifications, Accreditations, Validations

The laboratory maintains accreditations, certifications, and approvals with numerous state and national entities. Programs vary but may include on-site audits, reciprocal agreements with another entity, performance testing evaluations, review of the QA Manual, Standard Operating Procedures, Method Detection Limits, training records, etc. At the time of this QA Manual revision, the laboratory has accreditation/ certification/licensing with the following organizations:

ANAB
Alabama
Arkansas
California
Florida
Georgia
Guam
Hawaii
Illinois
Indiana
Iowa
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Mississippi
Nebraska
New Jersey
New Mexico
North Carolina
Pennsylvania
Puerto Rico
South Carolina
Tennessee
Texas
Virginia
Wyoming

Appendix 3. References used to prepare the QA Manual

The QAM has been prepared to be consistent with the requirements of the following documents:

- ANSI/ASQC, E4-1994, "Specifications and Guidelines for Quality Management Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995, or most recent version)
- "EPA Requirements for Quality Management Programs" (QA/R-2) (EPA/240/B-01/002, May 31, 2006).
- EPA 600/4-88/039, *Methods for the Determination of Organic Compounds in Drinking Water,* EPA, Revised July 1991.
- EPA 600/R-95/131, *Methods for the Determination of Organic Compounds in Drinking Water,* Supplement III, EPA, August 1995.
- EPA 600/4-79-019, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories,* EPA, March 1979.
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846), Third Edition, September 1986, Final Update I, July 1992, Final Update IIA, August 1993, Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996; Final Update IV, January 2008; Final Update V, August 2015.*
- *U.S. Department of Defense (DoD)/Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1.1, dated 2017*
- Federal Register, 40 CFR Parts 136, 141, 172, 173, 178, 179 and 261.
- *Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005)*
- *Statement of Work for Inorganics & Organics Analysis, SOM and ISM, current versions, USEPA Contract Laboratory Program Multi-media, Multi-concentration.*
- APHA, *Standard Methods for* the Examination of Water and Wastewater, 18th Edition, 19th, 20th, 21st, 22nd and on-line Editions.
- *U.S. Department of Energy* Order 414.1B, *Quality Assurance*, Approved April 29, 2004.
- *U.S. Department of Energy* Order 414.1C, *Quality Assurance*, June 17, 2005.
- *U.S. Department of Energy Order 414.1D, Quality Assurance, April, 25, 2011.*
- Nuclear Regulatory Commission (NRC) Quality Assurance Requirements.
- Marine Protection, Research, and Sanctuaries Act (MPRSA).
- Toxic Substances Control Act (TSCA).

Appendix 4. QA Manual Crosswalk with TNI and ISO/IEC 17025 Standards

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
-	QUALITY ASSURANCE MANUAL	V1M2 Sec. 4.2.8.3		
1.0	Title Page			
2.0	Table of Contents	V1M2 Secs. 4.2.8.3-4.2.8.4		8.1.2, 8.2.1
3.0	Introduction, Scope and Applicability	V1M2 Sec. 4.2.8.4		
3.1	Introduction and Compliance References	V1M2 Secs. 1.1; 1.2; 2.0; 3.2; 4.1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.4; 8.3.1
3.2	Terms and Definitions	V1M2 Secs. 3.0; 4.2.4	4.2.4	
3.3	Scope /Field of Testing	V1M2 Secs. 1.2; 4.2.4	4.1.2; 4.2.4	5.3; 5.4; 8.2.1; 8.2.4
3.4	Management of The Manual	V1M2 Secs. 4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	4.2.1; 4.2.7; 4.3.3.2; 4.3.3.3	5.3
4.0	Management and Responsibilities	V1M2 Sec. 4		8.2.4; 8.2.5
4.1	Overview	V1M2 Secs. 4.1.1, 4.1.3; 4.1.5	4.1.1; 4.1.3; 4.1.5; 4.2.6	5.1; 5.2; 5.5; 5.6 ; 6.2.1; 6.2.4
4.2	Roles and Responsibilities	V1M2 Secs. 4.1.4; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.3; 4.1.5; 4.1.6; 4.2.1; 4.2.6; 5.2.4	4.1.1 to 4.1.3; 4.1.5; 5.5; 5.6; 6.2.1; 6.2.4; 6.2.6 8.2.2;
4.3	Business Continuity and Contingency Plan *(Prev. Deputies)*	V1M2 Secs. 4.1.5; 4.1.7.2; 4.2.7	4.1.5; 4.2.7	
5.0	**Error! Reference source not found.**	V1M2 Secs. 5.2; 5.2.1	5.2.1	6.1; 6.2.3
5.1	Overview	V1M2 Secs. 5.2.2; 5.2.3; 5.2.5	5.2.2; 5.2.3; 5.2.5	6.2.2
5.2	Education and Experience Requirements for Technical Staff	V1M2 Secs. 5.2.1; 5.2.3; 5.2.4	5.2.1; 5.2.3; 5.2.4	6.2.2 to 6.2.4
5.3	Training	V1M2 Sec. 5.2.5	5.2.5	4.2.1; 6.2.2; 6.2.4; 6.2.5
5.4	Data Integrity and Ethics Training Program	V1M2 Sec. 4.2.8.1; 5.2.7		4.1.1
6.0	ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS	V1M2 Sec. 5.3		6.1; 6.3.1
6.1	Overview	V1M2 Secs. 5.3.1; 5.3.3; 5.3.4; 5.3.5	5.3.1; 5.3.3; 5.3.4; 5.3.5	6.3.1
6.2	Environment	V1M2 Secs. 5.3.1; 5.3.2; 5.3.3; 5.3.4; 5.3.5	5.3.1; 5.3.2; 5.3.3; 5.3.4; 5.3.5	6.3.1 to 6.3.5
6.3	Work Area	V1M2 Secs. 5.3.3; 5.3.4; 5.3.5	5.3.3; 5.3.4; 5.3.5	6.3.1
6.4	Responding to Emergencies			
6.5	Building Security	V1M2 Sec. 5.3.4	5.3.4	6.3.4
7.0	QUALITY SYSTEM			6.1; 8.2.4
7.1	Quality Policy	V1M2 Secs. 4.1.5; 4.2.2; 4.2.3; 4.2.8.3	4.1.5; 4.2.2; 4.2.3	8.2.3; 8.6.1
7.2	Ethics and Data Integrity	V1M2 Secs. 4.1.5; 4.16; 4.2.2; 4.2.8.1; 5.2.7	4.1.5; 4.2.2	4.1.1 to 4.1.3; 4.2.1; 6.2.1; 8.2.2; 8.2.3
7.3	Quality System Documentation	V1M2 Secs. 4.1.5; 4.2.2; 4.2.5	4.2.2; 4.2.5	8.2.4

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
7.4	QA/QC Objectives for the Measurement of Data	V1M2 Sec. 4.2.2	4.1.5; 4.2.2	6.2.4
7.5	Criteria for Quality Indicators			
7.6	Statistical Quality Control			
7.7	Quality System Metrics			
8.0	Document Control	V1M2 Secs. 4.2.7; 4.3.1; 4.3.2.2 ; 4.3.3.3; 4.3.3.4	4.2.7; 4.3.1; 4.3.2.2; 4.3.3.3; 4.3.3.4	8.2.4; 8.3.1
8.1	Overview			8.2.5; 8.3.1; 8.3.2
8.2	Document Approval and Issue	V1M2 Secs. 4.3.2; 4.3.2.1-4.3.2.3; 4.3.3.1	4.3.2.1; 4.3.2.2; 4.3.2.3; 4.3.3.1	8.2.5; 8.3.2
8.3	Procedures for Document Control Policy	V1M2 Secs. 4.3.2.1–4.3.2.2; 4.3.3.1	4.3.2.1; 4.3.2.2; 4.3.3.1	8.2.5; 8.3.2
8.4	Obsolete Documents	V1M2 Secs. 4.3.2.1–4.3.2.2	4.3.2.1; 4.3.2.2	8.2.5; 8.3.2
9.0	SERVICE TO THE CLIENT	V1M2 Secs. 4.4.1 - 4.4.4	4.4.1; 4.4.2; 4.4.3; 4.4.4	7.1.1; 7.1.1.4; 7.1.1.5; 7.1.1.8; 7.1.2.1
9.1	Overview	V1M2 Secs. 4.4.5; 4.5.5; 5.7.1	4.4.5; 5.7.1	
9.2	Review Sequence and Key Personnel	V1M2 Sec. 4.4.5	4.4.5	7.1.1.6
9.3	Balancing Laboratory Work Load and Capacity			
9.4	Documentation	V1M2 Sec. 5.7.1	5.7.1	
9.5	Special Services	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.3; 7.1.1.7
9.6	Client Communication	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.7
9.7	Reporting	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.7
9.8	Client Feedback and Surveys	V1M2 Secs. 4.7.1-4.7.2	4.7.1; 4.7.2	7.1.1.7; 8.6.2
10.0	SUBCONTRACTING OF TESTS	V1M2 Secs. 4.4.3; 4.5.4	4.4.3; 4.5.4	
10.1	Overview	V1M2 Secs. 4.5.1 - 4.5.3; 4.5.5; 5.3.1	4.5.1; 4.5.2; 4.5.3; 5.3.1	6.6.1; 7.1.2.1; 7.1.2.2
10.2	Qualifying and Monitoring Subcontractors	V1M2 Secs. 4.5.1; 4.5.2; 4.5.3; 4.5.5	4.5.1; 4.5.2; 4.5.3	6.6.1; 7.1.2.1; 7.1.2.2
10.3	Oversight and Reporting	V1M2 Sec. 4.5.5		
10.4	Contingency Planning			
10.5	Use of NELAP and A2LA Logo			
11.0	PURCHASING SERVICES AND SUPPLIES	V1M2 Sec. 4.6.1	4.6.1	
11.1	Overview	V1M2 Secs. 4.6.2; 4.6.3; 4.6.4	4.6.2; 4.6.3; 4.6.4	6.6.1; 6.6.2
11.2	Glassware	V1M2 Sec. 5.5.13.1		
11.3	Reagents, Standards & Supplies	V1M2 Secs. 4.6.2; 4.6.3; 4.6.4 2016 V1M4 1.7.2.5	4.6.2; 4.6.3; 4.6.4	6.6.1 to 6.6.3
11.4	Purchase of Equipment / Instruments / Software			
11.5	Services			
11.6	Suppliers			
12.0	COMPLAINTS	V1M2 Sec. 4.8	4.8	8.6.1; 8.6.2
12.1	Overview			7.9.1 to 7.9.3 8.6.1; 8.6.2;
12.2	External Complaints			7.9.2 to 7.9.7 8.6.1; 8.6.2;

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
12.3	Internal Complaints			8.6.1; 8.6.2
12.4	Management Review			8.6.1; 8.6.2
13.0	CONTROL OF NON-CONFORMING WORK	V1M2 Secs. 4.9.1; 5.10.5	4.9.1; 5.10.5	7.10.1
13.1	Overview	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5	4.9.1; 4.11.3; 4.11.5	7.10.1
13.2	Responsibilities and Authorities	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5; 5.2.7	4.9.1; 4.11.3; 4.11.5	7.10.1
13.3	Evaluation of Significance and Action Taken	V1M2 Secs. 4.9.1; 4.11.3; 4.11.5	4.9.1; 4.11.3; 4.11.5	4.1.5; 7.10.1; 7.10.2; 8.5.3
13.4	Prevention of Non-Conforming Work	V1M2 Secs. 4.9.4; 4.11.2	4.9.2; 4.11.2	7.10.2; 7.10.3; 8.5.3
13.5	Method Suspension / Restriction (Stop Work Procedures)	V1M2 Secs. 4.9.1; 4.9.2; 4.11.5	4.9.1; 4.9.2; 4.11.5	7.10.1; 7.10.2
14.0	CORRECTIVE ACTION	V1M2 Sec. 4.11		4.1.4; 4.1.5
14.1	Overview	V1M2 Secs. 4.9.2; 4.11.1; 4.11.2	4.9.2; 4.11.1; 4.11.2; 8.7.1; 8.7.3	7.10.2 8.7.1; 8.7.3;
14.2	General	V1M2 Sec. 4.11.2; 4.11.3	4.11.2; 4.11.3	7.7.2; 8.5.3; 8.7.1;
14.3	Closed Loop Correction Action Process	V1M2 Sec. 4.11.2; 4.11.3; 4.11.4; 4.11.6; 4.11.7; 4.12.2	4.11.2; 4.11.3; 4.11.4; 4.12.2	8.5.3; 8.6.1; 8.7.2
14.4	Technical Corrective Actions	V1M2 Sec. 4.11.6		8.7.1
14.5	Basic Corrections	V1M2 Secs. 4.11.1; 4.13.2.3	4.11.1; 4.13.2.3	7.5.2; 8.7.1
15.0	PREVENTIVE ACTION / IMPROVEMENT	V1M2 Secs. 4.10; 4.12.1; 4.12.2	4.10; 4.12.1; 4.12.2	4.1.4
15.1	Overview	V1M2 Secs. 4.15.1; 4.15.2	4.15.1; 4.15.2	8.6.2
15.2	Management of Change			
16.0	CONTROL OF RECORDS	V1M2 Secs. 4.2.7; 4.13.1.1; 4.13.3	4.2.7; 4.13.1.1	8.4.2
16.1	Overview	V1M2 Secs. 4.13.1.1 - 4.13.1.4; 4.13.2.1-4.13.2.3; 4.13.3	4.13.1.1 - 4.13.1.4; 4.13.2.1-4.13.2.3	8.4.1; 8.4.2
16.2	Programs with Longer Retention Requirements			
16.3	Technical and Analytical Records	V1M2 Sec. 4.13.2.2 - 4.13.2.3	4.13.2.2; 4.13.2.3	7.5.1; 8.4.2
16.4	Laboratory Support Activities			7.5.2; 8.4.2
16.5	Administrative Records			8.4.2
16.6	Records Management, Storage and Disposal	V1M2 Sec. 4.13.3		4.2.1; 8.4.2
17.0	AUDITS			
17.1	Internal Audits	V1M2 Sec. 4.2.8.1; 4.14; 4.14.1; 4.14.2 ; 4.14.3; 4.14.5; 5.9.1; 5.9.2	4.14.1; 4.14.2; 4.14.3; 5.9.1; 5.9.2	8.6.1; 8.8.1; 8.8.2
17.2	External Audits	V1M2 Secs.4.14.2; 4.14.3	4.14.2; 4.14.3; 4.14.4	4.2.1; 8.6.1
17.3	Audit Findings	V1M2 Secs. 4.14.2; 4.14.3; 4.14.5		8.6.1

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
18.0	MANAGEMENT REVIEWS	V1M2 Sec. 4.1.6; 4.15; 4.15.1; 4.15.2	4.1.6; 4.15.1; 4.15.2	4.1.4; 8.5.1; 8.6.1; 8.9.1; 8.9.2
18.1	Quality Assurance Report			8.5.1
18.2	Annual Management Review	V1M2 Sec. 4.2.2; 4.15.3	4.2.2	4.1.1, 4.1.4; 4.2.1; 7.1.1.3; 8.2.2; 8.5.1 to 8.5.3; 8.6.1; 8.9.3
18.3	Potential Integrity Related Managerial Reviews			4.1.5; 8.5.1; 8.6.1
19.0	TEST METHODS AND METHOD VALIDATION	V1M2 Sec. 5.4.1	5.4.1	7.2.1.1; 8.2.5
19.1	Overview	V1M2 Sec. 5.4.1	5.4.1; 5.4.5.1	6.2.3; 7.2.1.1 to 7.2.1.3
19.2	Standard Operating Procedures (SOPs)	V1M2 Secs. 4.2.8.5; 4.3.3.1; 5.4.2	4.3.3.1; 5.4.2	7.2.1.4
19.3	Laboratory Methods Manual	V1M2 Sec. 4.2.8.5 (2019 5.4.4.2)		6.2.3
19.4	Selection of Methods	V1M2 Secs. 4.13.3; 5.4.1; 5.4.2; 5.4.3. (2019 5.4.4) V1M4 Secs. 1.4; 1.5.1; 1.6.1; 1.6.2; 1.6.2.1; 1.6.2.2	5.4.1; 5.4.2; 5.4.3; 5.4.4; 5.4.5.1; 5.4.5.2; 5.4.5.3	7.1.1.2; 7.2; 7.2.1.2; 7.2.1.3; 7.1.2.4 to 7.2.1.7; 7.2.2.1 to 7.2.1.7; 7.2.2.1
19.5	Laboratory Developed Methods and and Non-Standard Methods	V1M2 Sec. 5.4.2. (2019 5.4.4.1, 5.4.4.2) V1M4 Sec. 1.5.1	5.4.2; 5.4.4; 5.4.5.2; 5.4.5.3	7.1.1.2; 7.2.1.4 to 7.2.1.7 7.2.2.1; 7.2.2.3; 8.2.5
19.6	Validation of Methods	V1M2 Sec. 5.4.2. (2019 5.4.5.4) V1M4 Secs. 1.5.1; 1.5.2; 1.5.2.1; 1.5.2.2; 1.5.3	5.4.2; 5.4.4; 5.4.5.2; 5.4.5.3	7.1.1.2; 7.1.2.4; 7.2.1.6; 7.2.2.1 to 7.2.2.4
19.7	Method Detection Limits (MDLs) / Limit of Detection (LOD)	V1M2 Sec. 5.9.3. V1M4 Secs. 1.5.2; 1.5.2.1; 1.5.2.2	5.4.5.3	7.2.2.3
19.8	Verification of Detection Limits	V1M2 Sec. 5.9.3		
19.9	Instrument Detection Limits (IDLs)	V1M2 Sec. 5.9.3. V1M4 Sec. 1.5.2.1		
19.10	Limit of Quantitation	V1M2 Sec. 5.9.3		
19.11	Retention Windows	V1M2 Sec. 5.9.3. V1M4 Sec. 1.5.4; (2009 1.7.3.6) (2016 1.7.2.6)		
19.12	Evaluation of Selectivity	V1M2 Sec. 5.9.3. V1M4 Sec. 1.5.4; (2009 1.7.3.6) (2016 1.7.2.6)		
19.13	Estimation of Uncertainty of Measurement	V1M2 Sec. 5.1.1; 5.1.2; 5.4.6	5.1.1; 5.1.2; 5.4.6.1; 5.4.6.2; 5.4.6.3	7.6.1; 7.6.2; 7.6.3
19.14	Sample Reanalysis Guidelines	V1M2 Sec 5.9.1	5.9.1	
19.15	Control of Data	V1M2 Secs. 5.4.7.1; 5.4.7.2; 5.9.1	5.4.7.1; 5.4.7.2; 5.9.1	7.11.1 to 7.11.6
20.0	EQUIPMENT AND CALIBRATIONS	V1M2 Secs. 5.5.4; 5.5.5; 5.5.6	5.5.4; 5.5.5; 5.5.6; 5.6.1	6.1; 6.4.3; 6.4.6; 6.4.9

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
20.1	Overview	V1M2 Secs. 5.5.1; 5.5.2; 5.5.3; 5.5.5; 5.5.10	5.5.1; 5.5.2; 5.5.3; 5.5.5; 5.5.10; 5.6.1	6.4.1; 6.4.4 to 6.4.6; 6.4.9; 6.4.11
20.2	Preventive Maintenance	V1M2 Secs. 5.5.1; 5.5.3; 5.5.7; 5.5.9	5.5.1; 5.5.3; 5.5.7; 5.5.9; 5.6.1	6.4.1 to 6.4.3; 6.4.6; 6.4.10
20.3	Support Equipment	V1M2 Secs. 5.5.10; 5.5.11; 5.5.13.1	5.5.10; 5.5.11; 5.6.2.1.2; 5.6.2.2.1; 5.6.2.2.2	6.4.11; 6.4.12; 6.5.1; 6.5.2; 6.5.3
20.4	Instrument Calibrations	V1M2 Secs. 5.5.8; 5.5.10; 5.6.3.1. V1M4 Sec. 1.7.1.1; (2009 1.7.2) (2016 1.7.1.2)	5.5.8; 5.5.9; 5.5.10; 5.6.1; 5.6.2; 5.6.3.1	6.4.2; 6.4.3; 6.4.6 to 6.4.8; 6.4.11; 6.4.13; 6.4.14; 6.5.1; 6.5.2
20.5	Tentatively Identified Compounds (TICs) – GC/MS Analysis			
20.6	GC/MS Tuning			
21.0	MEASUREMENT OF TRACEABILITY			
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24.1	Overview	V1M2 Secs. 5.9.2; 5.9.3	5.9.2	7.7.2 to 7.7.3
24.2	Controls	V1M2 Secs. 5.9.2; 5.9.3	5.9.2	7.7.1; 7.7.3

Sec. No.	Title	2009 and 2016 TNI Standard Reference	ISO/IEC 17025:2005(E) Reference	ISO/IEC 17025:2017(E) Reference
24.3	Negative Controls	V1M2 Secs. 5.9.2; 5.9.3 V1M4 Secs. (2019 1.7.3; 1.7.3.1; 1.7.4.1) (2016 1.7.2, 1.7.2.1, 1.7.3.1)	5.9.2	7.7.1; 7.7.3
24.4	Positive Controls	V1M2 Secs 5.9.2; 5.9.3. V1M4 Secs.(2009 1.7.3; 1.7.3.2; 1.7.3.2.1; 1.7.3.2.2; 1.7.3.2.3) (2016 1.7.2, 1.7.2.2, 1.7.3.2)	5.9.2	7.7.1; 7.7.3
24.5	Sample Matrix Controls	V1M2 Secs. 5.9.2; 5.9.3. V1M4 Secs. (2009 1.7.3 ; 1.7.3.3; 1.7.3.3.1; 1.7.3.3.2; 1.7.3.3.3) (2016 1.7.2, 1.7.2.3, 1.7.3.3)	5.9.2	7.7.1; 7.7.3
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24.7	Additional Procedures to Assure Quality Control	V1M2 Sec. 5.9.3. V1M4 Sec. (2009 1.7.3.4), (2016 1.7.2.4)		7.7.1; 7.7.3
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25.3	Reporting Level or Report Type	V1M2 Secs. 5.10.1; 5.10.7; 5.10.8	5.10.1; 5.10.7; 5.10.8	
25.4	Electronic Data Deliverables (EDDs)			
25.5	Supplemental Information for Test	V1M2 Secs. 5.10.1; 5.10.3.1; 5.10.5	5.10.1; 5.10.3.1; 5.10.5	7.1.1.3; 7.8.6.1; 7.8.6.2; 7.8.7.1 to 7.8.7.3
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25.7	Client Confidentiality	V1M2 Secs. 4.1.5; 5.10.7	4.1.5; 5.10.7	4.2.1 to 4.2.4
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Appendix 5. Terms/Glossary and Acronyms (EL-V1M2 Sec. 3.1)

Terms/Glossary:

Acceptance Criteria: Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation: The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory.

Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. (QAMS)

Analyst: The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

Analytical Uncertainty: A subset of Measurement Uncertainty that includes all laboratory activities performed as part of the analysis. (TNI)

Anomaly: A condition or event, other than a deficiency, that may affect the quality of the data, whether in the laboratory's control or not.

Assessment: The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria (to the standards and requirements of laboratory accreditation). (TNI)

Audit: A systematic and independent examination of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives. (TNI)

Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A **preparation batch** is composed of one (1) to twenty (20) environmental samples of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be twenty-four (24) hours. An **analytical batch** is composed of prepared environmental samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch can include prepared samples originating from various quality system matrices and can exceed twenty (20) samples. (TNI)

Bias: The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). (TNI)

Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. (ASQC)

Calibration: A set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. (TNI)

1) In calibration of support equipment the values realized by standards are established through the use of reference standards that are traceable to the International System of Units (SI).

2) In calibration according to methods, the values realized by standards are typically established through the use of Reference Materials that are either purchased by the laboratory with a certificate of analysis or purity, or prepared by the laboratory using support equipment that has been calibrated or verified to meet specifications.

Calibration Curve: The mathematical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response. (TNI)

Calibration Standard: A substance or reference material used to calibrate an instrument (QAMS)

Certified Reference Material (CRM): A reference material accompanied by a certificate, having a value, measurement uncertainty, and stated metrological traceability chain to a national metrology institute. (TNI)

Chain of Custody (COC) Form: Record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; the collector; time of collection; preservation; and requested analyses. (TNI)

Compromised Samples: Those samples which are improperly sampled, insufficiently documented (chain of custody and other sample records and/or labels), improperly preserved, collected in improper containers, or exceeding holding times when delivered to a laboratory. Under normal conditions, compromised samples are not analyzed. If emergency situation require analysis, the results must be appropriately qualified.

Confidential Business Information (CBI): Information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products. TNI and its representatives agree to safeguard identified CBI and to maintain all information identified as such in full confidentiality.

Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to Second Column Confirmation; Alternate wavelength; Derivatization; Mass spectral interpretation; Alternative detectors or Additional Cleanup procedures. (TNI)

Conformance: An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements. (ANSI/ASQC E4-1994)

Correction: Actions necessary to correct or repair analysis specific non-conformances. The acceptance criteria for method specific QC and protocols as well as the associated corrective actions. The analyst will most frequently be the one to identify the need for this action as a result of calibration checks and QC sample analysis**.** No significant action is taken to change behavior, process or procedure.

Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence. (ISO 8402)

Data Integrity: The condition that exists when data are sound, correct, and complete, and accurately reflect activities and requirements. (TNI)

Data Audit: A qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data re of acceptable quality (i.e., that they meet specified acceptance criteria).

Data Reduction: The process of transforming the number of data items by arithmetic or statistical calculations, standard curves, and concentration factors, and collation into a more useable form. (TNI)

Deficiency: An unauthorized deviation from acceptable procedures or practices, or a defect in an item (ASQC), whether in the laboratory's control or not.

Demonstration of Capability: A procedure to establish the ability of the analyst to generate analytical results of acceptable accuracy and precision. (TNI)

Document Control: The act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly, and controlled to ensure use of the correct version at the location where the prescribed activity if performed. (ASQC)

Duplicate Analyses: The analyses or measurements of the variable of interest performed identically on two subsamples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory. (EPA-QAD)

Equipment Blank: Sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.

External Standard Calibration: Calibrations for methods that do not utilize internal standards to compensate for changes in instrument conditions.

Field Blank: Blank prepared in the field by filing a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken (EPA OSWER)

Field of Accreditation: Those matrix, technology/method, and analyte combinations for which the accreditation body offers accreditation.

Holding Times: The maximum time that samples may be held prior to analyses and still be considered valid or not compromised. (40 CFR Part 136)

Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical test method. (TNI)

Internal Standard Calibration: Calibrations for methods that utilize internal standards to compensate for changes in instrument conditions.

Instrument Blank: A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination. (EPA-QAD)

Instrument Detection Limit (IDL): The minimum amount of a substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific instrument. The IDL is associated with the instrumental portion of a specific method only, and sample preparation steps are not considered in its derivation. The IDL is a statistical estimation at a specified confidence interval of the concentration at which the relative uncertainty is ± 100%. The IDL represents a range where qualitative detection occurs on a specific instrument. Quantitative results are not produced in this range.

Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample): A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes, taken through all preparation and analysis steps of the procedure unless otherwise noted in a reference method. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

An LCS shall be prepared at a minimum of 1 per batch of 20 or less samples per matrix type per sample extraction or preparation method except for analytes for which spiking solutions are not available such as total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. The results of these samples shall be used to determine batch acceptance.

Least Squares Regression (1st Order Curve): The least squares regression is a mathematical calculation of a straight line over two axes. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The regression calculation will generate a correlation coefficient (r) that is a measure of the "goodness of fit" of the regression line to the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r must be greater than or equal to 0.99 for organics and 0.995 for inorganics.

Limit(s) of Detection (LOD) [a.k.a., Method Detection Limit (MDL)]: The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017.

Limit(s) of Quantitation (LOQ) [a.k.a., Reporting Limit]: The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence.

(QS) Matrix: The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions shall be used:

> *Aqueous:* Any aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine. Includes surface water, groundwater effluents, and TCLP or other extracts.

Drinking Water: Any aqueous sample that has been designated as a potable or potential potable water source.

Saline/Estuarine: Any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake.

Non-Aqueous Liquid: Any organic liquid with <15% settleable solids.

Biological Tissue: Any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.

Solids: Includes soils, sediments, sludges, and other matrices with >15% settleable solids.

Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.

Air & Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbant tube, impinger solution, filter, or other device. (TNI)

Matrix Spike (spiked sample or fortified sample): A sample prepared, taken through all sample preparation and analytical steps of the procedure unless otherwise noted in a referenced method, by adding a known amount of target analyte to a specified amount of sample for which an independent test result of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix Spike Duplicate (spiked sample or fortified sample duplicate): A replicate matrix spike prepared and analyzed to obtain a measure of the precision of the recovery for each analyte.

Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

Method Detection Limit: See Limit of Detection (LOD)

Negative Control: Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results.

Non-conformance: An indication, judgment, or state of not having met the requirements of the relevant specifications, contract, or regulation.

Observation: A record of phenomena that (1) may assist in evaluation of the sample data; (2) may be of importance to the project manager and/or the client, and yet not at the time of the observation have any known effect on quality.

Performance Audit: The routine comparison of independently obtained qualitative and quantitative measurement system data with routinely obtained data in order to evaluate the proficiency of an analyst or laboratory.

Positive Control: Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects.

Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms. (TNI)

Preservation: Any conditions under which a sample must be kept in order to maintain chemical and/or biological integrity prior to analysis. (TNI)

Proficiency Testing: A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source. (TNI)

Proficiency Testing Program: The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories. (TNI)

Proficiency Test Sample (PT): A sample, the composition of which is unknown to the laboratory and is provided to test whether the laboratory can produce analytical results within specified acceptance criteria. (TNI)

Quality Assurance: An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item or service is of the type of quality needed and expected by the client. (TNI)

Quality Assurance [Project] Plan (QAPP): A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved. (EAP-QAD)

Quality Control: The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against “out of control” conditions and ensuring that the results are of acceptable quality. (TNI)

Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. One of any number of samples, such as Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking, intended to demonstrate that a measurement system or activity is in control. (TNI)

Quality Manual: A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users. (TNI)

Quality System: A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC activities. (TNI)

Raw Data: The documentation generated during sampling and analysis. This documentation includes, but is not limited to, field notes, electronic data, magnetic tapes, untabulated sample results, QC sample results, print outs of chromatograms, instrument outputs, and handwritten records. (TNI)

Record Retention: The systematic collection, indexing and storing of documented information under secure conditions.

Reference Material: Material or substance one or more properties of which are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (TNI)

Reference Standard: Standard used for the calibration of working measurement standards in a given organization or a given location. (TNI)

Sampling: Activity related to obtaining a representative sample of the object of conformity assessment, according to a procedure.

Second Order Polynomial Curve (Quadratic): The 2nd order curves are a mathematical calculation of a slightly curved line over two axis. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The 2nd order regression will generate a coefficient of determination (COD or r^2) that is a measure of the "goodness of fit" of the quadratic curvature the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r^2 must be greater than or equal to 0.99.

Selectivity: The ability to analyze, distinguish, and determine a specific analyte or parameter from another component that may be a potential interferent or that may behave similarly to the target analyte or parameter within the measurement system. (TNI)

Sensitivity: The capability of a method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. (TNI)

Spike: A known mass of target analyte added to a blank, sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of standard setting and meets the approval requirements of standard adoption organizations procedures and policies. (TNI)

Standard Operating Procedures (SOPs): A written document which details the method for an operation, analysis, or action, with thoroughly prescribed techniques and steps. SOPs are officially approved as the methods for performing certain routine or repetitive tasks. (TNI)

Storage Blank: A blank matrix stored with field samples of a similar matrix (volatiles only) that measures storage contribution to any source of contamination.

Surrogate: A substance with properties that mimic the analyte of interest. It is unlikely to be found in environment samples and is added to them for quality control purposes.

Surrogate compounds must be added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. Poor surrogate recovery may indicate a problem with sample composition and shall be reported to the client whose sample produced poor recovery. (QAMS)

Systems Audit (also Technical Systems Audit): A thorough, systematic, qualitative on-site assessment of the facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a total measurement system. (EPA-QAD)

Technical Manager: A member of the staff of an environmental laboratory who exercises actual day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results

Technology: A specific arrangement of analytical instruments, detection systems, and/or preparation techniques.

Traceability: The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project. (TNI)

Trip Blank: A blank matrix placed in a sealed container at the laboratory that is shipped, held unopened in the field, and returned to the laboratory in the shipping container with the field samples.

Uncertainty: A parameter associated with the result of a measurement that characterizes the dispersion of the value that could reasonably be attributed to the measured value.

Acronyms:

CAR – Corrective Action Report

CCV – Continuing Calibration Verification

CF – Calibration Factor

CFR – Code of Federal Regulations

COC – Chain of Custody

DOC – Demonstration of Capability

DQO – Data Quality Objectives

DUP - Duplicate

EHS – Environment, Health and Safety

EPA – Environmental Protection Agency

GC - Gas Chromatography

GC/MS - Gas Chromatography/Mass Spectrometry

HPLC - High Performance Liquid Chromatography

ICP - Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP/MS – ICP/Mass Spectrometry
ICV – Initial Calibration Verification
IDL – Instrument Detection Limit
IH – Industrial Hygiene
IS – Internal Standard
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LIMS – Laboratory Information Management System
LOD – Limit of Detection
LOQ – Limit of Quantitation
MDL – Method Detection Limit
MDLCK – MDL Check Standard
MDLV – MDL Verification Check Standard
MRL – Method Reporting Limit Check Standard
MS – Matrix Spike
MSD – Matrix Spike Duplicate
SDS - Safety Data Sheet
NELAP - National Environmental Laboratory Accreditation Program
PT – Performance Testing
TNI – The NELAC Institute
QAM – Quality Assurance Manual
QA/QC – Quality Assurance / Quality Control
QAPP – Quality Assurance Project Plan
RF – Response Factor
RPD – Relative Percent Difference
RSD – Relative Standard Deviation
SD – Standard Deviation
SOP – Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatiles
VOC – Volatile Organic Compound

Appendix 6. Analytical Method References

Reference methods include:

- *HASL-300 28th Edition, Environmental Measurements Laboratory (EML), 1997.*
- *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fourth Edition, EPA/600/4-90/027F, August 1993.*
- *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA-821-R-02-012, October 2002.*
- *Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act; Analysis and Sampling Procedures; 40CFR Part 136 as amended by Method Update Rule; August 28, 2017.*
- *Methods for Chemical Analysis of Water and Wastes, EPA 600 (4-79-020), 1983.*
- *Methods for the Determination of Inorganic Substances in Environmental Samples, EPA-600/R-93/100, August 1993.*
- *Methods for the Determination of Metals in Environmental Samples, EPA/600/4-91/010, June 1991. Supplement I: EPA-600/R-94/111, May 1994.*
- *Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991, Supplement I, EPA-600-4-90-020, July 1990, Supplement II, EPA-600/R-92-129, August 1992. Supplement III EPA/600/R-95/131 - August 1995 (EPA 500 Series) (EPA 500 Series methods)*
- *Technical Notes on Drinking Water Methods, EPA-600/R94-173, October 1994*
- *NIOSH Manual of Analytical Methods, 4th ed., August 1994.*
- *Statement of Work for Inorganics & Organics Analysis, SOM and ISM, current versions, USEPA Contract Laboratory Program Multi-media, Multi-concentration.*
- *Standard Methods for the Examination of Water and Wastewater, 18th/19th /20th/ on-line edition; Eaton, A.D. Clesceri, L.S. Greenberg, A.E. Eds; American Water Works Association, Water Pollution Control Federation, American Public Health Association: Washington, D.C.*
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846), Third Edition, September 1986, Final Update I, July 1992, Final Update IIA, August 1993, Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996; Final Update IV, January 2008; Final Update V, August 2015.*
- *Annual Book of ASTM Standards, American Society for Testing & Materials (ASTM), Philadelphia, PA.*
- *National Status and Trends Program, National Oceanographic and Atmospheric Administration, Volume I-IV, 1985-1994.*
- *Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005)*
- *Code of Federal Regulations (CFR) 40, Parts 136, 141, 172, 173, 178, 179 and 261*

Appendix B-3

Example Chain of Custody

Eurofins Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Phone (912) 354-7858 Phone (912) 352-0165

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler:	Lab PM: Fuller, David	Carrier Tracking No(s):	COC No:
Client Contact: Jason Hughes	Phone:	E-Mail: David.Fuller@et.eurofinsus.com	State of Origin: AL	Page: Page of
Company: ARCADIS US Inc	PWSID:			Job #:

Address: 1143 1st Ave South, Suite 109	Due Date Requested:
City: Birmingham	TAT Requested (days):
State, Zip: AL, 35233	Compliance Project: Δ Yes Δ No
Phone: 205-930-5965(Tel)	Lab Project #: (DO NOT REMOVE) 68030525
Email: jason.hughes@arcadis.com	PO #: 30212308
Project Name: Nouryon - Axis, AL	Project #:
Site:	SSOW#:

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D - VOCs - Water (CCL4, CS2)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A		

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Arcadis U.S., Inc.
1143 1st Avenue South, Suite 109
Birmingham
Alabama 35233
Phone: 205 930 5700
Fax: 205 930 5707
www.arcadis.com

Appendix C

AOC A Corrective Measures Implementation Plan

AOC A Corrective Measures Implementation Plan

LeMoyne Site
13440 Highway 43 North
Axis, Alabama 36505
USEPA ID #ALD008161176

February 29, 2024

AOC A Corrective Measures Implementation Plan

LeMoyne Site

Axis, Mobile County, Alabama

USEPA ID #ALD008161176

February 29, 2024

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Figure C-1 AOC A Location and Monitoring Well System
Figure C-2 AOC A Proposed Soil Vapor Extraction, Program, and Monitoring Wells Layout

Appendix

Appendix C-1 AOC A Soil Vapor Extraction System Design

Acronyms and Abbreviations

ADEM	Alabama Department of Environmental Management
AEIRG	Alabama Environmental Investigation and Remediation Guidance
Arcadis	Arcadis U.S., Inc.
AOC	Area of Concern
bgs	below ground surface
BKG	Background (well)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMIP	Corrective Measures Implementation Plan
COC	constituent of concern
CMS	Corrective Measures Study
DO	dissolved oxygen
DPT	direct push technology
ft	foot/feet
gpm	gallon per minute
GWPS	Groundwater Protection Standard
HSA	hollow-stem auger
IDW	investigation-derived waste
in. WC	inch of water column
in-Hg	inch of mercury
lb	pound
µg/L	microgram per liter
mg/L	milligram per liter
OM&M	operation, maintenance, and monitoring
PID	photoionization detector
ppm	part per million
PRG	Program (well)
psi	pound per square inch
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act

RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
ROI	radius of influence
scfm	standard cubic feet per minute
SVE	soil vapor extraction
TOC	total organic carbon
EPA	United States Environmental Protection Agency
VOC	volatile organic compound

1 Introduction

This document presents the Corrective Measures Implementation Plan (CMIP) for Area of Concern (AOC) A at the Nouryon Chemicals, LLC LeMoyne Plant (Nouryon) located in Axis, Mobile County, Alabama. This CMIP was developed through completion of a Corrective Measures Study (CMS) from June 2023 through December 2023 and includes enhancement of the Soil Vapor Extraction (SVE) technology that is currently utilized for treatment of carbon disulfide in the vadose zone at AOC A.

Carbon disulfide is a highly volatile compound, so SVE technology is the most effective remedial strategy to address remaining carbon disulfide mass within the AOC A soil. As documented in the January 2024 SVE Pilot Test Report provided to ADEM in the second quarterly CMS update (Arcadis, 2024a), the tight clay soils observed within the vadose zone at AOC A significantly limited the attainable SVE air flowrates within soils and would therefore limit the effectiveness of the SVE technology under current conditions and system configuration.

To address the challenges presented by the lithology, the SVE system has been redesigned and hydraulic fracture borings will be installed at the locations of the proposed SVE wells. This technique has been successfully utilized at sites with similar lithology in the area of the Mobile River valley. The hydraulic fracture borings will target a depth range of approximately 15 to 30 ft below land surface (ft bls) and will serve to increase the permeability of the vadose zone soils, subsequently increasing achievable vapor recovery rates at AOC A in the vicinity of the borings (and proposed SVE wells). An AOC A Site Layout showing the permit monitoring well system is provided as **Figure C-1**.

2 Corrective Measures Objectives

Remediation of soil and groundwater at AOC A is required by both the corrective measures component of the Alabama Hazardous Waste Management and Minimization Act (AHWMMA) permit number ALD 008 161 176 and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Consent Decree dated April 25, 1990. A detailed description of the site's regulatory requirements as they pertain to corrective action at AOC A is provided in the April 2019 CMIP (Sovereign, 2019) which is incorporated herein by reference.

The major goals of corrective measure for AOC A are three-fold and include:

- remediate soil to the extent necessary to eliminate a source of leaching to groundwater (carbon disulfide in soil) at AOC A;
- remediate soil to the United States Environmental Protection Agency (EPA) "Industrial Soil Regional Screening Level (RSL)" at AOC A; and,
- remediate groundwater to achieve the CERCLA Record of Decision (ROD) groundwater cleanup standard for carbon disulfide.

Due to the conditions of the ROD and institutional controls in place, cleanup to achieve unrestricted land use is not a goal of the corrective measures for AOC A, even though the corrective measure may result in achievement of unrestricted land use status.

3 Background

AOC A is the “Carbon Disulfide Transfer Tanks Area” and located in the southwest portion of the main production area of the LeMoyne Plant manufacturing area. This unit consists of a below grade concrete vault that is approximately 70 feet (ft) wide by 70 ft long and 10.5 ft deep (from grade). The concrete walls of the structure extend 2.5 ft above grade resulting in a total wall height of 13 ft. Twelve cylindrical carbon disulfide tanks were formerly located within the vault in a horizontal orientation on concrete saddles. When operational, the unit was filled with water to prevent any release of carbon disulfide from coming in contact with air.

The United States Environmental Protection Agency (EPA) 1992 RCRA Facility Assessment (RFA) recommended confirmatory sampling for AOC A based on observed staining and stressed vegetation during the 1991 Visual Site Inspection (VSI). The south side of the former tank vault is both topographically and hydraulically downgradient of this feature. Therefore, in accordance with the Confirmatory Sampling Workplan, two soil borings were installed along the south wall of the former tank vault on March 24, 2004. Subsurface soil samples contained concentrations of carbon disulfide that exceeded the Alabama Department of Environmental Management (ADEM) Migration to Ground Water Preliminary Screening Value (PSV) of 32 milligrams per kilogram (mg/kg). Based on the results of confirmatory sampling, a RCRA Facility Investigation (RFI) was recommended for AOC A in the October 2004 Confirmatory Sampling Report.

The RFI of AOC A commenced on March 30, 2005. Stormwater was pumped from the vault and the interior surfaces were cleaned for inspection. The RFI of AOC A included collection and analysis of soil samples to horizontally and vertically delineate carbon disulfide detected in subsurface soil on the south/southeast (downgradient) side of the vault identified during the March 2004 confirmatory sampling event. Soil sampling events were conducted on March 30, 2005 and July 13, 2005. The RFI also included evaluation of groundwater quality in the area of AOC A. The results of the RFI indicated that vadose zone soil on the southern side of AOC A contained concentrations of carbon disulfide that exceeded the Migration to Groundwater PSV of 32 mg/kg. RFI sampling results indicated that affected soil extends from an approximate depth of 11 ft below grade to the surface of the water table at approximately 30 ft below grade. Additionally, the concentration of carbon disulfide in groundwater in the area of AOC A exceeded the groundwater cleanup goal for carbon disulfide (per the EPA Record of Decision) of 700 micrograms per liter (µg/L). Based on the results of the RFI, the September 23, 2005 RFI Report recommended development of a CMIP for AOC A.

A CMIP for AOC A was submitted and approved by ADEM in 2006. Implementation of corrective measures at AOC A commenced on April 28, 2008. The approved corrective measure consisted of in-situ chemical oxidation by a modified Fenton's Reaction (injection of acidified ferrous sulfate, potable water and hydrogen peroxide [<7%]). In June 2011, the remedial approach was supplemented by addition of SVE. Though the SVE process was successful in recovering vapor phase carbon disulfide, the process was inefficient due to limitations from use of converted oxidant injection wells. These limitations included well design, well location/frequency, and prior use of the wells for oxidant injection (possible geochemical mineral fouling and/or short-circuiting). In 2018, the permit was modified to include a revised CMIP for enhanced SVE. The modified SVE system operated almost continuously from 2019 to 2022 until damage from a lightning strike in late 2022.

In a letter dated April 3, 2023, ADEM requested a repair plan for the damaged SVE system. In a response dated May 22, 2023, Nouryon asked ADEM for an extension to the due date for a revised remedial plan to February 2024 to coincide with the post-closure permit renewal application and allow for completion of a CMS. ADEM approved submittal of the revised remedial plan with the renewal application and requested Nouryon provide quarterly progress updates to the ADEM for status of the AOC A CMS and remedial design. The CMS was

completed from June 2023 through December 2023 with quarterly CMS updates to ADEM (Arcadis, 2023 and 2024a).

4 Geology and Hydrogeology

In general, the stratigraphy in the process areas is typified by a thin layer of fill (soil) material. Under the fill material, natural clay soils are present to depths ranging from approximately 15 to 20 feet below land surface (bls). This clay layer grades downward into sand with minor amounts of silt and clay and occasional lenses of clay and silty clay. Review of historical boring logs indicates that the sand ranges from fine to coarse and is poorly to well sorted. A general trend of increasing grain size with increasing depth has been observed at the site. The base of the alluvial sand layer has high percentages of coarse sand and gravel. A dense blue clay underlies the sand at depths up to 130 ft or more below grade.

The shallowest aquifer beneath the site occurs within the basal sand and gravel beds of the alluvium deposit. This aquifer is used by Nouryon as a source of process water from onsite production wells. The aquifer can be locally semi-confined in the western portion of the site but is generally characterized by unconfined water table conditions in the plant area. Saturated thickness ranges from about 65 to 75 feet, but water production is primarily from the 15- to 25-feet thick gravelly sand present at the base of the aquifer (i.e. above the basal clay). The transmissivity of the basal portion of the aquifer is estimated to be about 91,000 gallons per day (gpd) per foot. Historically, significant industrial usage of groundwater on property south of the Nouryon plant (former Acordis facility, now owned by Mobile County) caused a gradient toward the south. This southerly gradient was enhanced when an intercept well system along the plant's southern property boundary was activated in 1980. Cessation of industrial groundwater usage at the former Acordis facility in 2001 has resulted in a change of groundwater flow direction toward the east and the Mobile River. However, operation of intercept wells continues to exert hydraulic control over much of the southern portion of the plant process area.

Currently the Nouryon facility has 109 monitoring wells and piezometers, many of which are used for collection of water level measurements. Groundwater samples are collected from select wells for operation and maintenance of Operable Unit 1 and Operable Unit 2 under EPA decision documents. Seven intercept wells operated at the site to maintain hydraulic control and treatment of site groundwater. The intercept wells were installed as part of the groundwater remediation program (under CERCLA) to contain a plume of carbon disulfide and carbon tetrachloride. These wells are installed into the alluvial aquifer beneath the site. Given the change in groundwater flow direction mentioned above [and/or achievement of ROD groundwater criteria], certain intercept wells became obsolete [and are no longer in operation including IW-2, IW-3, IW-4, IW-6, and IW-7]. Two intercept wells (IW-5 and IW-6R) are currently operating in accordance with decision documents between Nouryon and EPA. IW-6R operates in the same general area as AOC A (located at AOC M) and captures groundwater under the main plant area to include AOC A. IW-5 operates at the former Halby portion of Operable Unit 2 in the north portion of the LeMoyne Plant.

5 Exposure Pathway Assessment

Exposure pathway assessment is the process of measuring or estimating the intensity, frequency, and duration of human exposure to substances present in the environment. The purpose of an exposure assessment is to identify and evaluate the ways in which an individual or population may be exposed to a constituent. The process includes characterization of the physical environment, identification of exposure pathways (including migration

pathways, exposure points, and exposure routes), and identification of potentially exposed individuals and populations. An exposure pathway consists of the following four elements which all must be present for exposure:

- A source and mechanism of constituent release to the environment.
- An environmental transport medium for the released constituent.
- A point of potential contact by the receptor with the medium containing the constituent (the exposure point).
- A route of exposure to the receptor at the exposure point (i.e., ingestion, inhalation, or dermal contact).

Based on these elements, the following exposure pathways are incomplete:

- Soil/direct contact –carbon disulfide is present in soil at concentrations that exceed the Industrial Regional Screening Level (RSL of 350 mg/kg). However, soil that contains carbon disulfide in excess of the RSL is present at depths greater than 12 feet below grade. Currently, there is no scenario by which plant workers would come into contact with soil at such depths.
- Surface water/sediment –carbon disulfide in soil is present at depths that preclude erosion and transport to surface water bodies and associated sediments. Additionally, since the depth to groundwater is generally 25-plus feet below grade, groundwater with carbon disulfide concentration is present at depths that preclude migration to surface water. More specifically, groundwater is too deep to discharge to surface water.
- Vapor Intrusion or Inhalation–given the depth and limited horizontal extent of carbon disulfide in soil and groundwater at AOC A and the distance to the nearest occupied structures, there is no completed pathway for vapor intrusion.
- Groundwater –the site's existing land use controls, which include a well restriction that prevents installation of potable supply wells at the plant and the Mobile County LeMoyne Industrial Park, renders the groundwater exposure pathway incomplete. The plant's process supply wells are unaffected by the plume of carbon disulfide. Since the plume is attenuating in both extent and concentration and the plant's industrial supply wells are located upgradient of the carbon disulfide plume, future migration of contaminated groundwater to the plant's supply wells is unlikely. Additionally, intercept well IW-6R continues to hydraulically control the carbon disulfide plume in the shallow alluvial aquifer.

Given the above analysis, the goals of the corrective measure for AOC A are to remediate the soil to remove the soil leaching to groundwater pathway and also protect future construction workers (through remediation and health and safety planning), if trenching or deep excavation is completed in the future at AOC A.

6 Soil Vapor Extraction

Due to the volatile nature of carbon disulfide, SVE technology has been identified as an effective remedial strategy to address remaining carbon disulfide impacts within the AOC A soils. As documented in the January 2024 SVE Pilot Test Report provided to ADEM in the second quarterly CMS update (Arcadis, 2024), the tight clay soils observed within the vadose zone at AOC A significantly limited the attainable SVE air flowrates and would therefore limit the effectiveness of the SVE technology under current conditions.

To address the challenges presented by the lithology, hydraulic fracture borings will be installed at the locations of the proposed SVE wells. This technique has been successfully utilized at sites with similar lithology in the area of the Mobile River valley. The hydraulic fracture borings will target a depth range of approximately 15 to 30 ft below

land surface (ft bls) and will serve to increase the permeability of the vadose zone soils, subsequently increasing achievable vapor recovery rates in the vicinity of the borings (and proposed SVE wells).

New SVE wells will then be installed by over-drilling the hydraulic fracture boring locations. Following the installation of the new SVE wells, a second SVE pilot test will be performed to determine the SVE system parameters necessary to finalize the full-scale system design.

6.1 Hydraulic Fracture Borings

As stated previously, results of the September 2023 pilot test showed very limited vapor flow and vacuum influence when utilizing the existing SVE well network. Based on these pilot test results, use of the existing SVE well network for remediation of the AOC A vadose zone was not considered feasible. To improve vadose zone permeability, hydraulic fracture borings will be installed within the AOC A target area. The borings will be installed with a direct push technology (DPT) rig, using the top-down injection technique. Hydraulic fracturing will be performed at seven boring locations and will involve creating sand-filled fractures within the targeted depth range (approximately 15 to 30 ft bls). The fractures within each boring will be spaced approximately 5 ft vertically, with each boring receiving 3 to 5 fractures per location.

Upon the completion of the hydraulic fracture borings, the locations will be over-drilled to facilitate installation of proposed SVE wells. Proposed locations of the hydraulic fracture borings are depicted on **Appendix C-1, Drawing C-1** and **Figure C-2**, as SVE-1 through SVE-7.

6.2 Well Installations

The proposed locations of the remedial infrastructure associated with the corrective measures are shown on **Appendix C-1, Drawing C-2.** The SVE network will consist of seven SVE wells and a SVE performance monitoring network consisting of four proposed performance monitoring (PM) wells (PM-1 through PM-4) and one existing permit monitoring well (MW-30). SVE wells will be installed by over-drilling the hydraulic fracture borings described in Section 3.1 above, and performance monitoring wells (PM-1 through PM-4) will be installed using the hollow-stem auger (HSA) drilling technique in accordance with Appendix B of the Alabama Environmental Investigation and Remediation Guidance (AEIRG).

6.2.1 SVE Wells

SVE wells (designated SVE-1 through SVE-7) will be constructed of 2-inch diameter, Schedule 5, 304 stainless-steel with 0.01-inch screens; risers will also be constructed of Schedule 5, 304 stainless steel. Wells will be completed with a 3-ft stick-up and an 18-inch x 18-inch x 4-inch in concrete pad.

The sand pack around the screen will be 20/30-sand filter pack to approximately 6 inches above the top of screen, a 6-inch fine sand seal (30/65-sand) will be installed on top the 20/30-sand pack. A 2-ft bentonite seal will be installed a top the fine sand seal and a cement seal will be installed to the surface. SVE wells will be equipped with a pressure gauge and a gate valve for flow control at the wellhead. Individual SVE well flowrates will be measured at the wellhead using a pitot tube. Construction details for SVE wells are shown on **Appendix C-1, Drawing C-5** and SVE well head completion details are shown on **Appendix C-1, Drawing C-4**.

6.2.2 SVE Performance Wells

The proposed PM wells will be constructed of 2-inch diameter schedule 40 PVC casing and 0.010-inch slotted well screen. Well screens will be installed at approximately 15 to 30 ft bls; however, it should be noted that final screen intervals will be determined based upon lithologic field observations. A 20/30 sand pack will be installed around and 1-ft above the well screen and the remainder of the well annulus will be grouted to the surface. PM wells will be completed with a 2-ft x 2-ft concrete pad with 8-inch steel manhole.

6.3 SVE System Design

An SVE system will be utilized as the primary corrective measure for AOC A. Air will be extracted from seven SVE wells operating continuously.

Based on professional experience at similar sites, each SVE well is expected to operate at a design flow rate of approximately 10 to 30 standard cubic feet per minute (scfm) per well which is expected to result in an attainable radius of influence (ROI) of approximately 15 ft. Operating well head vacuum is expected to range between 9 to 17 inches of mercury (in-Hg). SVE wells are spaced on 25 ft centers to provide approximately 5-feet overlap of ROI between wells.

As stated previously, a second pilot test will be performed following the installation of the new SVE wells. The pilot test will be performed to determine optimal operating parameters (pressures, flowrates, etc.), and identify the specifications for the optimal equipment components to be utilized at AOC A.

6.3.1 SVE Piping and Equipment

The SVE system will utilize a blower to provide vacuum to the seven SVE wells. The blower will be capable of providing a design flow range of approximately 100 to 300 scfm at a design pressure range of approximately 10 to 20 in-Hg.

Inside the system equipment container, each individual SVE well will have a vacuum gauge, gate valve, and shut-off valve located on the manifold legs. The piping layout for the SVE system is provided on **Appendix C-1, Drawing C-3**. The SVE system will utilize individual 2-inch carbon steel conveyance pipelines from the equipment container to individual SVE wells. SVE conveyance pipelines will be installed to slope towards the individual SVE well.

6.3.2 SVE Condensate Water Recovery and Disposal

Water collected in the air/water separator will be pumped to a holding tank located inside of the system equipment container. Water recovered during operation of the SVE system will be discharged to the existing facility water treatment system for treatment and discharge in accordance with the National Pollutant and Discharge Elimination System (NPDES) permit. Based on operational experience and pilot test results, the collection of significant amounts of water during operation of the SVE system is not expected.

6.3.3 SVE System Air Treatment

Air treatment will be performed using potassium permanganate impregnated zeolite installed within vapor phase air treatment vessels. Based on professional experience with treatment of carbon disulfide vapors at similar Sites,

it is anticipated that two 2,000 pound (lb) vessels will be installed in series to provide treatment of recovered vapors. Based on operational experience in Alabama with similar sized systems, an ADEM air permit likely will not be required; however, ADEM Form 448 (Air Division Remediation Approval Form) will be submitted to the ADEM for review and approval.

The treatment vessels will remain at AOC A for at least 90 days and with vapor treatment continuing until analytical sampling of the influent air stream (prior to treatment) indicates that air emissions of total hazardous air pollutants (HAPs) are consistently below modeled limits or permit requirements. A discharge stack of at least 15 ft in height will be installed away from potential receptors. Spent treatment media will be profiled and disposed of off-site at a permitted facility, as required.

6.3.4 SVE Control Systems

To maintain maximum runtime, programmable-logic controllers (PLC) will be used to provide system monitoring and control. A computer-based human machine interface (HMI) running secured control software will be connected to the on-Site PLC, and will allow the user to perform the following actions:

- start and stop the system automatically based on alarm conditions;
- reset alarms;
- view the alarm history;
- start and stop the SVE blower; and
- view system data, such as pressures and air flows.

The control systems will be equipped with a high-temperature alarm, low vacuum alarm, and high level alarm that will shut down the blower if the system is operating outside of preset values. Additional alarms, such as motor failure to start will also be used to shut down the system, if required.

Hour and amperage meters will be installed for the major components, to provide analysis of system runtime.

The HMI will utilize an internet connection to allow for remote control and monitoring of the systems. The HMI will also notify the operator through email or text message if a failure/alarm condition occurs.

The control panels will be located inside of the equipment container and the main electrical disconnect will be located outside of the container so that it is easily accessible. The control panels will be UL-certified and housed in properly rated National Electrical Manufacturers Association (NEMA) enclosures.

6.4 SVE System Construction and Implementation

An Alabama-licensed drilling contractor will install all SVE wells and performance monitoring wells. The drilling contractor will be responsible for obtaining any required well construction permits. Arcadis will obtain any electrical, mechanical, structural, and/or building permits required by Nouryon and the local municipality, county, and/or State of Alabama to perform the work. Arcadis maintains licensing as an Alabama Environmental Remediation Contractor (EV-S) through the Alabama Licensing Board of General Contractors (License number 45391).

6.5 SVE System Startup

Prior to the SVE system startup, the SVE system will be commissioned. During commissioning, the system will be tested to confirm that all equipment operates as intended. Motors will be checked for rotation, system instruments will be checked for proper operation, and all system interlocks and alarms will be tested. Initial operation of equipment will be conducted in accordance with the manufacturer's recommendations.

Following system commissioning, SVE system startup activities will commence and take place over a three-day period. The following activities will be conducted at least daily during startup:

- System compound readings including electric meter reading, compressor operating hours, flow, temperature and pressure throughout the system;
- Flow rate and pressure at each SVE well will be recorded and adjusted;
- Depth to water, dissolved oxygen (DO) concentration, pressure and observations will be recorded from performance monitoring wells including PM-1 through PM-4 and existing monitoring well MW-30;
- Headspace monitoring will be conducted with a photoionization detector (PID) for performance monitoring wells with an exposed screen interval to the Vadose Zone (PM-1 through PM-4);
- Volume of recovered fluids from the SVE system;
- Monitoring of SVE system influent, treatment midpoint, and effluent (discharge) utilizing a PID; and
- Evaluate noise caused from the remediation system to ensure that noise abatement devices are functioning properly.

During system startup, fine tuning and adjustments (e.g., SVE air flow rates, operating time cycles) will be made to the systems as needed, based on the data collected. These fine-tuning adjustments are intended to maximize the performance of the remediation system.

Vapor analytical samples will be collected once during startup from the SVE system influent, air treatment midpoint and effluent (discharge) and analyzed for VOCs using EPA Method TO-15.

If condensate or water is recovered in the SVE system air water separator during startup it will be sampled for VOCs by EPA Method 8260B for the development of a waste profile.

6.6 SVE System Operation, Maintenance, and Monitoring

Arcadis personnel will conduct Operation, Maintenance, and Monitoring (OM&M) of the proposed remediation system as required to keep the equipment operating efficiently. OM&M events will be conducted weekly for the first 3 weeks of operation following startup and monthly thereafter. During each OM&M event, personnel will inspect equipment and conduct routine preventive maintenance. Quarterly groundwater monitoring of the permit wells system will continue in accordance with the AOC A Groundwater Monitoring Plan. Monitoring data and system adjustments will be made, as needed.

The following activities will be performed during the weekly and monthly OM&M events:

- System compound readings including electric meter reading, blower operating hours, flow, temperature, and pressure throughout the system;
- Flow rate and pressure at each SVE well will be recorded;

- Depth to water, DO concentration, pressure and observations will be recorded from performance monitoring wells including PM-1 through PM-4 and existing monitoring well MW-30;
- Headspace monitoring will be conducted with a PID for performance monitoring wells with an exposed screen interval to the Vadose Zone (PM-1 through PM-4) for the first quarter; after data is collected selected wells and ongoing frequency will be evaluated;
- Volume of recovered fluids from the SVE system;
- Monitoring of SVE system influent, treatment midpoint, and effluent (discharge) utilizing a PID;
- Collection of vapor samples from the SVE system influent, treatment midpoint and effluent (discharge) for analysis by EPA Method TO-15 for VOCs; and
- Preventative and corrective maintenance as required.

During OM&M visits, fine tuning and adjustments will be made to the system as needed, based on the data collected. The field data collected during each event, modifications to the operational profile of the remedial system, and repairs to the system will be provided on a Site-specific OM&M checklist.

Analytical results of the SVE system influent, air treatment midpoint and effluent (discharge) will be utilized to determine mass recovery and condition of the air treatment vessels (i.e. if media replacement is required). Based on analytical data collected during the first quarter of operation, a reduction to a quarterly sampling frequency may be requested. Further based on analytical data collected, long-term operation of the air treatment units may not be required to meet discharge limits for air. If analytical data collected from the SVE system influent show concentrations of HAPs below discharge limits for three consecutive months, removal of the air treatment units will be requested at that time.

7 Schedule and Reporting

The following schedule is presented tentatively for completion of AOC A construction pending ADEM approval. This schedule assumes work will begin on during the second quarter of 2024 following submittal of this CMIP. ADEM will be notified at least two weeks prior to implementing the field activities.

Month & Year	SVE	RCRA Permit Action
February 2024	CMIP Submittal	ADEM CMIP Review
March – April 2024	Design, and procurement of SVE equipment	Quarterly Update to ADEM
May 2024	Hydraulic Fracture Wells and SVE well installation	Notify ADEM of Construction (2 weeks)
June – July 2024	Construction & installation of infrastructure and SVE equipment	Quarterly Update to ADEM
August 2024	SVE fully operational	Permit Renewal Issued
September 2024 – completion of corrective measure	Operate and maintain SVE; effectiveness/ performance monitoring	CMIP Reporting to ADEM in accordance with Permit requirements

8 Cost Estimate

The Corrective Action Estimate is provided **Appendix A-6** of the Post-Closure Permit Application Part B to include the cost estimate summary and financial assurance. SVE will remain as the corrective measures for AOC A. Additionally, the operation, maintenance, and monitoring programs and schedules remain unchanged. Therefore, the 2023 cost estimates and financial assurance remain. Adjustments to the cost estimate and financial assurance are expected in mid-2024 to account for the previous year's annual average consumer price index (i.e. adjustment for annual inflation as published by the US Bureau of Statistics and implementation of the AOC-A CMIP.

9 References

ADEM. 2017. Alabama Environmental Investigation and Remediation Guidance Manual (Revised). 116 p.

Arcadis. 2023. First Quarterly Corrective Measures Study Update. October 15.

Arcadis. 2024a. Second Quarterly Corrective Measures Study update. January 15.

Arcadis. 2024b. Preliminary Information Needs Response. Revised February 7.

Sovereign. 2019. Corrective Measures Implementation Report (Construction Complete Report) Remediation for AOC A –Former Carbon Disulfide Transfer Tank Area Nouryon Functional Chemicals LLC – LeMoyne Plant. Prepared by Sovereign Consulting, Inc. September 2019.

EPA Fifth Five-Year Review Report for Stauffer Chemical Co. (Cold Creek Plant) and Stauffer Chemical Co. (LeMoyne Plant) Superfund Sites Mobile County Alabama. Prepared by U.S. EPA Region 4. September 30, 2021.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008161176 OU-1. Prepared by U.S. EPA Region 4. September 27, 1989.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008161176 OU-3. Prepared by U.S. EPA Region 4. September 17, 1993.

EPA Record of Decision: Stauffer Chemical Co. (LeMoyne Plant) EPA ID: ALD008161176 OU-2. Prepared by U.S. EPA Region 4. March 18, 1999.

Final RCRA Facility Assessment for Akzo Nobel Functional Chemicals, LLC. Prepared by the ADEM. September 24, 2014.

RCRA Part B Post-Closure Permit Visual Site Inspection Response. Prepared by Akzo Nobel Functional Chemicals, LLC. December 19, 2013.

Operations and Maintenance Plan for OU-1 Groundwater Operable Unit. Nouryon Chemicals, LLC. LeMoyne Plant. Revised March 2020.

Figures

LEGEND

- DEEP MONITORING WELL
- SHALLOW MONITORING WELL
- INTERCEPT WELL
- FENCE
- RAILROAD
- STREAM
- WATER BODY
- SOLID WASTE MANAGEMENT UNIT
- BUILDING
- TANK

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   SWMU = SOLID WASTE MANAGEMENT UNIT
3. PROJECTION: NAD 1983 STATE PLANE ALABAMA WEST, US FEET
4. DATA SOURCES:
   NOURYON FUNCTIONAL CHEMICALS, LLC. - SITE LAYOUT, WELL NETWORK

0 120 240

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC.
LEMOYNE PLANT
AXIS, ALABAMA
AOC A CORRECTIVE MEASURES IMPLEMENTATION PLAN

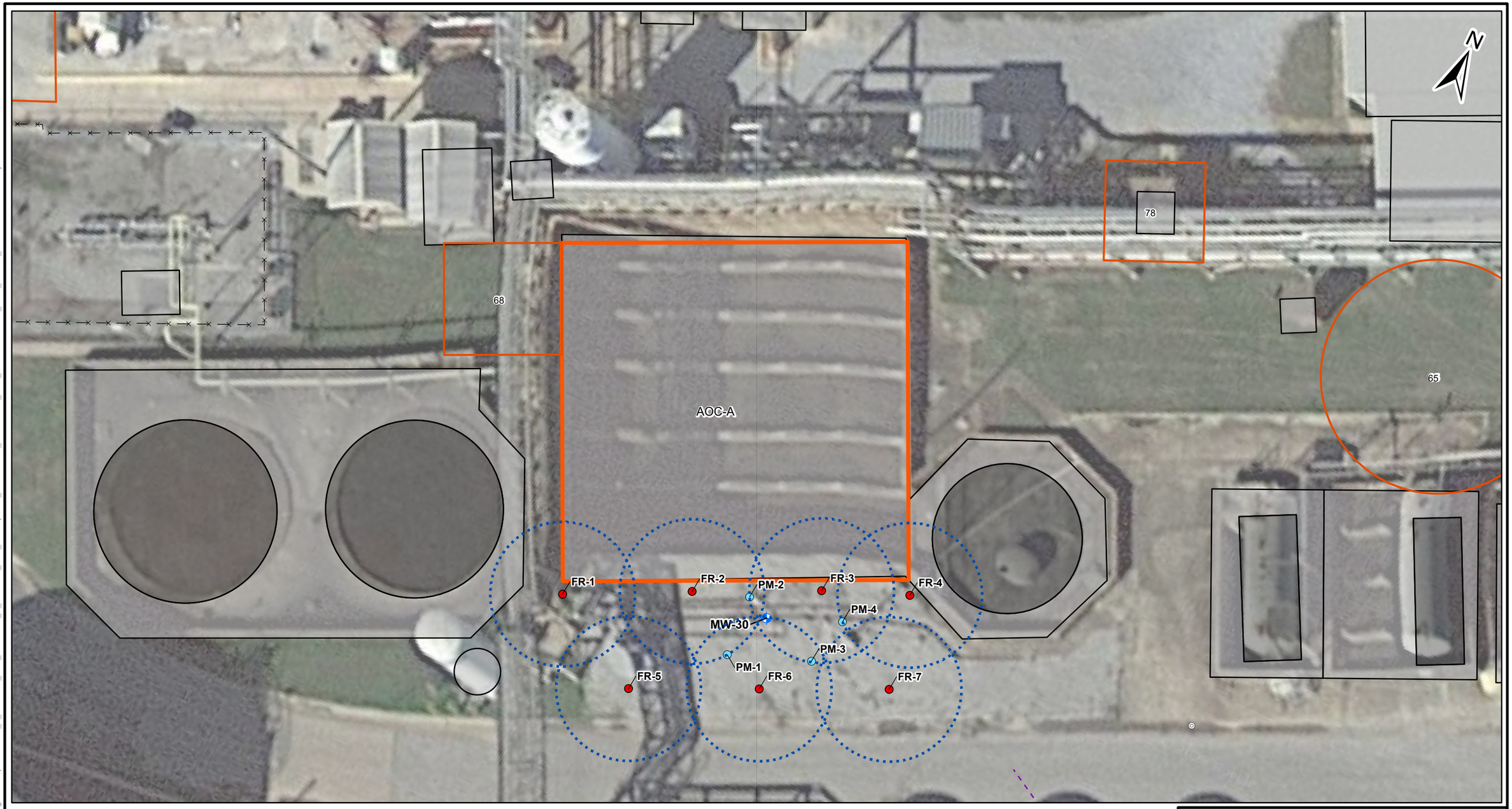
AOC A LOCATION

ARCADIS

FIGURE
C-1

Basemap Source: Esri, NASA, NGA, USGS, FEMA, Google, City of Mobile GIS Department, CONANP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS, accessed 1/31/2024.

Path: T:_EN\WNouryon\LeMoynePlant_AL\Pro_Figures\RCRA_Permit_Renewal_Applications\RCRA_Permit_Renewal_Application_2023\RCRA_Permit_Renewal_Application_2023_permitted_units.aprx\F2_AOC_A_AND_M_LAYOUT Last Saved By: ACarlone 1/31/2024



LEGEND

- PROPOSED FRACTURE WELL
- PROPOSED PERFORMANCE MONITORING WELL
- SHALLOW MONITORING WELL
- MANHOLE
- FENCE
- RAILROAD
- PROCESS DRAIN LINES
- AOC-A
- OTHER SWMU
- BUILDING
- TANK
- ESTIMATED FRACTURE EXTENT (15-FOOT RADIUS)

NOTES:

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AOC = AREA OF CONCERN
   ROI = RADIUS OF INFLUENCE
   SVE = SOIL VAPOR EXTRACTION
   SWMU = SOLID WASTE MANAGEMENT UNIT
3. PROJECTION: NAD 1983 STATE PLANE ALABAMA WEST, US FEET
4. DATA SOURCES:
   NOURYON FUNCTIONAL CHEMICALS, LLC. - SITE LAYOUT, WELL NETWORK

0 20 40

GRAPHIC SCALE IN FEET

NOURYON FUNCTIONAL CHEMICALS, LLC
.LEMOYNE PLANT
AXIS, ALABAMA
AOC A CORRECTIVE MEASURES IMPLEMENTATION PLAN

PERFORMANCE MONITORING AND FRACTURE WELL LAYOUT

ARCADIS

FIGURE
C-2

Path: T:_ENV\Nouryon\LeMoyne\Plant_AL\Pro_Figures\Proposals\AOC_A_Remedial_Plan_2023\AOC_A_Remedial_Plan_2023.aprx\Fx_PROPOSED_FRACTURE_AND_PERFORMANCE_MON_WELLS_LAYOUT Last Saved By: ACarlone 1/8/2024

Basemap Source: Esri, NASA, NGA, USGS, FEMA, Google, City of Mobile GIS Department, CONANP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS, accessed 1/8/2024.

Appendix C-1

Soil Vapor Extraction System Design

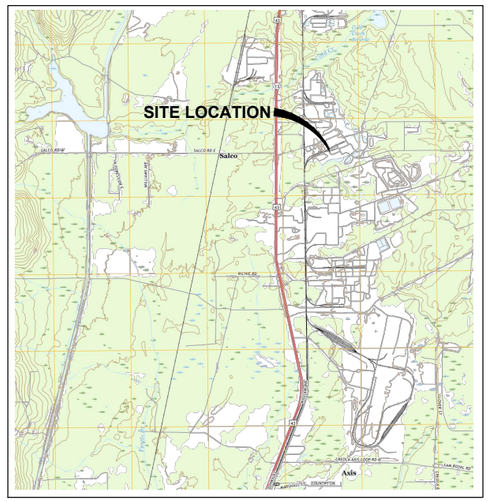
DESIGN DRAWINGS

SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

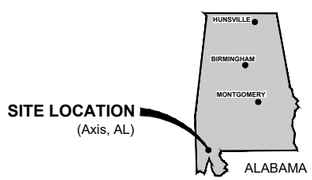
NOURYON FUNCTIONAL CHEMICALS, LLC
13440 U.S. HIGHWAY 43 NORTH
AXIS, MOBILE COUNTY, ALABAMA

FEBRUARY 2024

ARCADIS



LOCATION MAP
NOT TO SCALE



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G-2 GENERAL NOTES AND SPECIFICATIONS II

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C-2 SOIL VAPOR EXTRACTION (SVE) REMEDIATION SYSTEM LAYOUT
C-3 TRENCH SECTIONS & EROSION CONTROL DETAILS
C-4 SOIL VAPOR EXTRACTION WELLHEAD COMPLETION DETAILS
C-5 SOIL VAPOR EXTRACTION WELL DETAILS

MECHANICAL
M-1 MECHANICAL NOTES
M-2 MECHANICAL DETAILS I
M-3 MECHANICAL DETAILS II

CITY: BB, FL DIV/GROUP: EN DB: B.OLIVA LD: J.PERELLA PIC: PM: TM: LYR:ON=*;OFF=*REF*
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SURVEY LEGEND & ABBREVIATIONS:

- = CATCH BASIN
- = MANHOLE
- = LIGHT POLE
- = WATER METER
- = WATER VALVE
- = CATCH BASIN INLET
- = UTILITY POLE
- = RISER
- = FIRE HYDRANT
- = HANDHOLE
- = SIGN

- = 0.5' CURB
- = 2.00' CURB & GUTTER
- = CHAIN LINK FENCE
- I.D. = IDENTIFICATION
- EL. = ELEVATION
- INV. = INVERT
- A/C = AIR CONDITIONER
- SAN. = SANITARY
- P.R.M. = PERMANENT REFERENCE MONUMENT
- = CONCRETE

LEGEND

- VACUUM EXTRACTION CONVEYANCE PIPELINES
- PROPOSED SOIL VAPOR EXTRACTION WELL LOCATIONS

SITE HEALTH AND SAFETY

1. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL HEALTH AND SAFETY CODES AT ALL TIMES.
2. ALL EMPLOYEES OF THE CONTRACTOR WHO MAY COME IN CONTACT WITH CONTAMINATED SOIL OR GROUNDWATER SHALL BE CURRENT WITH THEIR 40-HOUR HAZWOPER TRAINING AND 8-HOUR REFRESHER.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PREPARE AND HAVE ON-SITE AT ALL TIMES A SITE-SPECIFIC HEALTH AND SAFETY PLAN (HASP) THAT COVERS THEIR EMPLOYEES.
4. THE CONTRACTOR SHALL ABIDE BY ARCADIS HASPS AND APPLICABLE TECO/PGS HEALTH AND SAFETY PROTOCOLS/GUIDELINES.
5. THE CONTAMINANTS OF CONCERN INCLUDE CARBON TETRACHLORIDE AND CHLOROFORM THAT HAVE BEEN DETECTED IN THE SITE'S GROUNDWATER. ADDITIONAL SITE INFORMATION MAY BE PROVIDED UPON REQUEST.
6. IT IS CONTRACTOR'S RESPONSIBILITY FOR EDUCATING ITS SUPERVISORS, EMPLOYEES, AND SUBCONTRACTORS OF ALL HEALTH AND SAFETY REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR WORKER SAFETY AND MAINTENANCE OF TRAFFIC DURING CONSTRUCTION.
7. AT A MINIMUM, ALL ON-SITE CONTRACTOR PERSONNEL SHALL BE IN LEVEL D WHICH IS DEFINED AS HARD HAT, STEEL-TOED SHOES, AND SAFETY GLASSES.
8. CONTRACTOR SHALL PROVIDE SAFETY SIGNS FOR TRENCHING.
9. EXCLUSION ZONES SHALL BE CLEARLY SECTIONED OFF USING, BUT NOT RESTRICTED TO, DELINEATORS, CAUTION TAPE, AND FENCING.

GENERAL NOTES

1. DETERMINING THE ACTUAL LOCATION OF ANY EXISTING UTILITY IS THE CONTRACTORS RESPONSIBILITY. BEFORE COMMENCING WORK, IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA. (PROVIDE 48 HOURS MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING INSTALLATION/CONSTRUCTION). THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT OCCUR DUE TO CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE OWNER AND ENGINEER ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COSTS INCURRED BECAUSE OF THE CONTRACTOR'S OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. SCHEDULE AND EXECUTE ALL WORK INVOLVING EXISTING UTILITIES TO MINIMIZE INTERRUPTION OF SERVICES. WHENEVER SUCH INTERRUPTION IS NECESSARY FOR COMPLETION OF THE WORK, NOTIFY THE ENGINEER AND THE OWNER AT LEAST 48 HOURS IN ADVANCE. ALL WORK TO REPAIR/RESTORE UTILITY SERVICE SHALL BE PERFORMED AS REQUIRED BY THE APPROPRIATE UTILITY. IF IT IS NECESSARY TO SHORE, BRACE, OR SWING A UTILITY, CONTACT THE UTILITY COMPANY OR DEPARTMENT AFFECTED AND OBTAIN THEIR PERMISSION REGARDING THE METHOD TO USE FOR SUCH WORK. ALL COSTS RELATED TO SERVICE, MAINTENANCE, INTERRUPTION, REPAIR, RELOCATION AND RESTORATION ARE TO BE INCLUDED IN THE CONTRACTOR'S BID. ANY DELAY OR INCONVENIENCE CAUSED TO THE CONTRACTOR BY THE VARIOUS UTILITIES SHALL BE INCIDENTAL TO THE CONTRACT, AND NO EXTRA COMPENSATION SHALL BE PAID.
2. FIELD CONDITIONS MAY NECESSITATE SLIGHT ALIGNMENT AND/OR GRADE DEVIATIONS FROM THOSE WHICH ARE INDICATED ON THE PLANS. ANY DEVIATIONS OR ADJUSTMENTS SHALL FIRST BE APPROVED BY THE ENGINEER BEFORE BEING PERFORMED.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION STAKING TO INCLUDE HORIZONTAL AND VERTICAL CONTROL FOR ALIGNMENT OF WORK. ALL SURVEY WORK TO ESTABLISH THE HORIZONTAL AND VERTICAL CONTROL SHALL BE UNDER THE GUIDANCE AND DIRECT SUPERVISION OF AN ALABAMA REGISTERED PROFESSIONAL SURVEYOR.
4. THE ENGINEER CANNOT GUARANTEE THAT TEMPORARY BENCH MARKS (TBM'S) OR OTHER SURVEY CONTROL POINTS WILL NOT BE DISTURBED PRIOR TO CONSTRUCTION. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL SATISFY HIMSELF AS TO THE ACCURACY OF ALL SURVEY OR EXISTING SITE INFORMATION AS INDICATED IN THE DRAWINGS OR SPECIFICATIONS. SHOULD THE CONTRACTOR DISCOVER ANY ERRORS, INACCURACIES OR OMISSIONS IN THE SURVEY DATA, HE SHALL IMMEDIATELY NOTIFY THE ENGINEER. BEFORE BEGINNING WORK, TAKE CARE TO PRESERVE ALL CONTROL STAKES, BENCH MARKS, REFERENCE POINTS AND PROPERTY CORNERS. THE OWNER WILL GRANT NO CLAIM FOR DAMAGES OR LOSS OF TIME BY THE CONTRACTOR DUE TO LOSS OR DISTURBANCE OF SURVEY CONTROL POINTS. CONTROL STAKES, BENCH MARKS, REFERENCE POINTS AND PROPERTY CORNERS DISTURBED BY THE CONTRACTOR'S WORK SHALL BE REPLACED BY AN ALABAMA REGISTERED PROFESSIONAL SURVEYOR WHO WILL BE SELECTED BY AND PAID BY THE CONTRACTOR. THE OWNER WILL NOT MAKE FINAL PAYMENT TO THE CONTRACTOR UNTIL ALL DISTURBED OR DESTROYED PROPERTY CORNERS AND PERMANENT BENCH MARKS HAVE BEEN REPLACED BY THE ALABAMA REGISTERED SURVEYOR. THE SURVEYOR SHALL CERTIFY THAT SUCH MARKERS HAVE BEEN REPLACED IN ACCORDANCE WITH THE STATE OF REQUIREMENTS.

GENERAL NOTES (Cont.)

5. ALL TREES, SHRUBS, ETC., ALONG THE LINES OF CONSTRUCTION SHALL BE PROTECTED AS MUCH AS POSSIBLE.
6. RESTORE ALL PRIVATE AND PUBLIC PROPERTY AFFECTED BY THIS WORK TO A CONDITION EQUAL TO OR BETTER THAN EXISTED BEFORE COMMENCING CONSTRUCTION WORK, UNLESS SPECIFICALLY EXEMPTED BY THE DRAWINGS. RESTORATION WORK INCLUDES, BUT IS NOT LIMITED TO PAVEMENT, BASE, SUBGRADE, CONCRETE CURBS, THERMOPLASTIC TRAFFIC MARKINGS, SIDEWALKS, SODDING, ETC. THE CONTRACTOR SHALL RECONSTRUCT ALL FACILITIES TO PRE-CONSTRUCTION GRADES AND DIMENSIONS, THE ACQUISITION OF SUCH ADDITIONAL INFORMATION SHALL BE THE CONTRACTOR'S RESPONSIBILITY, AND AT HIS EXPENSE. RECONSTRUCT ALL FACILITIES TO PRE-CONSTRUCTION GRADES AND DIMENSIONS, UNLESS OTHERWISE NOTED. WATER, FERTILIZE AND SUPPLY ALL ITEMS AND CARE NECESSARY TO MAINTAIN THE HEALTH OF ALL NEW VEGETATION AND VEGETATION REPLACEMENT, AT NO EXPENSE TO THE OWNER, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
7. PROVIDE ANY TEMPORARY CONTROLS AND/OR STRUCTURES REQUIRED TO MAINTAIN SUITABLE AND SAFE WORKING CONDITIONS AT ALL TIMES. SUCH ITEMS SHALL BE REMOVED ONCE THAT PORTION OF WORK HAS BEEN COMPLETED.
8. STORE CONSTRUCTION EQUIPMENT AND MATERIALS ONLY IN THOSE AREAS APPROVED BY THE ENGINEER. SECURITY OF CONSTRUCTION EQUIPMENT AND MATERIALS IS THE RESPONSIBILITY OF THE CONTRACTOR. PUBLIC RIGHTS-OF-WAY MAY NOT BE UTILIZED FOR STORAGE OF EQUIPMENT OR MATERIALS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENTITY WHICH OWNS THE RIGHT-OF-WAY.
9. UPON COMPLETION OF THE PROJECT, PROVIDE AN AS-BUILT SURVEY OF ALL IMPROVEMENTS IN AUTOCAD FORMAT UTILIZING THE CONSTRUCTION PLANS AS A BASIS. THE AS-BUILT SURVEY MUST BE PREPARED BY AN ALABAMA REGISTERED SURVEYOR. AS A MINIMUM, AS-BUILT DRAWINGS FOR PIPELINE CONSTRUCTION SHALL SHOW CONSTRUCTED HORIZONTAL AND VERTICAL LOCATIONS OF ALL BENDS, FITTINGS AND VALVES, AND ELEVATIONS AT ALL LOCATIONS WHERE PROPOSED DESIGN ELEVATIONS ARE SHOWN ON THE DRAWINGS. THE AS-BUILT SURVEY SHALL BE TIED INTO THE STATE PLANE COORDINATE SYSTEM.
10. SPECIAL EMPHASIS ON EXCAVATION SAFETY AND TRENCH CONSTRUCTION:
    a. OSHA'S EXCAVATION SAFETY STANDARDS 29, CFR PART 1926.650-652 SUBPART P, IS CONSIDERED AS COMPLIMENTARY TO THESE CONTRACT DOCUMENTS. IF THERE IS ANY DUPLICATION, REDUNDANCY OR CONFLICT BETWEEN THE STIPULATIONS OF THESE CONTRACT DOCUMENTS AND THOSE STANDARDS, THE MOST STRINGENT REQUIREMENT SHALL GOVERN.
    b. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT EXCAVATIONS DO NOT ENDANGER WORKMEN, EXISTING STRUCTURES, UTILITIES, OR OTHER FACILITIES. IF SUCH CONDITIONS OCCUR WHICH MAY ENDANGER WORKMEN, EXISTING STRUCTURES, UTILITIES, OR OTHER FACILITIES, IMMEDIATELY INSTALL AND MAINTAIN ADEQUATE SHEETING AND BRACING PER OSHA SPECIFICATIONS. CEASE ALL WORK UNTIL THE SHEETING AND BRACING HAS BEEN PROPERLY AND COMPLETELY INSTALLED. INSTALL THE SHEETING AND BRACING IN A MANNER THAT WILL ALLOW REMOVAL WITHOUT INJURING OR ENDANGERING WORKMEN, THE WORK, ADJACENT STRUCTURES, ETC. PROMPTLY AND COMPLETELY FILL ALL VOIDS CAUSED BY THE WITHDRAWAL OF SHEETING WITH SAND AND COMPACT TO A DEGREE EQUAL TO THE SURROUNDING SOIL. REMOVE THE SHEETING AS THE WORK PROGRESSES OR, AT THE DISCRETION OF THE ENGINEER, CUT THE SHEETING OFF BELOW FINISHED GRADE AND LEAVE IN PLACE.
11. THE CONTRACTOR SHALL MAINTAIN ACCESS TO PRIVATE PROPERTY AT ALL TIMES.
12. ALL DISTURBED GRASSED AREAS SHALL BE FULLY RESTORED WITH SOD TO MATCH THAT WHICH EXISTED PRIOR TO CONSTRUCTION. ANY SOD LAID ON AN INCLINE SHALL BE PROPERLY PINNED.
13. COUNTY ROADWAY PAVEMENT IS NOT TO BE OPEN-CUT OR DISTURBED. ANY DISTURBED SIDEWALKS SHALL BE RESTORED IN FULL PANEL SECTIONS.

GENERAL NOTES FOR UTILITY CONSTRUCTION

1. UNDER NO CIRCUMSTANCES SHALL PIPE BE LAID IN A WET TRENCH OR STRUCTURES BE CONSTRUCTED IN A WET EXCAVATION.
2. THE PIPE SHALL BE INSTALLED TO THE GRADE AND ELEVATIONS SHOWN ON THE CONSTRUCTION DRAWINGS. DETAILED CONSTRUCTION LOGS SHALL BE MAINTAINED BY THE CONTRACTOR AND FURNISHED TO THE ENGINEER.
3. IF NECESSARY, USE TEMPORARY SHEETING OR TRENCH BOXES TO MINIMIZE THE SIZE OF THE EXCAVATIONS AND TO PROTECT ADJACENT EXISTING ROADWAYS, UTILITIES AND OTHER FACILITIES. THERE SHALL BE NO ADDITIONAL COST TO THE OWNER.
4. BACKFILL ALL TRENCHES WITHIN PUBLIC RIGHT-OF-WAY AT THE END OF EACH DAYS WORK. NO TRENCH SHALL BE LEFT OPEN OVERNIGHT. THE ENDS OF ALL PIPE SHALL BE PLUGGED AT THE CLOSE OF EACH DAYS WORK.
5. PERFORM SURFACE RESTORATION IMMEDIATELY FOLLOWING SUCCESSFUL PRESSURE TESTING, INCLUDING ROADWAY, DRIVEWAY, LANDSCAPING, GRASSING OR OTHER. RESHAPE DITCHES TO EXISTING CONTOURS. GRASSING SHALL BE WHERE EXISTING GRASS HAS BEEN DAMAGED BY CONSTRUCTION.
6. NO MACHINE EXCAVATION SHALL BE PERFORMED WITHIN 5 FEET OF A GAS MAIN.
7. CONTRACTOR SHALL CONTACT ALABAMA ONE CALL BY CALLING 811 OR 1-800-292-8525 AT LEAST 48 HOURS PRIOR TO EXCAVATION. ALL PROPOSED CONSTRUCTION SHALL BE WHITE-LINE PAINTED PRIOR TO CONTACTING ALABAMA ONE CALL.

EROSION CONTROL NOTES

1. ALL CONSTRUCTION ACTIVITIES SHALL INCORPORATE BEST MANAGEMENT PRACTICES TO CONTROL EROSION, SEDIMENTATION, AND THE POTENTIAL FOR DOWNSTREAM WATER QUALITY DEGRADATION. CONSTRUCTION PRACTICES INCLUDE:
    c. CONSTRUCT TEMPORARY SEDIMENTATION BASINS OR EARTHEN BERMS AT DOWN-GRADIENT ENDS OF NEWLY GRADED AREAS TO PROVIDE FOR SEDIMENT AND TURBIDITY REMOVAL.
    d. LIMIT SITE CLEARING TO THOSE AREAS REQUIRED FOR A PARTICULAR PHASE OF CONSTRUCTION. EXISTING TREES AND VEGETATION TO REMAIN WHEREVER POSSIBLE.
    e. TURBIDITY BARRIERS, HAY BALES AND OTHER EROSION CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL CONSTRUCTION ACTIVITIES ARE COMPLETE AND THE POTENTIAL FOR EROSION IS ELIMINATED.
2. DO NOT EMPLOY SILT FENCES IN A MANNER TO CAUSE THEM TO ACT AS A DAM ACROSS PERMANENTLY FLOWING WATERCOURSES. USE SILT FENCES AT UPLAND LOCATIONS, AND TURBIDITY BARRIERS IN PERMANENT WATER BODIES, REGARDLESS OF WATER DEPTH.

SUBMITTALS

1. CONTRACTOR SHALL PROVIDE SUBMITTAL DOCUMENTS FOR APPROVAL BY THE ENGINEER PRIOR TO PURCHASE. DOCUMENTS SHALL BE PRESENTED IN A SINGLE BINDER WITH TAB SEPARATION BASED ON EQUIPMENT. PROVIDE SPECIFICATIONS, FEATURES AND DRAWING CONNECTION CUT-SHEETS FOR ALL EQUIPMENT, MATERIALS AND APPURTENANCES PER THE CONTRACT DOCUMENTS.

CONSTRUCTION SCHEDULE

1. THE CONTRACTOR SHALL CONFIRM A CONSTRUCTION SCHEDULE WITH THE ENGINEER'S PROJECT MANAGER AT LEAST 14 DAYS PRIOR TO ANY WORK AT THE SITE.
2. THE PROPOSED CONSTRUCTION SCHEDULE SHALL BE PRESENTED IN A TIMELINE FORMAT SHOWING ESTIMATED START DATE, DURATION, AND COMPLETION TIMES FOR EACH ACTIVITY. ANY DEVIATION FROM THE ORIGINALLY PROPOSED SCHEDULE MUST BE COMMUNICATED TO THE ENGINEER'S PROJECT MANAGER WITHIN 24 HOURS.

AS-BUILT DRAWINGS

1. THE CONTRACTOR SHALL MAINTAIN DURING THE CONSTRUCTION FIELD MARK-UP RED LINE DRAWINGS SHOWING ACTUAL DETAILS, DIMENSIONS, AND OTHER PERTINENT FEATURES THAT VARY FROM THE ORIGINAL DESIGN.
2. UPON COMPLETION OF THE PROJECT, PROVIDE AN AS-BUILT SURVEY OF ALL IMPROVEMENTS IN AUTOCAD FORMAT UTILIZING THE CONSTRUCTION PLANS AS A BASIS. THE AS-BUILT SURVEY MUST BE PREPARED BY AN ALABAMA SURVEYOR. AS A MINIMUM AS BUILT DRAWINGS FOR PIPELINE CONSTRUCTION SHALL SHOW CONSTRUCTED HORIZONTAL AND VERTICAL LOCATIONS OF ALL BENDS, FITTINGS AND VALVES AND ELEVATIONS. AT ALL LOCATIONS WHERE PROPOSED DESIGN ELEVATIONS ARE SHOWN ON THE DRAWINGS. THE AS-BUILT SURVEY WILL BE TIED INTO THE STATE PLANE COORDINATE SYSTEM.

NOT TO SCALE

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

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Professional Engineer's Name: JOHN F. PERELLA, PE
Professional Engineer's No.: 37041-E
State: AL | Date Signed: | Project Mgr.: JH
Designed by: ZV | Drawn by: BO | Checked by: JP

NOT FOR CONSTRUCTION DO NOT SEAL

ARCADIS
ARCADIS U.S., INC.
ALABAMA CERTIFICATE OF AUTHORIZATION NUMBER 1822

NOURYON FUNCTIONAL CHEMICALS, LLC - 13440 U.S. HIGHWAY 43 NORTH, AXIS, MOBILE COUNTY, ALABAMA
SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

GENERAL NOTES AND SPECIFICATIONS I

DESIGN DRAWINGS

ARCADIS Project No. 30190974
Date JANUARY 2024
ARCADIS
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G-1

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GENERAL PIPELINE REQUIREMENTS

1. VACUUM EXTRACTION (VE) WELLS SHOWN ON THE CONSTRUCTION DRAWINGS WILL BE INSTALLED BY AN ALABAMA LICENSED DRILLING CONTRACTOR.
2. IF THERE ARE ANY DISCREPANCIES BETWEEN SPECIFICATIONS AND CONSTRUCTION DRAWINGS, THE ENGINEER SHALL BE CONSULTED TO RESOLVE THE DISCREPANCY.
3. ALL MATERIALS NOT SPECIFICALLY DESCRIBED, BUT REQUIRED FOR A COMPLETE AND PROPER INSTALLATION OF THE WORK, SHALL BE NEW, FIRST QUALITY OF THEIR RESPECTIVE KIND AND AS SELECTED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE ENGINEER.
4. ALL MATERIALS SHALL BE PROPERLY STORED TO PREVENT DAMAGE. ANY DAMAGED MATERIALS WILL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
5. INSTALLATION OF ALL PIPE AND FITTINGS SHALL COMPLY WITH THE PIPE MANUFACTURER'S RECOMMENDED PROCEDURES.

VACUUM EXTRACTION PIPING REQUIREMENTS

1. VACUUM EXTRACTION PIPELINES SHALL UTILIZE SLOPE AS NOTED ON THE PLANS. INDIVIDUAL VACUUM EXTRACTION PIPELINES (2") TO VE WELLS SHALL BE SLOPED TO DRAIN TO THE RESPECTIVE VE WELL.
2. VACUUM EXTRACTION PIPELINES SHALL BE CONSTRUCTED OF 2-INCH DIAMETER CARBON STEEL PIPE.

PRESSURE TESTING

1. RESTRAINT -THE PIPELINE TEST SECTION MUST BE RESTRAINED AGAINST MOVEMENT IN THE EVENT OF CATASTROPHIC FAILURE. JOINTS MAY BE EXPOSED FOR LEAKAGE EXAMINATION PROVIDED THAT RESTRAINT IS MAINTAINED.
2. THE TESTING EQUIPMENT CAPACITY AND THE PIPELINE TEST SECTION SHOULD BE SUCH THAT THE TEST SECTION CAN BE PRESSURIZED AND EXAMINED FOR LEAKS WITHIN TEST DURATION TIME LIMITS. LOWER CAPACITY TESTING AND PRESSURIZING EQUIPMENT MAY REQUIRE A SHORTER TEST SECTION.
3. TEST EQUIPMENT AND THE PIPELINE TEST SECTION SHOULD BE EXAMINED BEFORE PRESSURE IS APPLIED TO ENSURE THAT CONNECTIONS ARE TIGHT, NECESSARY RESTRAINTS ARE IN PLACE AND SECURE, AND COMPONENTS THAT SHOULD BE ISOLATED OR DISCONNECTED ARE ISOLATED OR DISCONNECTED. ALL LOW PRESSURE FILLING LINES AND OTHER ITEMS NOT SUBJECT TO THE TEST PRESSURE SHOULD BE DISCONNECTED OR ISOLATED.
4. IF LEAKS ARE DISCOVERED, DEPRESSURIZE THE TEST SECTION BEFORE REPAIRING LEAKS. CORRECTLY MADE FUSION JOINTS DO NOT LEAK. LEAKAGE AT A BUTT FUSION JOINT MAY INDICATE IMMINENT CATASTROPHIC RUPTURE. DEPRESSURIZE THE TEST SECTION IMMEDIATELY IF BUTT FUSION LEAKAGE IS DISCOVERED. LEAKS AT FUSION JOINTS REQUIRE THE FUSION JOINT TO BE CUT OUT AND REDONE.
5. IF THE PRESSURE LEAK TEST IS NOT COMPLETED DUE TO LEAKAGE, EQUIPMENT FAILURE, ETC., THE TEST SECTION SHOULD BE DE-PRESSURIZED AND REPAIRS MADE. ALLOW THE TEST SECTION TO REMAIN DEPRESSURIZED FOR AT LEAST EIGHT (8) HOURS BEFORE RETESTING.
6. THE CONTRACTOR SHALL PROVIDE PIPE TESTING RECORDS TO THE ENGINEER. THESE RECORDS MUST INCLUDE FINAL APPROVAL SIGNATURES BY THE ENGINEER OR DESIGNATED ENGINEER REPRESENTATIVE.

VE PIPING PRESSURE TESTING PROCEDURE

1. THE VE PIPING TEST PROCEDURE WILL BE PERFORMED UNDER PRESSURE CONDITIONS. THE TEST SECTION WILL BE PRESSURIZED TO 30 PSI AND MAINTAINED AT THAT PRESSURE FOR ONE (1) HOUR. IF THE TARGET TEST PRESSURE REMAINS STEADY (WITHIN 5% OF THE TARGET TEST VACUUM) FOR ONE HOUR, LEAKAGE IS NOT INDICATED.

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Professional Engineer's Name: **JOHN F. PERELLA, PE**
Professional Engineer's No.: 37041-E

State	Date Signed	Project Mgr.
AL		JH
Designed by	Drawn by	Checked by
ZV	BO	JP

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ARCADIS U.S., INC.
ALABAMA CERTIFICATE OF AUTHORIZATION NUMBER 1822

NOURYON FUNCTIONAL CHEMICALS, LLC - 13440 U.S. HIGHWAY 43 NORTH, AXIS, MOBILE COUNTY, ALABAMA
SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

GENERAL NOTES AND SPECIFICATIONS II

DESIGN DRAWINGS

ARCADIS Project No. 30190974
Date JANUARY 2024

ARCADIS
4300 W. CYPRESS ST.
SUITE 450
TAMPA, FL 33637
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SHEET
G-2

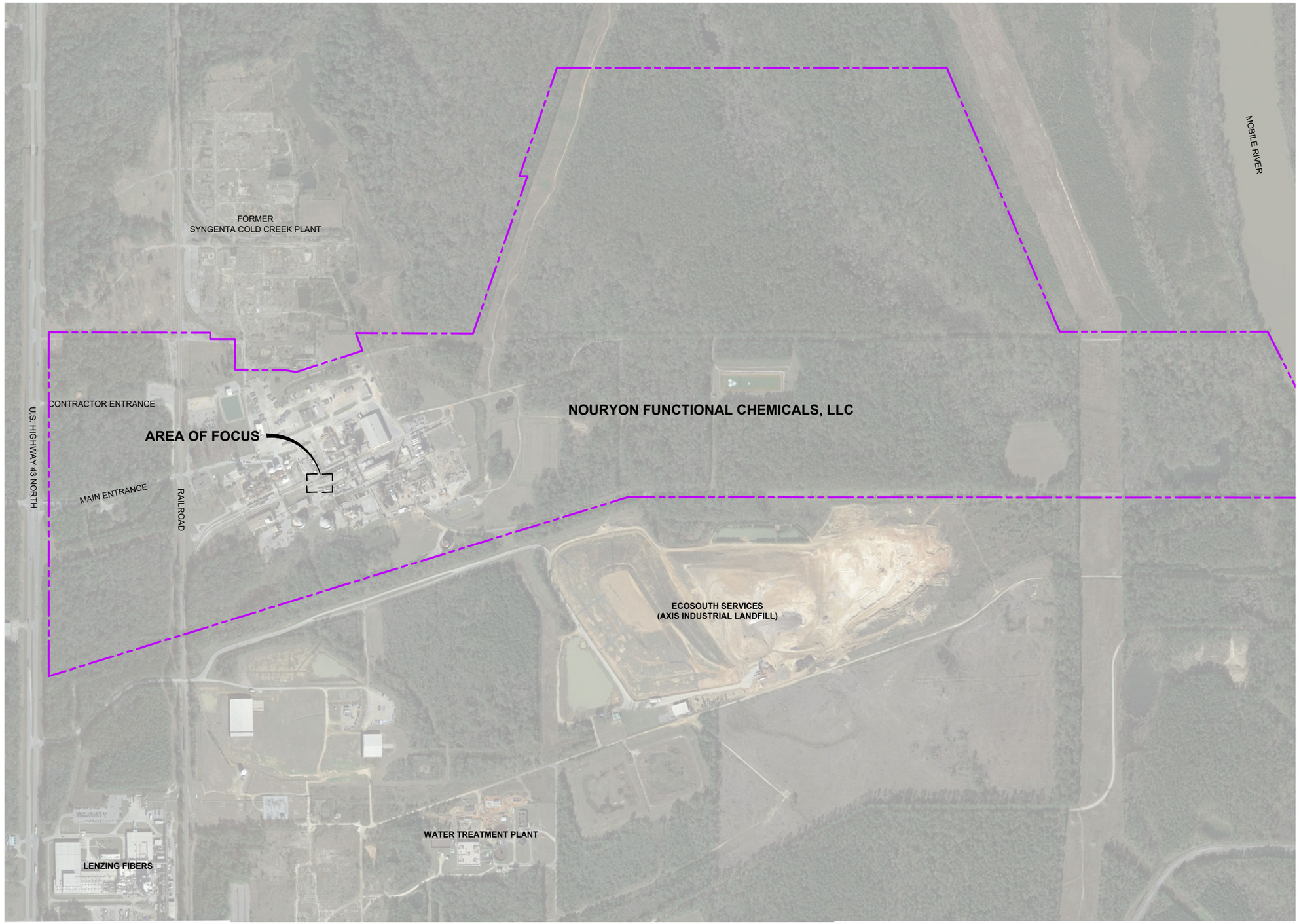

FIGURE NOTES:
1. Aerial image from Google Earth Pro, December 2022.

0 800' 1,600' 3,200'
GRAPHIC SCALE

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Professional Engineer's Name
JOHN F. PERELLA, PE
Professional Engineer's No.
37041-E

State	Date Signed	Project Mgr.
AL		JH
Designed by	Drawn by	Checked by
ZV	BO	JP

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NOURYON FUNCTIONAL CHEMICALS, LLC - 13440 U.S. HIGHWAY 43 NORTH, AXIS, MOBILE COUNTY, ALABAMA
SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

SITE PLAN

DESIGN DRAWINGS

ARCADIS Project No.
30190974

Date
JANUARY 2024

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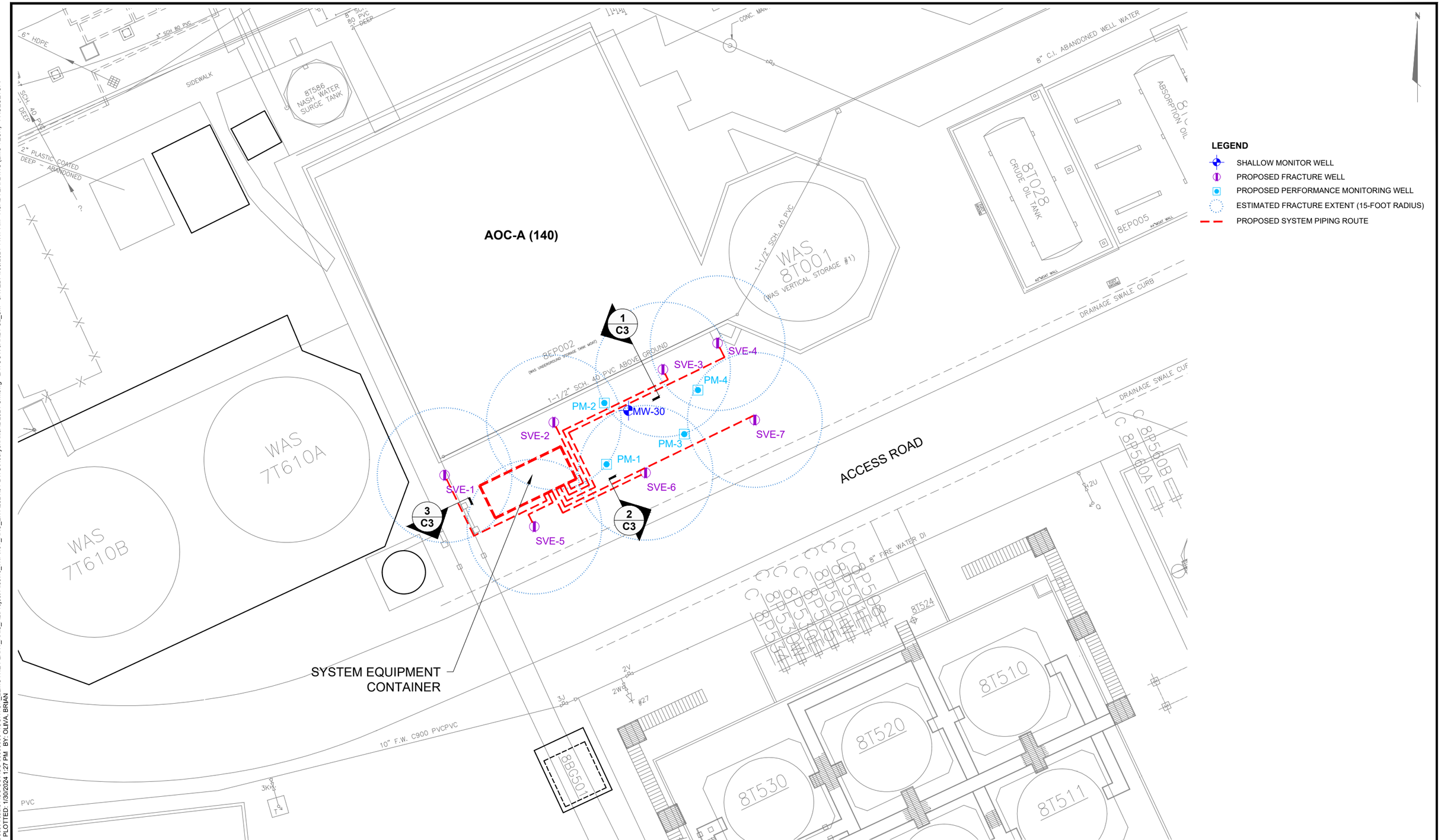

LEGEND

- SHALLOW MONITOR WELL
- PROPOSED FRACTURE WELL
- PROPOSED PERFORMANCE MONITORING WELL
- ESTIMATED FRACTURE EXTENT (15-FOOT RADIUS)
- PROPOSED SYSTEM PIPING ROUTE

GRAPHIC SCALE 0 8' 16' 24'

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Professional Engineer's Name: JOHN F. PERELLA, PE		
Professional Engineer's No.: 37041-E		
State: AL	Date Signed:	Project Mgr.: JH
Designed by: ZV	Drawn by: BO	Checked by: JP

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SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

SOIL VAPOR EXTRACTION (SVE) REMEDIATION SYSTEM LAYOUT

DESIGN DRAWINGS

ARCADIS Project No.: 30190974

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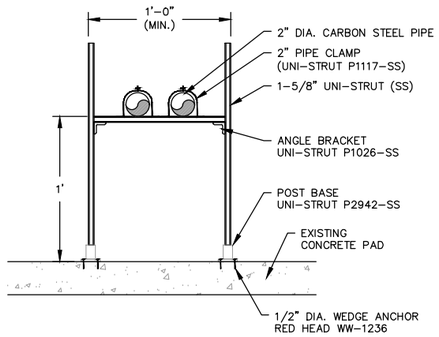


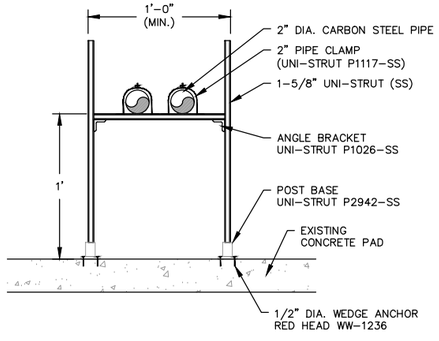
(2) 2-INCH DIA. CARBON STEEL VE CONVEYANCE PIPE

NOTES:

1. ALL PIPE STAND MATERIAL SHALL BE STAINLESS STEEL.
2. PIPE SUPPORTS WILL BE INSTALLED AT A SPACING NO MORE THAN 6-FEET AND AT ALL DIRECTION CHANGES ON ALL NEW ABOVE GROUND PVC PIPE.

PIPE SUPPORT DETAIL 1 C-2

NOT TO SCALE



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NOTES:

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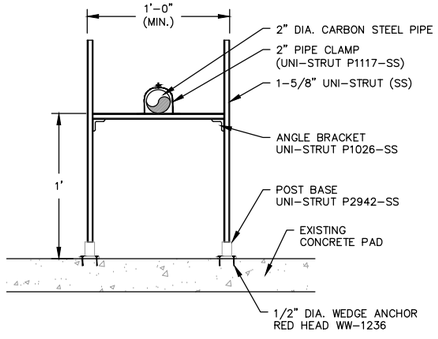
PIPE SUPPORT DETAIL 2 C-2

NOT TO SCALE



(1) 2-INCH DIA. CARBON STEEL VE CONVEYANCE PIPE

NOTES:

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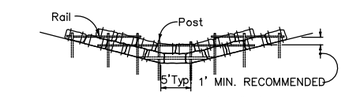
2. PIPE SUPPORTS WILL BE INSTALLED AT A SPACING NO MORE THAN 6-FEET AND AT ALL DIRECTION CHANGES ON ALL NEW ABOVE GROUND PVC PIPE.

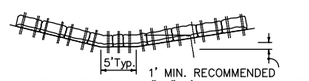
PIPE SUPPORT DETAIL 3 C-2

NOT TO SCALE



ANCHOR LOWER BALES WITH 2-2" X 2"X4' STAKES PER BALE. ANCHOR TOP BALES TO LOWER BALES WITH 2-2" X 2"X4' STAKES PER BALE.

ELEVATION TYPE II

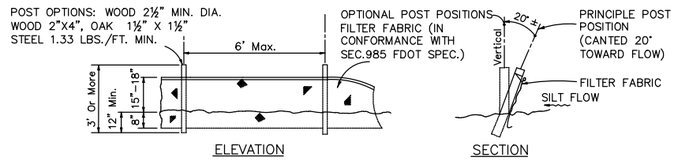


ANCHOR BALES WITH 2-2"X2"X4' STAKES PER BALE

ELEVATION TYPE I

APPLICATION AND SPACING: THE USE OF TYPES I & II BALE BARRIERS SHOULD BE LIMITED TO THE CONDITIONS OUTLINED IN CHART I, SHEET 1 OF 3, INDEX NO. 102 (2010 EDITION)

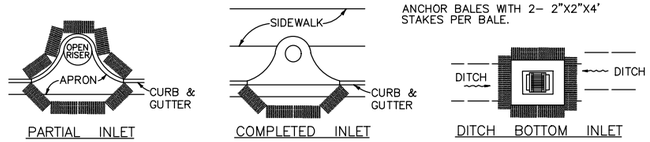
BARRIER FOR UNPAVED DITCHES



ELEVATION SECTION

NOTE: SILT FENCE TO BE PAID FOR UNDER THE CONTRACT UNIT PRICE FOR STAKED SILT FENCE (LF).

TYPE III SILT FENCE



PARTIAL INLET COMPLETED INLET DITCH BOTTOM INLET

PROTECTION AROUND INLETS OR SIMILAR STRUCTURES

NOTES:

1. EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED THROUGHOUT CONSTRUCTION TO PREVENT THE INFILTRATION OF PROJECT SITE SOILS INTO A PUBLIC DRAINAGE SYSTEM.
2. FOR ADDITIONAL DETAILS, REFER TO F.D.O.T. INDEX #102, 103, AND 104. (2010 EDITION)
3. SEE PLANS FOR LOCATION OF PROPOSED EROSION CONTROL DEVICES.

EROSION CONTROL DEVICES

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Professional Engineer's Name: JOHN F. PERELLA, PE
Professional Engineer's No.: 37041-E
State: AL | Date Signed: | Project Mgr.: JH
Designed by: ZV | Drawn by: BO | Checked by: JP

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ALABAMA CERTIFICATE OF AUTHORIZATION NUMBER 1822

NOURYON FUNCTIONAL CHEMICALS, LLC - 13440 U.S. HIGHWAY 43 NORTH, AXIS, MOBILE COUNTY, ALABAMA

SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

CROSS SECTIONS & EROSION CONTROL DETAILS

DESIGN DRAWINGS

ARCADIS Project No. 30190974

Date JANUARY 2024

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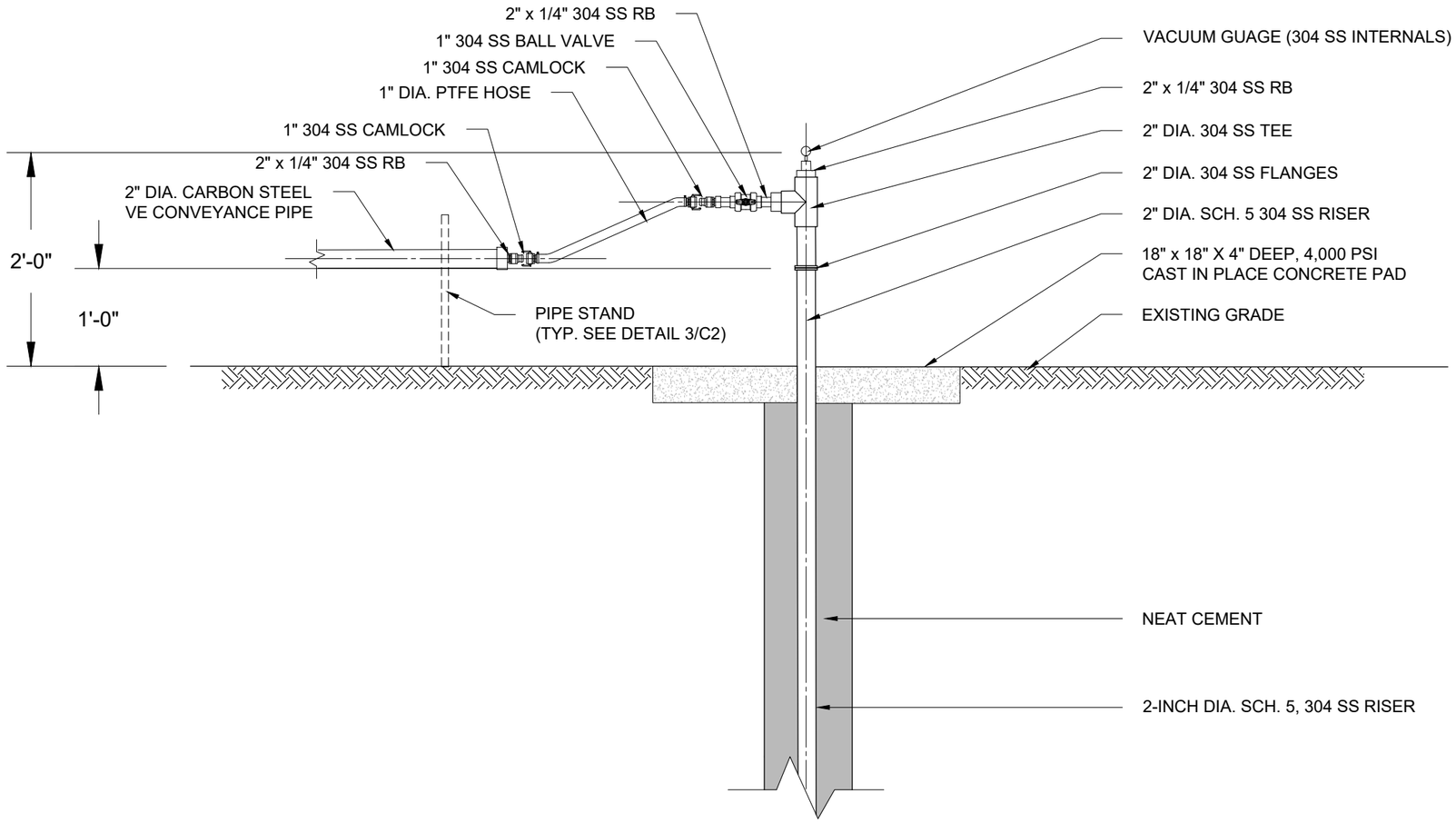

SOIL VAPOR EXTRACTION (SVE) WELLHEAD DETAIL

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NOT TO SCALE

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Professional Engineer's Name: JOHN F. PERELLA, PE
Professional Engineer's No.: 37041-E

State	Date Signed	Project Mgr.
AL		JH
Designed by	Drawn by	Checked by
ZV	BO	JP

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NOURYON FUNCTIONAL CHEMICALS, LLC - 13440 U.S. HIGHWAY 43 NORTH, AXIS, MOBILE COUNTY, ALABAMA
SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

SOIL VAPOR EXTRACTION WELLHEAD COMPLETION DETAILS

DESIGN DRAWINGS

ARCADIS Project No. 30190974
Date FEBRUARY 2024

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TAMPA, FL 33637
TEL. 813.353.5794

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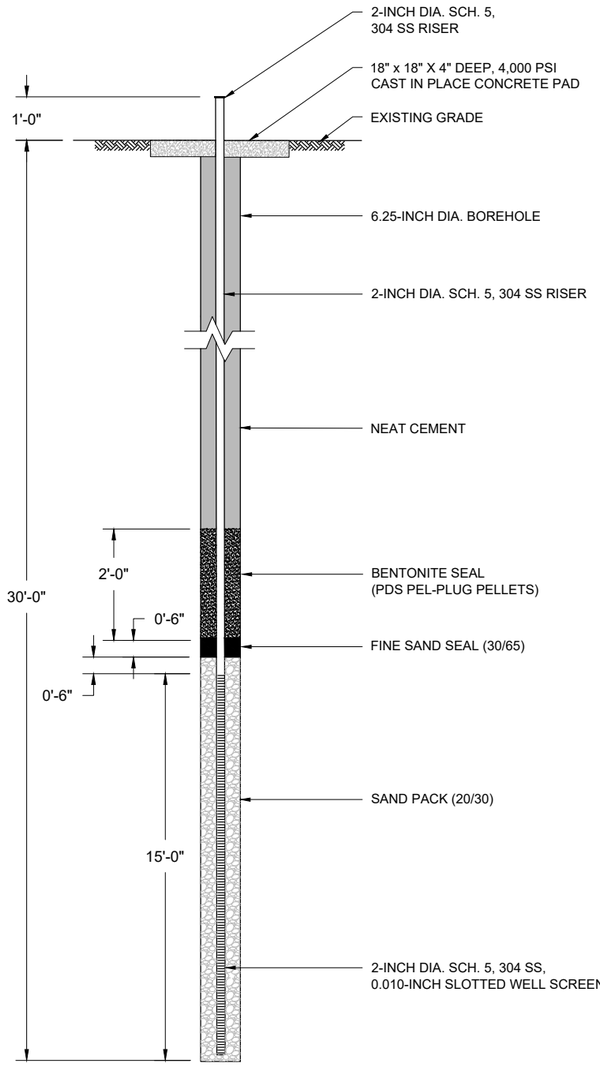
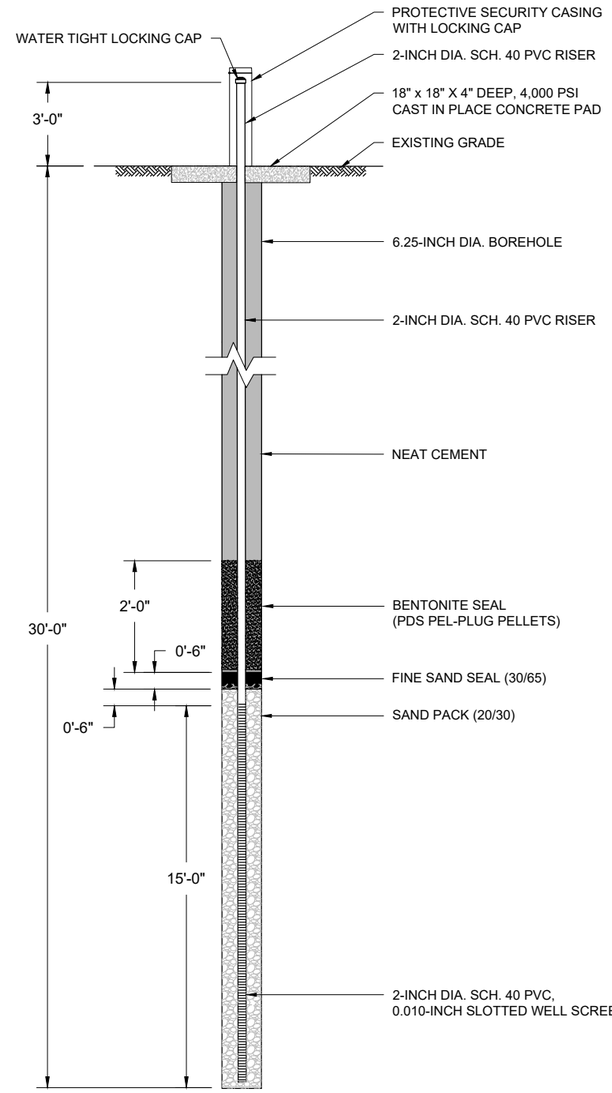


SOIL VAPOR EXTRACTION WELL (SVE-1 THROUGH SVE-7)

NOT TO SCALE



PERFORMANCE MONITORING WELL (PM-1 THROUGH PM-4)

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NOTES:
1. FINAL WELL DEPTH TO BE DETERMINED BASED ON FIELD OBSERVATIONS.

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Professional Engineer's No.: 37041-E		
State: AL	Date Signed:	Project Mgr.: JH
Designed by: ZV	Drawn by: BO	Checked by: JP

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ALABAMA CERTIFICATE OF AUTHORIZATION NUMBER 1822

NOURYON FUNCTIONAL CHEMICALS, LLC - 13440 U.S. HIGHWAY 43 NORTH, AXIS, MOBILE COUNTY, ALABAMA
SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

SOIL VAPOR EXTRACTION WELL DETAILS

DESIGN DRAWINGS

ARCADIS Project No.: 30190974

Date: FEBRUARY 2024

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PIPE SUPPORTS, PIPE WRAPS, PIPE INSULATION AND PIPE PENETRATIONS

1. GALVANIZED CARBON STEEL PIPING THROUGH CONCRETE OR BELOW GRADE SHALL BE WRAPPED WITH 3M SCOTCHWRAP TYPE 51 ALL WEATHER OR APPROVED EQUIVALENT.
2. EXHAUST PIPING FOR VAPOR EXTRACTION BLOWER INSIDE THE ENCLOSURE, SHALL BE INSULATED TO PREVENT POTENTIAL TOUCH POINT BURNS AND TO REDUCE HEAT LOAD WITHIN THE ENCLOSURE. PIPE INSULATION SHALL BE OWENS CORNING FIBERGLAS PIPE INSULATION AND SHALL BE 2-INCHES THICK.

EQUIPMENT, PIPING AND APPURTENANCES INSTALLATION

1. ALL EQUIPMENT SHALL BE INSTALLED LEVEL.
2. THE EQUIPMENT AND PIPING INSTALLERS PROVIDED BY THE CONTRACTOR SHALL BE THOROUGHLY TRAINED AND EXPERIENCED IN THE NECESSARY CRAFTS AND FAMILIAR WITH THE SPECIFICATION PROVIDE HERE.
3. CONSTRUCTION DRAWINGS SHOW GENERAL ARRANGEMENT, DIRECTION AND SIZE OF EQUIPMENT AND PIPING AND ARE NOT INTENDED TO SHOW EVERY OFFSET, VALVE AND FITTING OR EVERY STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED. INSTALL THE PIPING AND APPURTENANCES TO SUIT, AND IN ACCORDANCE WITH THE PIPING AND INSTRUMENTATION DIAGRAM PROVIDED IN THE CONSTRUCTION DRAWING PACKAGE. VERIFY ALL MEASUREMENTS AT THE SITE.
4. INSTALL ALL PIPING IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND AS APPROVED BY THE ENGINEER.
5. THE CONTRACTOR SHALL PROVIDE ADEQUATE PIPE SUPPORTS FOR BOTH HORIZONTAL AND VERTICALLY MOUNTED PIPES.
6. PRESSURE GAUGES, FLOW METERS AND OTHER INSTRUMENTATION SHALL BE INSTALLED IN LOCATIONS THAT ARE EASILY READABLE AND ACCESSIBLE FOR MAINTENANCE.
7. LABELING OF EQUIPMENT AND PIPING SHALL INCLUDE, BUT NOT LIMITED TO, FLOW DIRECTION ARROWS, EQUIPMENT IDENTIFICATION PLACARDS AND SAFETY PLACARDS.
8. ALL PIPE FITTINGS AND MATERIALS SHALL BE CAREFULLY INSPECTED IN THE FIELD BEFORE INSTALLATION. CRACKED, BROKEN, WARPED, OUT-OF-ROUND, AND DAMAGED PIPE JOINTS, INCLUDING DAMAGED PIPELINING OR COATINGS OR SPECIALS, AS DETERMINED BY THE ENGINEER, SHALL NOT BE INSTALLED. SUCH REJECTED PIPE OR OTHER MATERIALS SHALL BE CLEARLY TAGGED IN SUCH A MANNER AS TO NOT DEFACE OR DAMAGE IT, AND THE PIPE SHALL THEN BE REMOVED FROM THE SITE BY THE CONTRACTOR AT HIS OWN EXPENSE.

PIPING AND APPURTENANCES

1. PIPING MATERIALS AND PIPING APPURTENANCES ARE IDENTIFIED ON THE PIPING AND INSTRUMENTATION DIAGRAMS THAT ARE INCLUDED IN THE CONSTRUCTION DRAWINGS. ADDITIONAL SPECIFICATIONS ARE PROVIDED IN THIS SECTION. IF THERE ARE ANY DISCREPANCIES BETWEEN THESE SPECIFICATIONS AND THE CONSTRUCTION DRAWINGS, THE ENGINEER SHALL BE CONSULTED TO RESOLVE THE DISCREPANCY.
2. BELOW GRADE PIPING MATERIALS FOR VAPOR EXTRACTION SYSTEM SHALL BE TYPE 1, GRADE 1, SCHEDULE 80 PVC PIPE AND FITTINGS CONFORMING TO ASTM D1784 AND D1785, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
3. PIPE AND FITTING PVC JOINTS SHALL BE GLUED USING PVC CEMENT MEETING THE REQUIREMENTS OF ASTM D2855 HEAVY WEIGHT, HEAVY BODY CEMENT.
4. ABOVE GRADE PIPING MATERIALS FOR AIR SPARGE SYSTEM SHALL BE SCHEDULE 40 GALVANIZED CARBON STEEL PIPE AND FITTINGS CONFORMING TO ASTM A53 GRADE A, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
5. ABOVE GRADE HOSE BETWEEN PIPING AND VAPOR PHASE GRANULAR ACTIVATED CARBON VESSELS SHALL BE TIGERFLEX WST-SLR AS MANUFACTURED BY KURIYAMA OF AMERICA OR APPROVED EQUIVALENT.
6. FLANGE CONNECTIONS SHALL BE ANSI CLASS 150 FLANGES UNLESS OTHERWISE NOTED. JOIN FLANGES WITH FULL FACED GASKETS, 1/8 INCH THICK. GASKET MATERIAL SHALL BE VITON. PROVIDE MACHINE MADE OR DIE STAMPED GASKETS WITH INSIDE AND OUTSIDE EDGES CONCENTRIC. OVERSIZE BOLT HOLES TO PREVENT CRIMPING OF GASKET WHEN INSTALLED.
7. ALL VALVES SHALL BE PROVIDED WITH VITON O-RING SEALS AND SHUTTER.

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Professional Engineer's No.: 37041-E
State: AL | Date Signed: | Project Mgr.: JH
Designed by: ZV | Drawn by: BO | Checked by: JP

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NOURYON FUNCTIONAL CHEMICALS, LLC - 13440 U.S. HIGHWAY 43 NORTH, AXIS, MOBILE COUNTY, ALABAMA
SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

MECHANICAL NOTES

DESIGN DRAWINGS

ARCADIS Project No. 30190974
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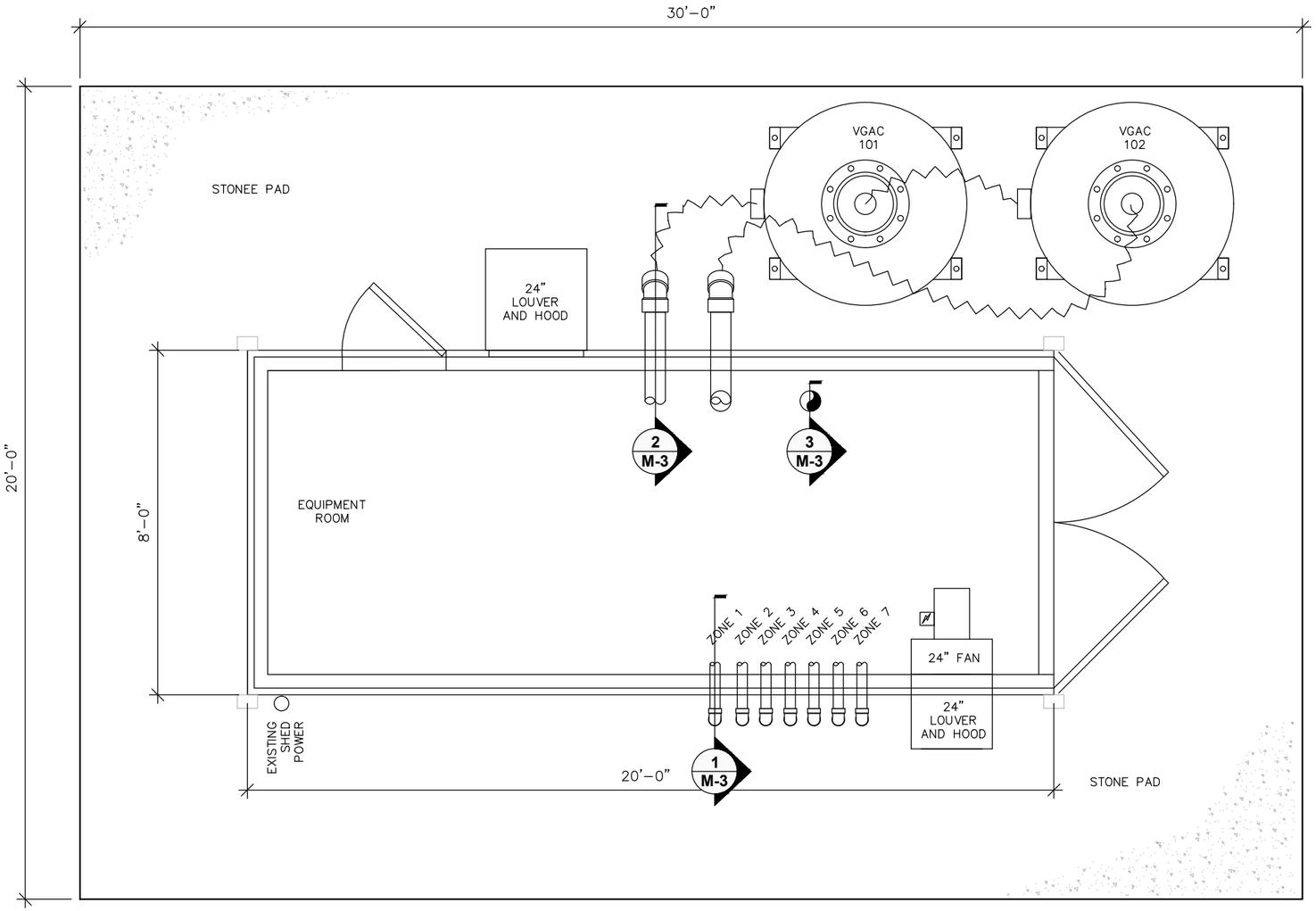

EQUIPMENT ENCLOSURE / PAD LAYOUT

NOTE:

1. VENTILATION SHOWN HERE IS PRELIMINARY. ADDITIONAL VENTILATION MAY BE REQUIRED.
2. PIPE AND CONDUIT LOCATIONS ARE PRELIMINARY. COORDINATE ACTUAL LOCATION WITH EQUIPMENT VENDORS.

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SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

MECHANICAL DETAILS I

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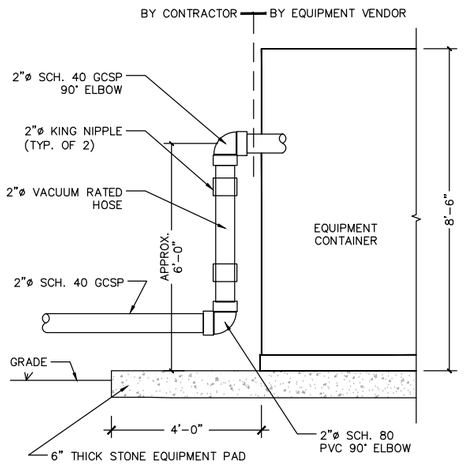
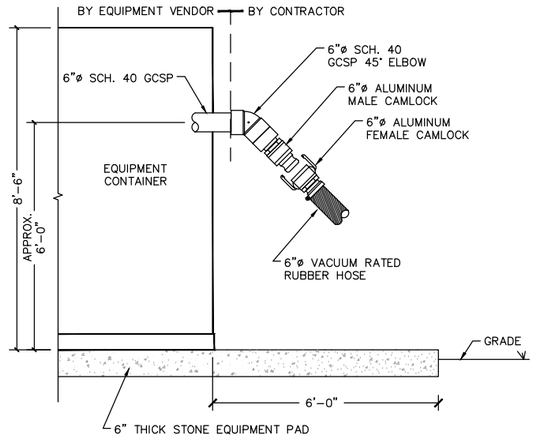


VE INFLUENT CONNECTION DETAIL

1 / M-2

NOT TO SCALE

NOTE–VE INFLUENT CONNECTION DETAIL:
1. 2"ø SCH. GCSP THROUGH EQUIPMENT CONTAINER SHALL BE PROVIDED LONG BY THE EQUIPMENT VENDOR TO BE CUT TO FIT IN THE FILED BY THE CONTRACTOR.
2. ALL PENETRATIONS THROUGH EQUIPMENT CONTAINER SHALL BE WATER TIGHT.

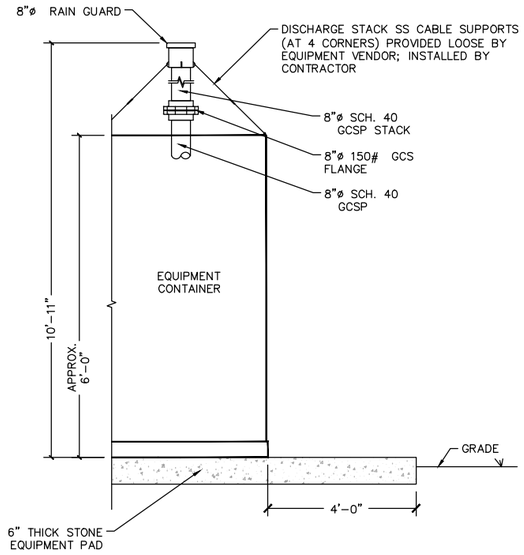


VE VGAC CONNECTION DETAIL

2 / M-2

NOT TO SCALE

NOTE–VE VGAC CONNECTION DETAIL:
1. 6"ø SCH. 40 GCSP THROUGH EQUIPMENT CONTAINER SHALL BE PROVIDED LONG BY THE EQUIPMENT VENDOR TO BE CUT TO FIT IN THE FILED BY THE CONTRACTOR.
2. ALL PENETRATIONS THROUGH EQUIPMENT CONTAINER SHALL BE WATER TIGHT.



VE DISCHARGE CONNECTION DETAIL

3 / M-2

NOT TO SCALE

NOTE–VE DISCHARGE STACK DETAIL:
1. ALL PENETRATIONS THROUGH EQUIPMENT CONTAINER SHALL BE WATER TIGHT.

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SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

MECHANICAL DETAILS II

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LEGEND

- FLEXIBLE HOSE
- CONTROL PANEL OR EQUIPMENT
- SOFTWARE LINK, SYSTEM FUNCTION CONNECTION OR COMMUNICATION LINK
- FO — FIBER OPTIC CONNECTION
- MAIN PROCESS LINE
- AUXILIARY SYSTEMS
- BUILDING/AREA EXTENTS
- ELECTRIC (ELECTRONIC) SIGNAL
- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- NEEDLE VALVE
- PISTON CHECK VALVE
- SPRING CHECK VALVE
- SWING CHECK VALVE
- BALL CHECK VALVE
- DIAPHRAGM VALVE
- SOLENOID OPERATED VALVE
- MOTOR OPERATED VALVE
- BLOCK & BLEED VALVE
- SAMPLE PORT
- PRESSURE REGULATING VALVE
- FLANGED CONNECTION/PIPE TRANSITION
- NON-FLANGED PIPE TRANSITION
- UNION
- REDUCER
- Y STRAINER
- PRESSURE RELIEF VALVE
- VACUUM RELIEF VALVE
- VENT
- CAMLOCK
- QUICK CONNECT
- HOSE BARB CONNECTION
- CAP
- PARTICULATE FILTER
- COALESCING FILTER

- M — MOTOR
- VFD — VARIABLE FREQUENCY DRIVE
- M — PUMP
- M — BLOWER
- TM — THERMAL MASS FLOW METER
- MAGNETIC FLOW METER
- POSITIVE DISPLACEMENT FLOW METER
- AVERAGING PILOT TUBE FLOW METER
- FI — ROTAMETER WITH VALVE
- STATIC MIXER
- SITE GLASS
- FILTER
- BELL FLOAT

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	⊖	○	⊖
SHARED DISPLAY, SHARED CONTROL	⊜	◎	⊜
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.	⬡	⬡	⬡
PROGRAMMABLE LOGIC CONTROLLER FUNCTION	◈	◈	◈

PIPELINE DESIGNATION

6"–S04P
- 6" — SIZE
- S04P — MATERIAL
- P — LINE TYPE

MATERIAL:

BRZ – BRASS/BRONZE
CIR – CAST IRON
CST – CARBON STEEL
CPR – COPPER
CVC – CHLORINATED POLYVINYL CHLORIDE
DIR – DUCTILE IRON
FRP – FIBERGLASS
GCS – GALVANIZED CARBON STEEL
HDPE– HIGH DENSITY POLYETHYLENE
LCS – LINED CARBON STEEL
PET – POLYETHYLENE

TYPE:

D = DUCT
H = HOSE
C = DOUBLE WALL CONTAINMENT PIPE
P = PIPE
T = TUBE

POP – POLYPROPYLENE
PVC – POLYVINYL CHLORIDE
RUB – RUBBER
S04 – 304 STAINLESS STEEL
S4L – 304L STAINLESS STEEL
S16 – 316 STAINLESS STEEL
S6L – 316L STAINLESS STEEL
TEF – TEFLON
VIT – VITON
TYG – TYGON

ALARMS:

1. AN ALARM THAT DISABLES ALL OR ANY PART OF THE SYSTEM WILL SEND A NOTIFICATION TO THE OPERATOR VIA THE SCADA SYSTEM.

INTERLOCKS:

1. HIGH HIGH IN KO TANK WILL DISABLE SVE BLOWER.
2. USER ADJUSTABLE LOW & HIGH VACUUM SET POINTS WILL DISABLE SVE BLOWER.
3. USER ADJUSTABLE DIFFERENTIAL PRESSURE SET POINT WILL DISABLE SVE BLOWER.
4. LSH WILL ACTIVATE THE TRANSFER PUMP. LSL WILL DISABLE THE TRANSFER PUMP.
5. FAILURE TO START WILL DISABLE SVE BLOWER.
6. HIGH PRESSURE WILL DISABLE SVE BLOWER.
7. HIGH/HIGH LEVEL ALARM WILL DISABLE ALL EQUIPMENT.
8. HIGH TEMPERATURE WILL DISABLE SVE BLOWER.
9. EMERGENCY STOP/KILL SWITCH WILL DISABLE ALL EQUIPMENT.
10. LOCALLY ADJUSTABLE TEMPERATURE SWITCH WILL OPERATE EXHAUST FAN.
11. EQUIPMENT CONTAINER EXHAUST FAN MUSTY OPERATE FOR SVE BLOWER TO OPERATE.

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D = USER'S CHOICE	DIFFERENTIAL			
E = VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE,INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = USER'S CHOICE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTEGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH	STOP	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VIBRATION, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS		RELAY,COMPUTE,CONVERT	
Z = POSITION, DIMENSION	Z AXIS	UNCLASSIFIED	DRIVE, ACTUATOR, FINAL CONTROL ELEMENT	

ABBREVIATIONS:

AC AIR COMPRESSOR
AD AIR DRYER
AI pH INDICATOR
AIT pH INDICATOR TRANSMITTER
AR AIR RECEIVER TANK
AS ANTI-SCALANT
C CENTER LINE
CAH CONDUCTIVITY ALARM HIGH
CFM CUBIC FEET PER MINUTE
CI CONDUCTIVITY INDICATOR
CIP CLEAN IN PLACE
CIT CONDUCTIVITY INDICATOR TRANSMITTER
CO CLEAN OUT
CTE CONDUCTIVITY TEMPERATURE ELEMENT
CY CUBIC YARDS
°C DEGREES CELSIUS
DPAL DIFFERENTIAL PRESSURE ALARM LOW
DPAH DIFFERENTIAL PRESSURE ALARM HIGH
DPIT DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER
DPI DIFFERENTIAL PRESSURE INDICATOR
E ELECTRIC ACTUATOR
ECIP ELECTRODE CLEAN IN PLACE
EM ENVIRONMENTAL MEDIA
ELEV ELEVATION
F FILTER
FE FLOW ELEMENT
FI FLOW INDICATOR
FIT FLOW INDICATING TRANSMITTER
FMO FLOW MONITOR
FQ FLOW TOTALIZER
FT FOOT/ FEET
FT FLOW TRANSMITTER
FV FLOW VALVE
GAC GRANULATED ACTIVATED CARBON
GAL GALLONS
GPD GALLONS PER DAY
HAZ HAZARDOUS
HDPE HIGH DENSITY POLYETHYLENE
HOA HAND/ OFF/ AUTO
HR HOUR
HS HAND SWITCH
IN. INCHES
kg KILOGRAMS
KV TIMER VALVE
L LITER
LAH LEVEL ALARM HIGH
LAHH LEVEL ALARM HIGH HIGH
LAL LEVEL ALARM LOW
LE LEVEL ELEMENT
LP LIQUID PHASE
LS LEVEL SWITCH
LT LEVEL TRANSMITTER
M MOTOR
MAX MAXIMUM
uM MICROMETER
mg MILLIMETER
MIN MINIMUM
MMF MULTIMEDIA FILTER
NA NOT APPLICABLE
NC NORMALLY CLOSED
NO NORMALLY OPEN
NPT NATIONAL PIPE THREAD
% PERCENT
LB POUNDS
PAH PRESSURE ALARM HIGH
PAL PRESSURE ALARM LOW
PI PRESSURE INDICATOR
PIT PRESSURE INDICATOR TRANSMITTER
PSIG PRESSURE PER SQUARE FOOT GAUGE
PR PRESSURE RELIEF VALVE
PRV PRESSURE REGULATING VALVE
PSV PRESSURE SAFETY VALVE
PVR PRESSURE VACUUM RELIEF
QAPP QUALITY ASSURANCE PROJECTION PLAN
NaOH SODIUM HYDROXIDE
SP SAMPLE PORT
T TANK
TAH TEMPERATURE ALARM HIGH
TAHH TEMPERATURE ALARM HIGH HIGH
TI TEMPERATURE INDICATOR
TIT TEMPERATURE INDICATOR TRANSMITTER
TYP TYPICAL
TWV THREE WAY VALVE
V VALVE
VAH VACUUM ALARM HIGH
VAL VACUUM ALARM LOW
VE VACUUM ELEMENT
VIT VACUUM INDICATING TRANSMITTER
XLPE CROSS LINKED POLYETHYLENE
YI STATUS INDICATOR
ZX POSITION INDICATOR

NOTES:
1. ANY FIRST LETTER COMBINED WITH A MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: DP= DIFFERENTIAL PRESSURE; FQ= TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER INTHE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL, SPECIFY THAT NATURE OF THE ANALYSIS. EXAMPLE: pH
3. MEANING OF A "USER'S CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.

GENERAL NOTES:
1. ALL ANALOG SET POINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE.
2. ALARMS THAT SHUT DOWN TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
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Designed by: ZV | Drawn by: BO | Checked by: JP

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SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

PIPING AND INSTRUMENTATION DIAGRAM LEGEND

DESIGN DRAWINGS

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Date FEBRUARY 2024

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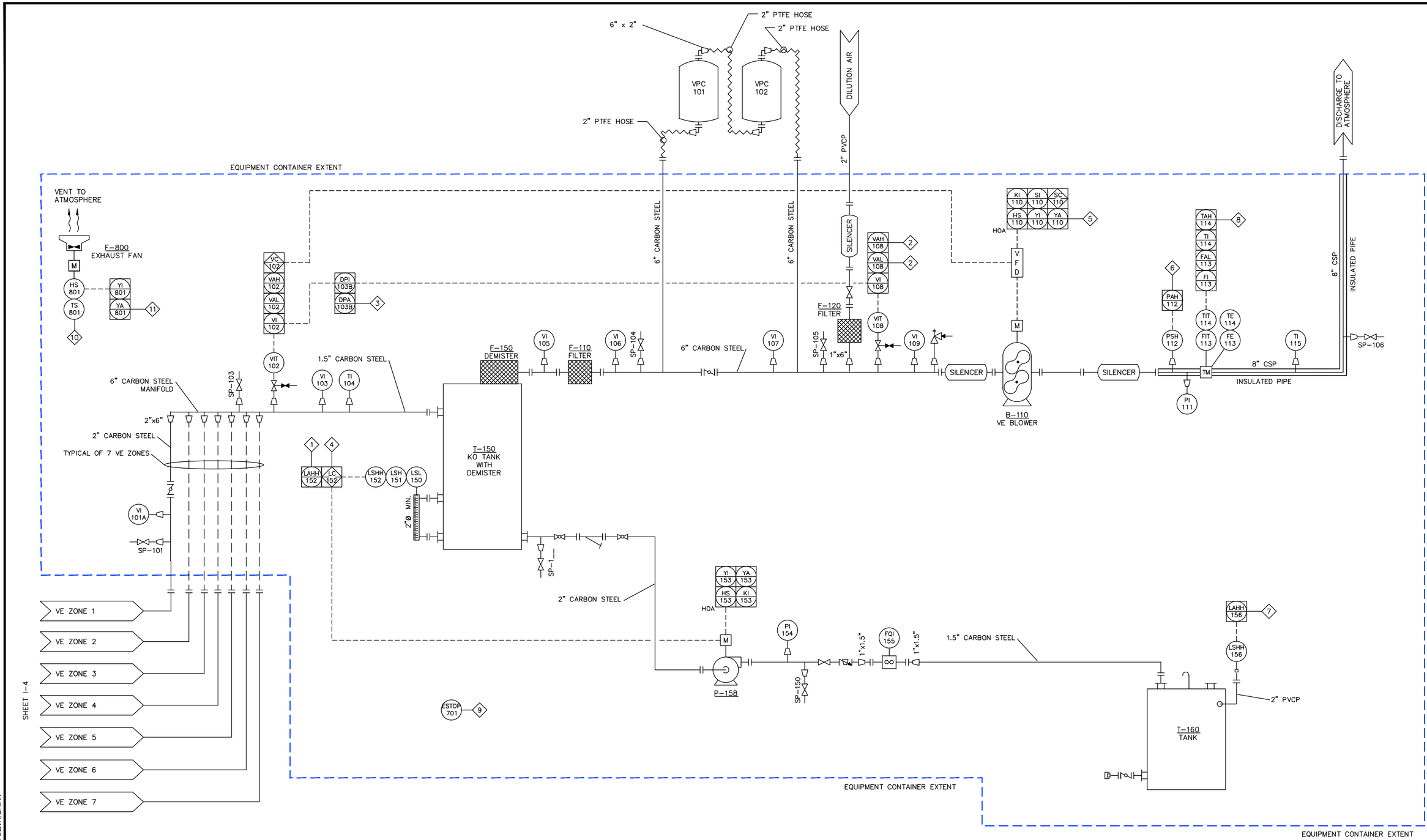

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Designed by	Drawn by	Checked by
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SOIL VAPOR EXTRACTION REMEDIATION SYSTEM

PIPING AND INSTRUMENTATION DIAGRAM SOIL VAPOR EXTRACTION

DESIGN DRAWINGS

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Appendix D

AOC M Corrective Measures Implementation Plan (November 2004)

CORRECTIVE MEASURES IMPLEMENTATION PLAN

FOR

AOC M – CARBON DISULFIDE VERTICAL STORAGE TANK #4

AKZO NOBEL FUNCTIONAL CHEMICALS LLC

AXIS, ALABAMA

EPA ID No. ALD 008 161 176

NOVEMBER 2004

Prepared for:

Akzo Nobel Functional Chemicals LLC

13440 Highway 43 North

Axis, Alabama 36505

Prepared by:

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111-A North Gold Drive

Robbinsville, New Jersey 08691

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Figure 1 – Regional Facility Location Map

Figure 2 – Facility Location Map

Figure 3 – Layout of Main Production Area

Figure 4 – AOC M Location Map

Figure 5 – Carbon Disulfide in Groundwater – AOC M

Figure 6 – Proposed Locations of Groundwater Monitoring Wells and Recovery Well

Figure 7 – Source Area Recovery Well IW-6 Schematic

Figure 8 – Process Flow Diagram

Tables:

Table 1 – Summary of Carbon Disulfide Concentrations in Groundwater – AOC M

Appendices:

Appendix A – Groundwater Sampling Logs, October 6-7, 2004

Appendix B – Groundwater Modeling Results Report, ESI – November 2004

Attachments:

Attachment 1 – Pace Analytical Services, Inc. Laboratory Analysis Results Report #2039937

1. INTRODUCTION

Akzo Nobel Functional Chemicals LLC (Akzo Nobel) is submitting this Corrective Measures Implementation Plan (CMI Plan) for their facility located on Highway 43 North in Axis, Mobile County, Alabama. This CMI Plan is submitted in accordance with the Alabama Department of Environmental Management's (ADEM) correspondence to Akzo Nobel dated July 20, 2004. Specifically, this CMI Plan addresses Area of Concern M (AOC M) – Carbon Disulfide Vertical Storage Tank #4.

1.1 Background

1.1.1 Facility Description

The Akzo Nobel facility is located in the LeMoyne Industrial Park approximately 20 miles north of Mobile, Alabama on U.S. Highway 43 North in Axis, Alabama. Akzo Nobel's LeMoyne plant is approximately 741 acres, the majority of which is undeveloped woodland.

The Akzo Nobel plant is located at latitude N 30°58'17" and longitude W 88°1'30". A regional facility location map is provided as Figure 1. A more detailed depiction of the Akzo Nobel facility location and adjoining properties is provided as Figure 2. The Akzo Nobel plant is bounded to the south by the former Acordis Cellulosic Fibers Inc. property (formerly Courtaulds, and now owned by Mobile County) and to the north by Syngenta (Cold Creek) and undeveloped land owned by Alabama Power Company. The Mobile River is located along the eastern property boundary and U.S. Highway 43 is located along the western property boundary.

The area surrounding the LeMoyne plant is predominantly industrial with a few small residential communities located within a few miles of the site. Regionally, the area is sparsely populated and is primarily river bottom land and wetlands.

1.1.2 Facility Operations

Chemical manufacturing began at the site when Stauffer Chemical Company purchased the property in 1953. Prior to that time, the property was used by Southern Alabama Lumber. Between 1953 and 1985, Stauffer Chemical operated a multi-product chemical manufacturing plant at the site. Stauffer's production facilities included carbon disulfide, sulfuric acid, carbon tetrachloride, caustic/chlorine, Crystex® and metam sodium (formerly known as Vapam).

Cheseborough Ponds purchased Stauffer Chemical in 1985 and made it a separate division of the company. Unilever subsequently purchased Cheseborough Ponds and then sold Stauffer Chemical to ICI Americas a few months after the acquisition. A few months later, ICI Americas sold the specialty chemical division to Akzo Chemie America, Inc. (now Akzo Nobel Chemicals Inc.) on August 19, 1987. The LeMoyne plant is operated by Akzo Nobel Functional Chemicals LLC.

Currently, Akzo Nobel's LeMoyne plant manufactures inorganic and organic compounds including carbon disulfide, sulfuric acid, sulfur chlorides, monochloroacetic acid (MCA), sodium hydrosulfide, and Crystex®, a proprietary sulfur compound. The processes and operations at the site included ten plants, of which six are currently operating, one is inactive (metam sodium) and three have been demolished. The layout of the main production area of the plant is depicted on Figure 3. For a more detailed description of the plant's ownership and

operational history, please refer to the RCRA Facility Assessment (April 5, 2001, revised February 22, 2002).

1.2 Regulatory Setting – AOC M

In March 1992, USEPA completed a RCRA Facility Assessment (RFA) of the LeMoyne plant. A total of 139 SWMUs and 14 AOCs were identified during the RFA. No further action was recommended for 106 SWMUs and 6 AOCs. Confirmatory sampling was suggested for 25 SWMUs and 8 AOCs. A RCRA Facility Investigation (RFI) was suggested for an additional 8 SWMUs. Finally, confirmatory sampling was recommended for another 8 SWMUs and 3 AOCs unless adequate documentation of proper demolition could be provided.

In September 1999, ADEM and TechLaw (an EPA Contractor) completed a RFA of the LeMoyne plant and issued a revised RFA report dated April 5, 2001, which was subsequently revised and dated February 22, 2002. The revised RFA suggested a RFI for AOC M and SWMU 146. AOC M is the area of vertical storage tank #4 and is located along the LeMoyne plant's southern property boundary as depicted on Figure 4. ADEM's subsequent notification letter dated November 25, 2002 and Akzo Nobel's permit to be issued by ADEM in the future also specify completion of an RFI at AOC M and SWMU 146.

An RFI Workplan for AOC M and SWMU 146 was submitted to ADEM on June 9, 2003. ADEM approved the RFI Workplan in correspondence dated September 2, 2003. The results of the RFI of AOC M and SWMU 146 were presented in a RFI Report dated May 28, 2004. ADEM approved the RFI Report and, due to the concentration of carbon disulfide in wells in the area of AOC M, required a CMI Plan for this area in a correspondence to Akzo Nobel dated July 20, 2004. Background information pertaining to AOC M is provided in the following sections.

1.3 Background Information – AOC M

A release from vertical storage tank #4 of an estimated 6,200 lbs. of carbon disulfide occurred in November 1994. An estimated 600 lbs. of carbon disulfide was recovered. During the RFA, this location was designated as AOC M. At the time of the release, the area of AOC M was under hydraulic control due to the operation of three intercept wells located in the area. Vertical storage tank #4 is located between and proximal to intercept wells IW-1 and IW-2. Intercept well IW-3 is located approximately 360 feet west of vertical storage tank #4. All of these intercept wells fully penetrate the shallow aquifer and terminate on a basal clay layer. The intercept well system has been in operation since 1980.

Akzo Nobel emptied and cleaned vertical storage tank #4 after the release. In November 1994, Akzo Nobel conducted soil remediation by excavation and off-site disposal of 216 cubic yards of soil. Akzo Nobel subsequently conducted two soil quality investigations in the area of AOC M during the period February 27 through March 2, 1995 and on August 9, 1995. Akzo Nobel conducted a soil vapor extraction (SVE) pilot test and preliminary SVE system design during the period September 1995 through November 1995. The area of AOC M remains under hydraulic control from the groundwater recovery system that has been operating since 1980 and under the authority of CERCLA since 1990.

Non-detectable to very low concentrations of carbon disulfide were detected in soil samples collected from the around the perimeter of vertical storage tank #4 during the RFI in November 2003. Elevated concentrations of carbon disulfide were detected in groundwater samples collected from well pair O-36 and O-37 which are located on the eastern (downgradient) side of vertical storage tank #4. The concentrations of carbon disulfide in wells O-29 and O-30, which are located on the western (upgradient) side of

vertical storage tank #4, were below the preliminary screening value (PSV) which is the USEPA Region 9 Preliminary Remediation Goal of 1,000 µg/L (tap water).

1.4 CMI Plan Objectives

In accordance with ADEM correspondence dated July 20, 2004, there are two objectives of the CMI Plan for AOC M. The first objective is to determine the horizontal and vertical extent of carbon disulfide in groundwater in AOC M. The second objective is to develop a remedy for groundwater in AOC M, including procedures to implement and monitor the remedy, for inclusion in Akzo's Hazardous Waste Management and Minimization Act permit. The CMI Plan must be implemented in phases because the extent of carbon disulfide in groundwater has not yet been delineated. Therefore, a field sampling plan is included herein which proposes installation and sampling of two groundwater monitoring wells. One well will be installed to determine the horizontal extend of carbon disulfide south of vertical storage tank #4 and one well will be installed to determine the vertical extent of carbon disulfide in groundwater in the area.

1.5 Organization of CMI Plan

This CMI Plan is organized into five sections as follows.

Section 1 presents background information on the Akzo Nobel facility including an overview of the plant operations, regulatory setting and CMI Plan objectives.

Section 2 presents the physical characteristics of the plant including topography, geology and hydrogeology and a description of AOC M.

Section 3 presents the Field Sampling Plan for horizontal and vertical delineation of carbon disulfide in groundwater in AOC M.

Section 4 presents the proposed remedy for groundwater in AOC M.

Section 5 presents a schedule for implementation of the CMI Plan.

The following Appendices and Attachments are included in this CMI Plan.

Appendix A – Groundwater Sampling Logs, October 6-7, 2004

Appendix B - ESI Groundwater Model Results

Attachment 1 - Pace Analytical Services Inc. Laboratory Analysis Results Report
October 6-7, 2004 Groundwater Sampling Event

2. DESCRIPTION OF CURRENT CONDITIONS

The following sections provide a description of the physical characteristics of the site.

2.1 Topography and Site Features

The Akzo Nobel facility is located in Section 12 of Township 1 South, Range 1 West in Mobile County, Alabama. The facility is located on U.S. Highway 43 in Axis, Alabama approximately 20 miles north of Mobile, Alabama. Land to the south and north of the facility is industrial; to the west is Highway 43 and to the east is the Mobile River.

The main production area of the facility is located on a Quaternary-age river terrace of the Alabama River system, approximately 1.5 miles west of the Mobile River. The terrace is nearly flat, ranging in elevation from about 10 ft. above mean sea level (msl) near the Mobile River to approximately 45 ft. above msl 2,100 ft. west of the river in the undeveloped portion of the property. Topographic relief occurs along the streams and creeks that are tributaries to the Mobile River. The facility occupies land along the south side of Cold Creek. About 1 mile west of the facility, the river terrace terminates at low hills of Tertiary-age clay and sand sediments that reach a maximum elevation of about 300 ft above msl.

The elevation in the vicinity of AOC M is approximately 37 ft. above msl. The elevation of the Unnamed Tributary, which flows from southwest to northeast approximately 300 ft. north of AOC M, is approximately 24 ft. above msl. Therefore, topography in the area of AOC M slopes north toward the Unnamed Tributary.

Drainage within the facility is controlled by a plant-wide system of earthen ditches, underground pipes, and storm drains. In general, drainage from non-process sections of

the facility is conveyed to the Unnamed Tributary south and east of the main production area of the facility.

The topography of the facility and surrounding area is shown on Figure 2, which consists of portions of the Creola and Basin 7.5-minute quadrangle maps developed by the U.S. Geological Survey (USGS).

2.2 Site Geology and Hydrogeology

In general, the stratigraphy at the site is typified by a thin layer of fill (soil) material. Under the fill material, natural clay soils are present to depths ranging from approximately 15 to 20 feet below land surface (bls). This clay layer grades downward into alluvial deposits consisting of sand with minor amounts of silt and clay and occasional lenses of clay and silty clay. Review of historical boring logs indicates that the sand ranges from fine to coarse and is poorly to well sorted. A general trend of increasing grain size with increasing depth has been observed at the site. The base of the alluvial sand layer has high percentages of coarse sand and gravel. A dense blue clay underlies the sand. In the area of AOC M, the clay is encountered at a depth of 120+ feet below grade. The thickness of this basal clay layer is unknown.

The shallowest aquifer beneath the site occurs within the basal sand and gravel beds of the alluvium deposit. This aquifer is used by the Akzo Nobel facility as a source of process water from onsite production wells. The aquifer can be locally semi-confined in the western portion of the site but is generally characterized by unconfined water table conditions in the plant area. Saturated thickness ranges from about 65 to 75 feet, but water production is primarily from the 15- to 25-feet thick gravelly sand present at the base of the aquifer (i.e. above the basal clay). [In October 2004, the saturated thickness in AOC M was greater than 90 ft.] The transmissivity of the basal portion of the aquifer is estimated to be about 91,000 gallons per day (gpd) per foot. Historically, the

groundwater gradient across most of the site, and particularly in the area of AOC M, was toward the south due primarily to groundwater withdrawal from production wells at the former Courtaulds facility (now Mobile County Industrial Park), which has ceased operation. As indicated on Figure 9 (Groundwater Contour Map, November 2003) in the May 2004 RFI Report, there is a cone of depression centered approximately on AOC M due to pumping from three intercept wells in the area. Groundwater throughout the main production area of the plant, from a large area south of AOC M (off-site) and from a small area east of the main production area is captured by this cone of depression. In November 2003, water table elevations ranged from about 12 ft. above msl to 5.5 ft. above msl.

Currently, the Akzo Nobel LeMoyne facility has 91 monitoring wells, some of which are used for collection of groundwater samples and water level measurements, and five intercept wells which are used to contain the groundwater plume. The intercept wells are part of a groundwater remediation program (under CERCLA) installed to contain off-site migration of a contaminant plume and reduce the concentration of contaminants in groundwater. These wells are installed into the alluvial aquifer beneath the site.

2.3 Description of AOC M

Vertical storage tank #4 is located southwest of the LeCreek Wastewater Treatment Pond (SWMU 14). Vertical storage tank #4 is a one-million gallon steel tank that sits on a compacted sand base and is surrounded by a ring of concrete and a steel wall which forms a "moat". The concrete is covered by a layer of asphalt and extends approximately two feet from the edge of the moat wall.

The tank was discovered to be leaking on November 14, 1994. Carbon disulfide had leaked from the bottom of the tank where it pooled before emerging at the base of the tank. An estimated 6,200 lbs of carbon disulfide were released, of which an estimated

600 lbs were recovered. During November and December 1994, approximately 216 tons of contaminated soil were excavated and disposed off-site at Chemical Waste Management in Emelle, Alabama. The 1994 leak prompted the facility to take the tank out of service. The tank was immediately taken out of service and subsequently decontaminated.

Following the discovery of the release of carbon disulfide from vertical storage tank #4 in November 1994, an interim remedial action was immediately performed as mentioned above. Carbon disulfide is extremely volatile, with a vapor pressure of approximately 360 mmHg at 25°C. As such, a significant percentage of the carbon disulfide likely attenuated by volatilization.

The soil excavation discussed above was conducted around the northern perimeter of vertical storage tank #4 and a small area topographically downgradient (northeast) of the tank. The excavation varied in depth from one to three feet below grade. Analysis of post-excavation soil samples indicated non-detectable concentrations of carbon disulfide. This finding indicates that surface soil affected by the release of carbon disulfide was remediated.

As previously mentioned, investigations of subsurface soil quality were conducted by Akzo in February-March 1995, August 1995 and during the RFI in November 2003. The results of these investigations, along with the results of a groundwater investigation conducted in November 2003, have been incorporated into the database and are presented in the May 2004 RFI Report. As indicated on the logs for soil borings installed in AOC M during the November 2003 RFI, silty, clayey sand and poorly graded sand with silt and clay were encountered in the area at depths ranging from 7.5 to 12.0 feet below grade around vertical storage tank #4. These fine grained sediments are underlain by poorly graded sand. Driller logs for Intercept Wells in the area of AOC M indicate that the lower 50+ feet of this sand unit contains coarse sand and gravel. This sand/gravel unit is

underlain by a clay layer referred to in the records as the "basal clay". The thickness of the basal clay layer in the site area is unknown.

3. FIELD SAMPLING PLAN

This section presents the results of recent field sampling activities conducted at AOC M to facilitate preparation of this CMI Plan. This section also presents a field sampling plan to accomplish horizontal and vertical delineation of carbon disulfide in groundwater at AOC M.

3.1 Recent Groundwater Quality Data – AOC M

ADEM's July 20, 2004 letter to Akzo Nobel notes the elevated concentration of carbon disulfide detected in wells O-36 and O-37 which are located approximately 30 ft. east of vertical storage tank #4 and were sampled during the RFI in November and December 2003. ADEM further states "*...the horizontal and vertical extent of the carbon disulfide plume in groundwater should be determined to the MCL. If the plume can be delineated using existing wells, this may be appropriate. However, additional wells may be required to fully delineate the plume. These additional delineation activities should be addressed in the CMI Plan.*"

The horizontal extent of carbon disulfide west and southwest of vertical storage tank #4 was demonstrated during the RFI. Specifically, the concentrations of carbon disulfide in well O-29 (7.9 µg/L) and O-30 (278 µg/L) are below the preliminary screening value (PSV) identified in the RFI Workplan. The PSV for carbon disulfide is the USEPA Region 9 Preliminary Remedial Goal - Direct Contact Exposure Pathway (PRG) for tap water of 1,000 µg/L. Therefore, the horizontal delineation objective is to determine the horizontal extent of carbon disulfide in groundwater to the north, east and south of vertical storage tank #4. To determine groundwater quality in these downgradient and sidegradient directions, the closest existing monitoring wells to vertical storage tank #4 were selected for collection and analysis of groundwater samples.

The following wells were selected for sampling to determine the horizontal extent of carbon disulfide in groundwater in AOC M: O-38, O-39, O-48, O-49, O-65, O-66 and O-76. The locations of these wells are depicted on Figure 5. All monitoring wells listed above have been developed within the last five years. Well O-7 was also selected for sampling to enable determination of the concentration of carbon disulfide in groundwater along the site's southern property boundary. However, this well has five distinct screened intervals. Additionally, field inspection revealed that well O-7 is filled with silt to a depth of approximately 60 ft. below grade, whereas the well's original depth was 134 ft. As a result of these findings, well O-7 was not used for groundwater quality monitoring. Therefore, a data gap has been identified relating to horizontal delineation of carbon disulfide in groundwater in the southern portion of AOC M. Additionally, there are no existing monitoring wells that are screened below the basal clay layer. Since the well containing the highest concentration of carbon disulfide (O-36) in AOC M is screened from 108-128 ft. (i.e. on top of the basal clay), a data gap has been identified relating to vertical delineation of carbon disulfide. As discussed in further detail below, a new monitoring well (O-7R) will be installed at the location of well O-7 and well O-7 will be properly abandoned. Additionally, a vertical delineation well will be installed downgradient of vertical storage tank #4.

On October 6-7, 2004 groundwater samples were collected from the monitoring wells listed above for analysis for carbon disulfide by USEPA method 8260. Well purging, collection of field measurements and collection of groundwater samples was conducted by Eco-Systems, Inc. of Fairhope, AL. Analysis of groundwater samples was conducted by Pace Analytical Services, Inc. of Saint Rose, LA. Groundwater Sample Collection Logs, which summarize field measurements collected during purging and sampling of each well, are provided in Appendix A. The results of laboratory analysis of groundwater samples collected from AOC M are provided in Pace Analytical Services' report in Attachment 1. Table 1 presents a summary of the results of analysis of groundwater

samples collected from AOC M in October 2004 and during the RFI in November and December 2003.

As indicated in Table 1, the only wells in AOC M that contain carbon disulfide in concentrations that exceed the PSV are O-36 and O-37. Carbon disulfide was not detected in groundwater samples collected from six of the seven wells in AOC M that were sampled in October 2004. Well O-39 contained only 5.21 µg/L of carbon disulfide. These results indicate that the horizontal extent of carbon disulfide in groundwater in AOC M has been delineated west, north and east of vertical storage tank #4.

3.2 Field Sampling Goals

The goals of the field sampling plan are 1) to delineate the horizontal extent of carbon disulfide in the southern portion of AOC M, and 2) to delineate the vertical extent of carbon disulfide below the alluvial aquifer.

3.3 Sampling and Analysis Plan

This section describes the tasks that will be conducted to accomplish the field sampling plan goals described above. All work will be conducted in accordance with project's Quality Assurance Project Plan which was provided in the RFI Workplan (June 2003) for AOC M and SWMU 146 and Alabama Environmental Investigation and Remediation Guidance (October 2002).

3.3.1 Installation of Monitoring Wells

Two groundwater monitoring wells will be installed in the area of AOC M. One of the wells (to be identified as MW-24) will be installed to determine the vertical extent of carbon disulfide in groundwater. The second well (to be identified as O-

7R) will be installed to determine the horizontal extent of carbon disulfide in groundwater along the southern property boundary.

Vertical delineation well MW-24 will be installed east of wells O-36 and O-37 along the South Access road as depicted on Figure 6. The proposed location of the vertical delineation well was selected based on the following rationale:

- The location is downgradient of AOC M in the direction of plume migration.
- The location is presumed to be beyond the source area thereby limiting the potential for "dragging" contaminants vertically downward during the well drilling process.
- The location affords drilling equipment access due to the presence of the South Access road and suitable terrain.

Horizontal delineation well O-7R will be installed at the location of existing well O-7. Monitoring well O-7 can not be used for the purpose of determining groundwater quality because it has five distinct screened intervals and is filled with silt from its total depth of 134 ft. to approximately 60 ft. below grade. A monitoring well is needed at this location because no other wells exist on site to evaluate groundwater quality south of AOC M.

The proposed monitoring wells will be installed using a relatively new drilling method known as Rotosonic (or simply 'sonic') drilling (although other drilling methods including mud rotary will also be evaluated for use at the site). Sonic drilling has been used in the mineral exploration, mining, geotechnical and construction industries and is becoming more common in environmental site investigations. Sonic drilling does not use a drilling fluid. As such, waste generated during well installation is limited to the soil core/cuttings removed to create the open borehole. Sonic drilling combines the use of conventional

rotational power with high frequency mechanical vibration forces generated by a hydraulically powered drill head or oscillator. The vibrational forces are transmitted down the drill string to advance both the core barrels and the outer, or override, casing through overburden and soft bedrock. The core barrel is advanced ahead of the casing in 5 to 30 ft. increments. The override casing is then advanced down to the depth of the core barrel before retrieval of the sample core to keep the borehole open. By advancing outer casing during drilling, and in the case of the vertical delineation well, into the basal clay layer, contaminants present in the unconfined water table aquifer are isolated from underlying zones.

For vertical delineation well MW-24, a permanent outer casing will be set approximately ten feet into the basal clay and grouted in place using the tremie method. The grout will be allowed to cure for 24-hours after which drilling to set the two-inch diameter well will resume. The depth to the basal clay layer in the area of proposed vertical delineation well MW-24 is unknown. Therefore, the actual construction specifications of the well will be based on observations made by the field geologist during drilling. The anticipated specifications of vertical delineation monitoring well MW-24 are as follows:

- 140 ft. of 6-in. diameter outer PVC casing, set approximately 10 ft. into the basal clay layer and sealed with a cement-bentonite grout;
- 10 ft. of 2-in. diameter, 0.020-slot PVC screen and 150 ft. of PVC casing;
- #0 Morie sand or equivalent to 2 ft. above the screened interval and cement-bentonite grout to grade (i.e. between the inner and outer casing); and,
- 6-in. diameter locking steel protective standpipe set in a 2ft. x 2ft. concrete pad.

The anticipated specifications of the horizontal delineation monitoring well O-7R are as follows:

- 20 ft. of 2-in. diameter, 0.020-slot PVC screen and 110 ft. of PVC casing;
- #0 Morie sand or equivalent to 2 ft. above the screened interval and cement-bentonite grout to grade; and,
- 6-in. diameter locking steel protective standpipe set in a 2ft. x 2ft. concrete pad.

The soil cores collected during drilling will be described by a geologist using the Unified Soils Classification System. A log of soil/sediments encountered during drilling will be prepared by the field geologist. Each sample core will also be screened for the presence of organic vapors using a photoionization detector (PID) equipped with an 11.7eV lamp.

The monitoring wells will be developed by over-pumping immediately after installation. The wells will be pumped until a turbid-free discharge is observed. Well development fluids will be containerized and disposed of properly.

3.3.2 Collection of Groundwater Samples

Groundwater samples will be collected from new monitoring wells MW-24 and O-7R in accordance with procedures described in Alabama Environmental Investigation and Remediation Guidance (October 2002). Groundwater samples will be collected after the wells have been purged of a minimum of three well volumes and field measurements of pH, conductivity, temperature and turbidity have stabilized. The groundwater samples will be analyzed for carbon disulfide by USEPA method 8260B. Quality assurance samples will be collected in accordance with the project's Quality Assurance Project Plan and will include one field blank, one trip blank and one duplicate sample.

The results of analysis of groundwater samples collected from MW-24 and O-7R will be compared to the PSV to determine whether the delineation objectives have been accomplished.

4. CORRECTIVE MEASURES IMPLEMENTATION

This section presents the proposed remedy and implementation process for groundwater at AOC M. The Alabama Environmental Investigation and Remediation Guidance (revised October 2002) and USEPA's Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action (April 2004) were used as guidance in the preparation of this component of the CMI Plan.

4.1 Background

As previously mentioned, site groundwater is governed by CERCLA as Operable Unit 1. Additionally, a groundwater pump and treat system has been operating at the site since 1980. The pump and treat system, which consists of five intercept wells and a groundwater improvement pond (GWIP), has maintained hydraulic control of groundwater across the entire plant production area and a large portion of off-site groundwater south of the site. In fact, the most significant hydraulic influence exerted by the intercept well system occurs in the area of AOC M where three intercept wells are located. Vertical storage tank #4 is located between intercept wells IW-1 and IW-2.

The intercept well system acts as an engineering control that prevents migration of groundwater affected by carbon disulfide. This fact has been confirmed by the results of analysis of groundwater samples collected from the area in October 2004 which indicate that carbon disulfide has not migrated from the immediate vicinity of vertical storage tank #4. It has also been an effective groundwater remedy in the area of AOC M. As indicated in the concentration vs. time graph for intercept well IW-2 (the closest intercept well to vertical storage tank #4) provided in Appendix E of the RFI Workplan dated June 2003, the concentration of carbon disulfide has steadily decreased since the spike detected in January 1995, two months after the November 1994 release described in

Section 2.3. In fact, the intercept well system had reduced the concentration of carbon disulfide in groundwater to asymptotic conditions that approximated the USEPA's Preliminary Remedial Goal (PRG) of 1,000 µg/L for a prolonged period of time prior to the November 1994 release from vertical storage tank #4. Similarly, recovery of groundwater from IW-1 reduced the concentration of carbon disulfide to below the PRG by January 1983. The concentration of carbon disulfide remained below the PRG virtually every month through 1994. After the release in November 1994, the concentration of carbon disulfide reached its peak in August 1995, and has steadily declined since that time.

In addition to the remedy described above, site groundwater is also subject to institutional control. The Akzo Nobel facility is located within the LeMoyne Industrial Park, which is restricted to industrial development through an agreement amongst various industrial entities. The industrial park was established under the provisions of Act No. 604 of the 1978 Regular Session, and codified as Sections 11-23-1 through 11-23-8 inclusive, Code of Alabama 1975. The agreement established for the LeMoyne Industrial Park permits only industrial development and activities within the industrial park. Therefore, residential development of any property within the industrial park is prohibited.

Additionally, the deed to the Akzo Nobel property is restricted in accordance with the CERCLA Consent Decree entered on April 25, 1990 by the United States District Court for the Southern District of Alabama, Southern Division, in the United States of America v. Akzo Chemicals Inc. and ICI Americas Inc., Civil Action File No. 90-0162-B-C. Specific restrictions prohibit 1) use of the property in a manner that would interfere with the performance of work defined in the Consent Decree, 2) use of the property in a manner which would adversely affect the integrity or function of the groundwater intercept and treatment system or the groundwater monitoring system required in accordance with the Consent Decree, 3) placement of drinking water wells on the property prior to completion of work required by the Consent Decree, and 4) placement

of drinking water wells into any of the SWMUs on the property which are identified in Appendix 2 of the Consent Decree.

Copies of the LeMoyne Industrial Park agreement and the Deed Notice were provided in Appendix F of the RFI Workplan dated June 2003.

4.1.1 Results of Groundwater Modeling

Geraghty & Miller, Inc. prepared a groundwater flow model for the site in 1992 using the popular USGS model MODFLOW. The objective of the model was to evaluate groundwater capture of the intercept well system previously described herein. The model was described in their January 1992 report titled "Preliminary Design Report, Stauffer Chemical Company Sites, Ground-Water Operable Unit, Volume II, Development of Ground-Water Flow Models". The electronic files for the model no longer exist, therefore the report and accompanying figures were used to reconstruct the original model.

The updated model was recalibrated using June 2004 groundwater elevation data and pumping well flow rates for the intercept wells, on-site industrial supply wells and off-site industrial supply wells in the region. The objectives of the new modeling effort were to 1) evaluate the effects on onsite hydraulic control from significantly decreased withdrawal from supply wells on the former Courtaulds facility south of the site, and 2) enable evaluation of the effects of alternate pumping scenarios for on-site wells.

A detailed discussion of the model is provided in Appendix B. As indicated on Figure 7 in the model report, the intercept well system exerts hydraulic control over almost the entire production area of the site and a significant portion of land south of the site. Additionally, the groundwater flow path to intercept well IW-4

(off-site and south of the undeveloped portion of the site) originates from properties south of the Akzo Nobel property. This condition may be a function of the significant reduction of groundwater withdrawal at the former Courtaulds site and resulting change in groundwater flow direction.

4.2 Remediation Objectives

The contaminant of concern for groundwater in AOC M is carbon disulfide. Per the Record of Decision for Operable Unit 1, the groundwater cleanup goal for carbon disulfide is 700 µg/L. However, noting that groundwater in AOC M is a small component of Operable Unit 1 for which a remedy already exists and noting that it may be technically impracticable to achieve the PRG in this circumstance, achievement of the PRG for groundwater at AOC M is not proposed herein.

There are two proposed remediation objectives for groundwater at AOC M. The first objective is to control the migration of contaminated groundwater away from the source area. Groundwater samples collected from well O-36, which is located approximately 30 ft. east of vertical storage tank #4, contained 378,000 µg/L of carbon disulfide when last sampled on December 15, 2003. Preventing the migration of groundwater from the source area will prevent additional contamination of groundwater downgradient of this area.

The second remediation objective for groundwater in AOC M is to reduce the concentration of carbon disulfide in the source area to facilitate achievement of remediation goals for Operable Unit 1.

As described below in Section 4.3.6 (Monitoring Plan), routine monitoring will be conducted to measure progress toward attainment of the remedial objectives. Attainment of these goals will be demonstrated when the following conditions exist.

- For control of plume migration: (1) the concentration of carbon disulfide decreases in plume fringe wells in AOC M over four consecutive quarterly monitoring events; or, (2) a best-fit line on a log-linear plot of the concentration of carbon disulfide over eight consecutive quarterly monitoring events indicates a negative slope. Plume fringe wells are those wells that define the horizontal extent of carbon disulfide in groundwater by containing detectable concentrations of carbon disulfide which are below the PRG. Plume fringe wells include O-29, O-30 and O-39. Depending on the concentration of carbon disulfide in proposed well O-7R, this well may also be considered a plume fringe well and added to the list of wells sampled on a quarterly basis.
- For source concentration reduction: the concentration of carbon disulfide in well O-36 decreases two orders of magnitude (i.e. 378 mg/L to 3.78 mg/L), or, the concentration of carbon disulfide in IW-2 attenuates to the asymptotic conditions that existed in this well during 1994 prior to the release of carbon disulfide in November 1994. Specifically, the target asymptotic condition is the average concentration of carbon disulfide (1.76 mg/L) that existed in IW-2 over the period January 1994 through November 1994.

The remediation objectives are consistent with USEPA policy regarding groundwater protection and cleanup for RCRA Corrective Action and are also considered achievable and appropriate for AOC M. Rationale supporting the proposed cleanup objectives include:

- The plant is located in the LeMoyne Industrial Park where large portions of the water table aquifer are restricted from potable use. The entire water table aquifer within the 741 acre Akzo Nobel property is designated non-drinking water in accordance with the CERCLA Consent Decree.

- Groundwater at the Akzo Nobel property has no current or foreseeable beneficial use.
- Groundwater at AOC M does not discharge to surface water or to a drinking water aquifer at levels that could cause concern.
- Groundwater at the Akzo Nobel property does not cause other exposures through media transfer (i.e. indoor air).
- Groundwater at AOC M and through the entire production area of the plant is under hydraulic control and being remediated by the intercept well system under CERCLA.

4.3 Remediation Plan Summary

Containment of plume migration and reduction of the source area concentration of carbon disulfide can be accomplished by recovery of groundwater from the source area. Although generally considered a containment strategy, groundwater recovery (i.e. pump and treat) can be an effective remediation strategy at sites where the aquifer materials are permeable and contain negligible organic carbon. In such circumstances, adsorption of contaminants to aquifer materials is minimal and allows for more efficient removal of contaminants from groundwater. As documented in the RFI Report dated May 2004, the aquifer in the area of AOC M consists of 84% sand at 24 ft. below grade and is generally void of organic carbon. Although analysis of soil samples from deeper intervals was not conducted during the RFI, the RFA dated February 2002 reports that the aquifer is more permeable with increasing depth and contains gravel layers at its base. These factors, combined with the observed trend of decreasing concentrations of carbon disulfide over time in groundwater samples collected from Intercept Wells IW-1 and IW-2, indicate that groundwater recovery is a feasible remedial alternative for groundwater at AOC M.

Implementation of corrective measures to remediate groundwater at AOC M will be conducted in phases. As described in the following sections, remediation of groundwater

at AOC M will involve utilization of components of the existing Operable Unit 1 groundwater remediation system.

4.3.1 Installation of a Source Area Groundwater Recovery Well

The concentration of carbon disulfide in monitoring well O-36 is considered indicative of source area groundwater quality. Ideally, groundwater recovery would be conducted from well O-36. As indicated in the RFI Report dated May 28, 2004, an obstruction was encountered in this well during implementation of the RFI. The obstruction was pushed to the bottom of the well thereby enabling use of the well as a monitoring point. However, well O-36 is not considered to be an effective recovery well because of the presence of this obstruction, its small diameter (4 inches), limited screen length (20 feet), material of construction (machine slotted PVC) and age (installed in 1978).

A groundwater recovery well (to be identified as IW-6) will be installed in proximity to source area monitoring well O-36 as depicted on Figure 6. The recovery well will be completed on top of the basal clay in the area at an approximate depth of 130 ft. below grade. The actual depth of the recovery well will be determined by the field geologist and will be based on the depth at which the basal clay is encountered. The proposed recovery well will be installed using the sonic drilling method described in Section 3.3.1.

The depth to the basal clay layer in the area of the proposed recovery well is approximately 130 ft. Therefore, the anticipated specifications of IW-6 are as follows:

- 50 ft. of 6-in. diameter, 0.040-slot, continuous wrap stainless steel screen;
- 80 ft. of 6-in. diameter carbon steel casing;

- #2 Morie sand or equivalent to 2 ft. above the screened interval and cement-bentonite grout to grade; and,
- 2 ft. x 2 ft. locking steel vault at grade.

A schematic of the proposed recovery well is provided as Figure 7.

IW-6 will be developed by over-pumping to remove any sediment that may have accumulated in the well during construction and to optimize the hydraulic connection between the well screen and the formation. The well will be pumped until a turbid-free discharge is observed. Well development fluids will be containerized and disposed of properly.

4.3.2 Recovery Well Testing

The yield of IW-6 will be determined by performance of a step-drawdown test. The objective of the step-drawdown test is to determine the optimum pumping rate of IW-6 such that it operates at or near its maximum efficiency. Groundwater pumped from IW-6 during the test will be discharged to the LeCreek WWTP for treatment.

After new recovery well IW-6 is installed and tested and an optimum pumping rate is determined, the effects of long term groundwater withdrawal from IW-6 on the capture zone will be evaluated using the model. It is anticipated that operation of well IW-6 will enable reduction of the flow rate of one or more of the intercept wells located in the area of AOC M to alleviate current recovery of groundwater from an extensive off-site area.

4.3.3 Equipment Specification and Design

Components of the pumping system will be specified after the optimum flow rate of IW-6 is determined by the step-drawdown test and the discharge head is calculated. Components of the system that will be specified during this process include the submersible pump, discharge piping, sample port, flow control valve, flow meter, level control apparatus, and electrical service. This task will also include determination of the flow capacity of the existing recovered groundwater manifold piping.

A piping and instrumentation diagram and equipment specification list will be prepared upon completion of this task to facilitate construction of the proposed corrective measure. A preliminary layout of the proposed corrective measure is provided as Figure 8.

4.3.4 Installation of Source Area Groundwater Recovery Components

After completion of equipment specification and design activities, competitive bids will be obtained for installation of the recovery system components described above.

The selected contractor will provide all labor, materials and equipment necessary to install the groundwater recovery system in accordance with the design and specifications.

4.3.5 Start-up and Adjustment of Source Area Groundwater Recovery System

After completion of installation, the system will be tested for proper operation and adjusted to maintain the desired flow rate. Exposed components will be inspected for leaks and repaired as necessary. System controls (i.e. level sensor, pump stop/start controls, system alarm, etc.) will also be tested for proper operation.

4.3.6 Monitoring Plan

The monitoring objectives of the proposed corrective measure for AOC M are to determine whether the concentration of carbon disulfide in source area well O-36 and existing intercept well IW-2 and in plume fringe wells decrease in a manner consistent with the remedial objectives described in Section 4.2.

4.3.6.1 Source Reduction

To monitor the source area groundwater recovery system's effectiveness in reducing the concentration of carbon disulfide, groundwater samples will be collected from IW-6 on the day of start-up and analyzed for carbon disulfide by USEPA method 8260. The results of analysis of this sampling event will represent the baseline concentration for monitoring of remedial progress as described in Section 4.2. Groundwater samples are collected from existing intercept wells on a monthly basis. The baseline concentration of carbon disulfide in intercept well IW-2 will be represented by the concentration detected in this well during the month that IW-6 is activated.

Groundwater samples will be collected from new well IW-6 in accordance with the monitoring requirements of the plant's RCRA permit. The results of monitoring of IW-6 will be presented on a quarterly basis during the first year of operation and semi-annually thereafter.

Monthly monitoring and maintenance of the new recovery well and existing intercept wells will be conducted in accordance with current practice.

As previously mentioned, the concentration of carbon disulfide in well O-36 will be used to evaluate whether source reduction is occurring. Well O-36 will be sampled on a quarterly basis as discussed below to monitor the source area concentration of carbon disulfide.

4.3.6.2 Migration Control

To monitor the source area groundwater recovery system's effectiveness in limiting and/or preventing the migration of carbon disulfide, groundwater samples will be collected from select monitoring wells in AOC M on a quarterly basis and analyzed for carbon disulfide by USEPA method 8260. This component of the monitoring plan will include sampling of source area monitoring well O-36 and plume fringe monitoring wells. Plume fringe wells that will be monitored to evaluate the remedy's ability to limit migration of impacted groundwater include: O-29, O-30, O-39 and O-7R.

(3/07 ; 6/07 ; 9/07 and 12/07

4.3.7 Waste Management

Wastes generated during implementation of the CMI Plan will be segregated, containerized, labeled, and staged in a designated area by the Contractor. Akzo Nobel will manage, transport, and dispose of investigation-derived wastes (IDWs) in a manner that protects human health and the environment.

Drill cuttings generated during installation of monitoring and recovery wells will be containerized, labeled, and staged onsite. At the conclusion of field activities associated with implementation of the CMI Plan, the cuttings will be properly characterized, managed, and disposed in accordance with applicable regulations. The method of waste management and disposal will be based on the results of waste characterization.

Plastic and any other non-soil wastes generated during the investigation will be containerized and disposed of in a manner consistent with the disposal of the corresponding drill cuttings/soils.

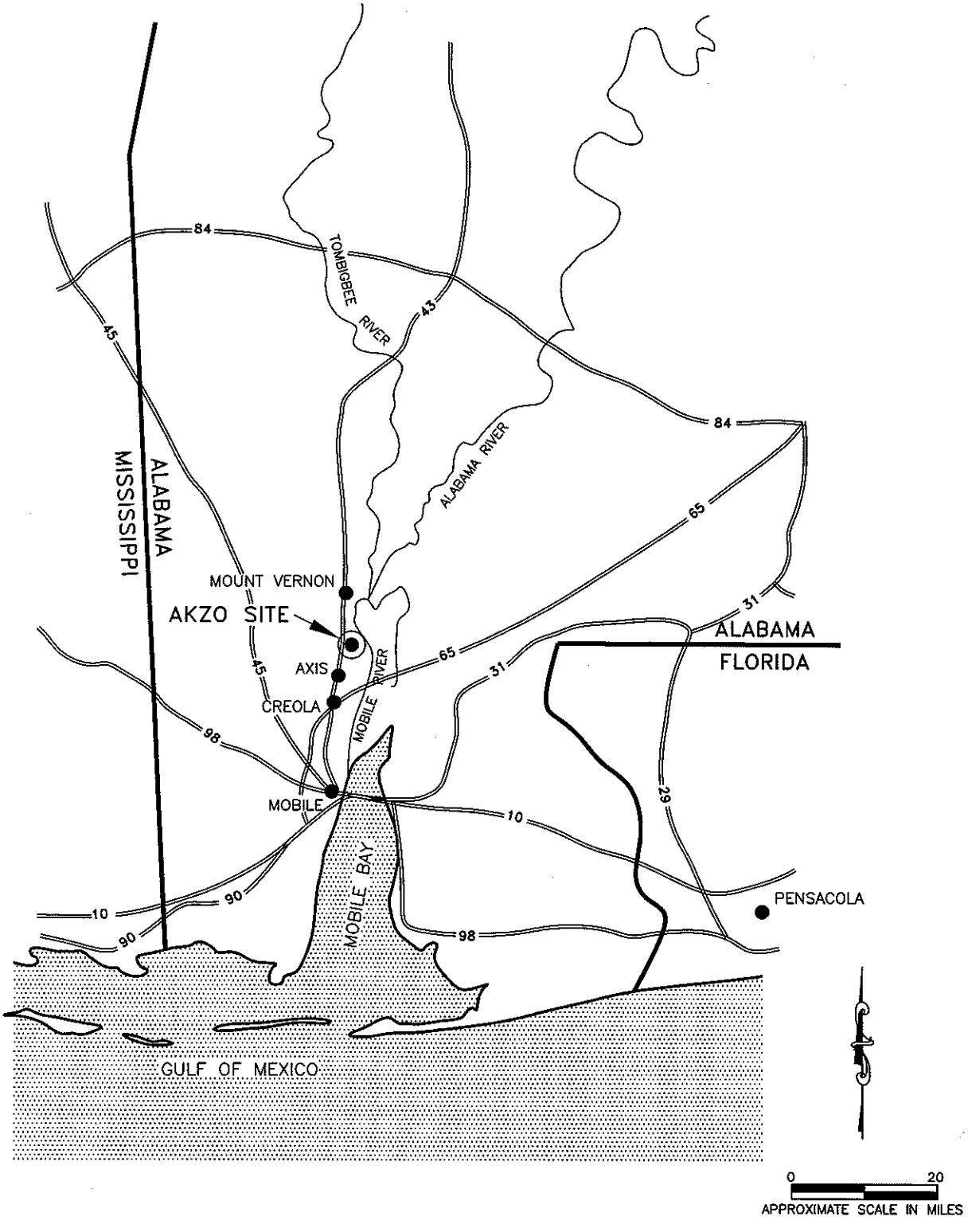
The waste material to be containerized at each drilling location will be placed in labeled 55-gal., open-top Type 17C Department of Transportation (DOT)-approved steel drums. Labels will be completed with black permanent markers and will be attached when the drums prior to placement of waste into the drums.

As drilling operations are completed, the contractor will transport the drums to an area designated by Akzo Nobel personnel. Drums will be moved from the point of generation to a control area. Akzo Nobel personnel will assign a specific, sequential waste container ID number to each container to reference the AOC and boring number where the cuttings originated.

5.0 SCHEDULE

This section summarizes the schedule for implementation of the CMI Plan. The schedule is subject to change since the plan will be implemented in phases with the scope of work and completion of certain tasks being dependent on the results of prior tasks.

CMI PLAN IMPLEMENTATION SCHEDULE												
Task Description	**Task Duration, months**											
	1	2	3	4	5	6	7	8	9	10	11	12
Install Delineation Wells and IW-6												
Delineation Well Groundwater Sampling												
Recovery Well Step-Test												
Equipment Specification & Design, Bid Solicitation												
Contractor Selection, Equipment Procurement												
Install Groundwater Recovery Components												
IW-6 Start-up & Adjustment												
Monthly Monitoring/Maintenance of IW-6												
First Quarterly Monitoring of Plume Fringe Wells												
First Progress Report to Include Trend Analysis												



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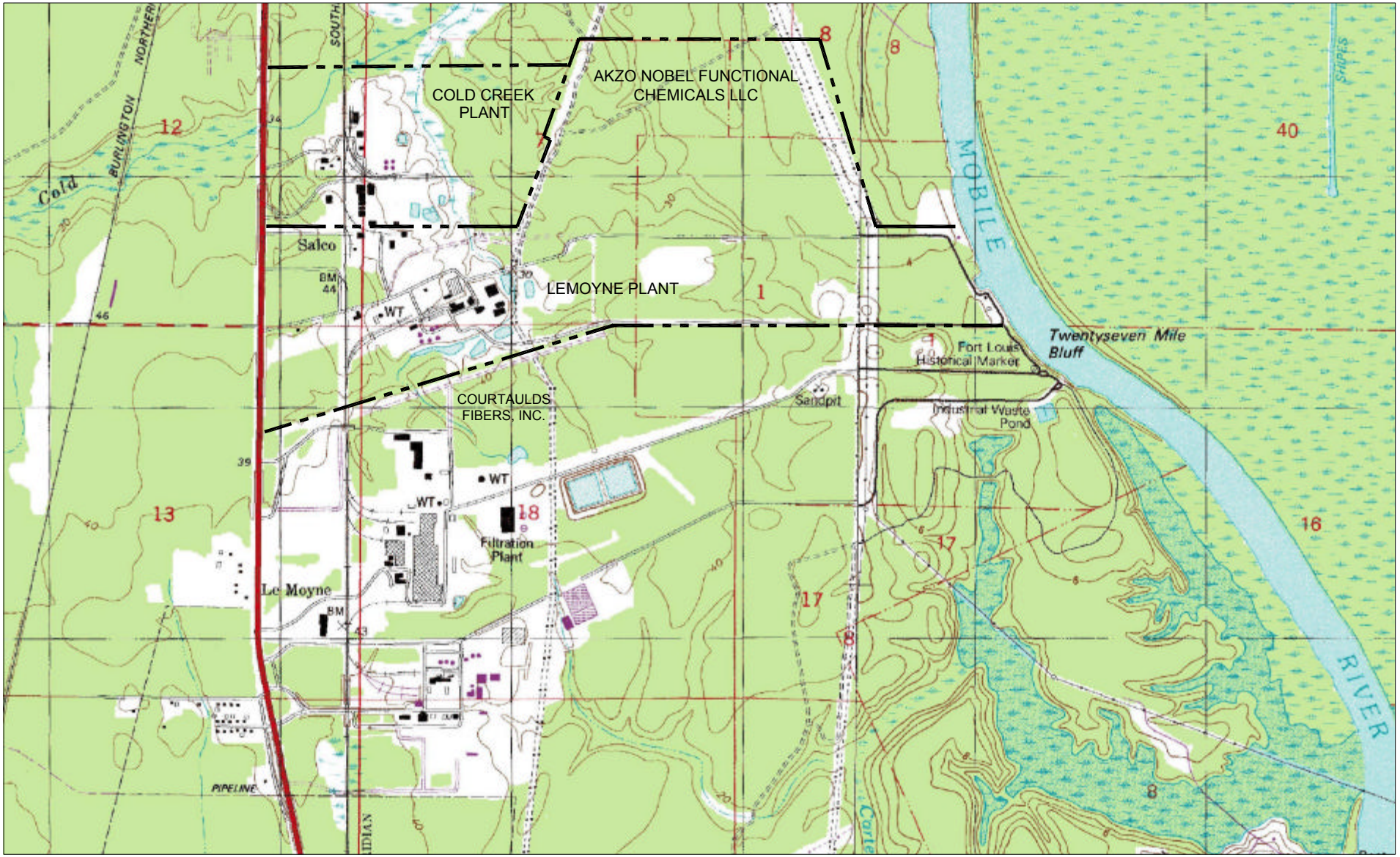
Project No. File: POINTMAP\FIG1-1-SITEMAP.dwg Date: 3/5/04

FIGURE 1
REGIONAL FACILITY LOCATION MAP

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LEMOYNE PLANT
AXIS, ALABAMA



REFERENCE:
U.S.G.S. 7.5 Minutes Series
A) Creola Quadrangle, Alabama 1982
Photorevised 1985
b) The Basin Quadrangle, Alabama 1980

0 2000
APPROXIMATE SCALE IN FEET

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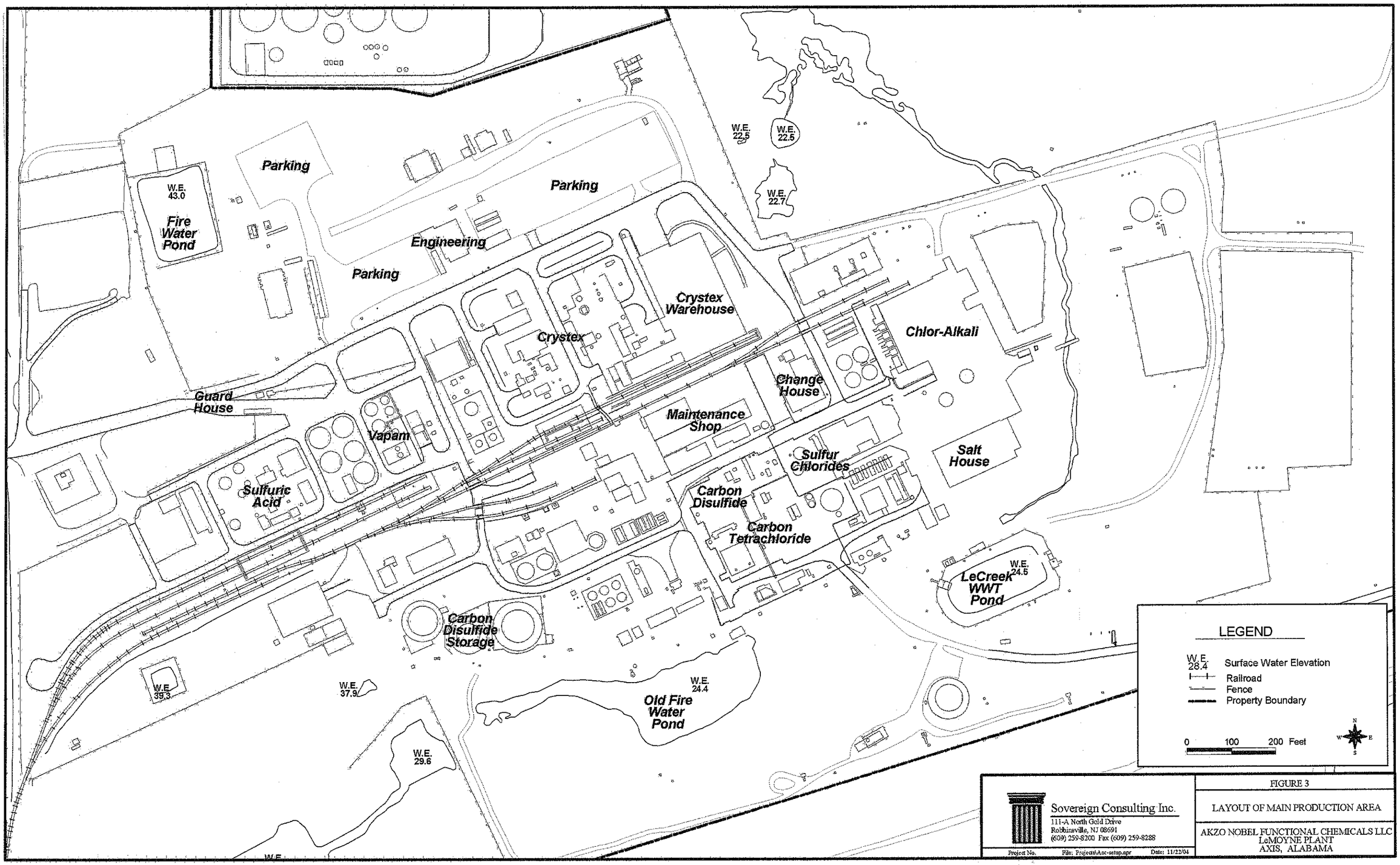
Project No. File: Pointmap\FIG1-2-FACILITY.dwg Date: 11/01/04

FIGURE 2
FACILITY LOCATION MAP

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LEMOYNE PLANT
AXIS, ALABAMA



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Project No. | File: Projects\Anc-setup.apr | Date: 11/22/04

FIGURE 3

LAYOUT OF MAIN PRODUCTION AREA

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

W.E. 43.0

W.E. 22.5

W.E. 22.5

W.E. 24.5

W.E. 39.3

W.E. 37.9

W.E. 24.4

W.E. 29.6

AOC-M

LEGEND

W.E. 28.4 Surface Water Elevation

Railroad

Fence

Property Boundary

0 100 200 Feet

N W E S

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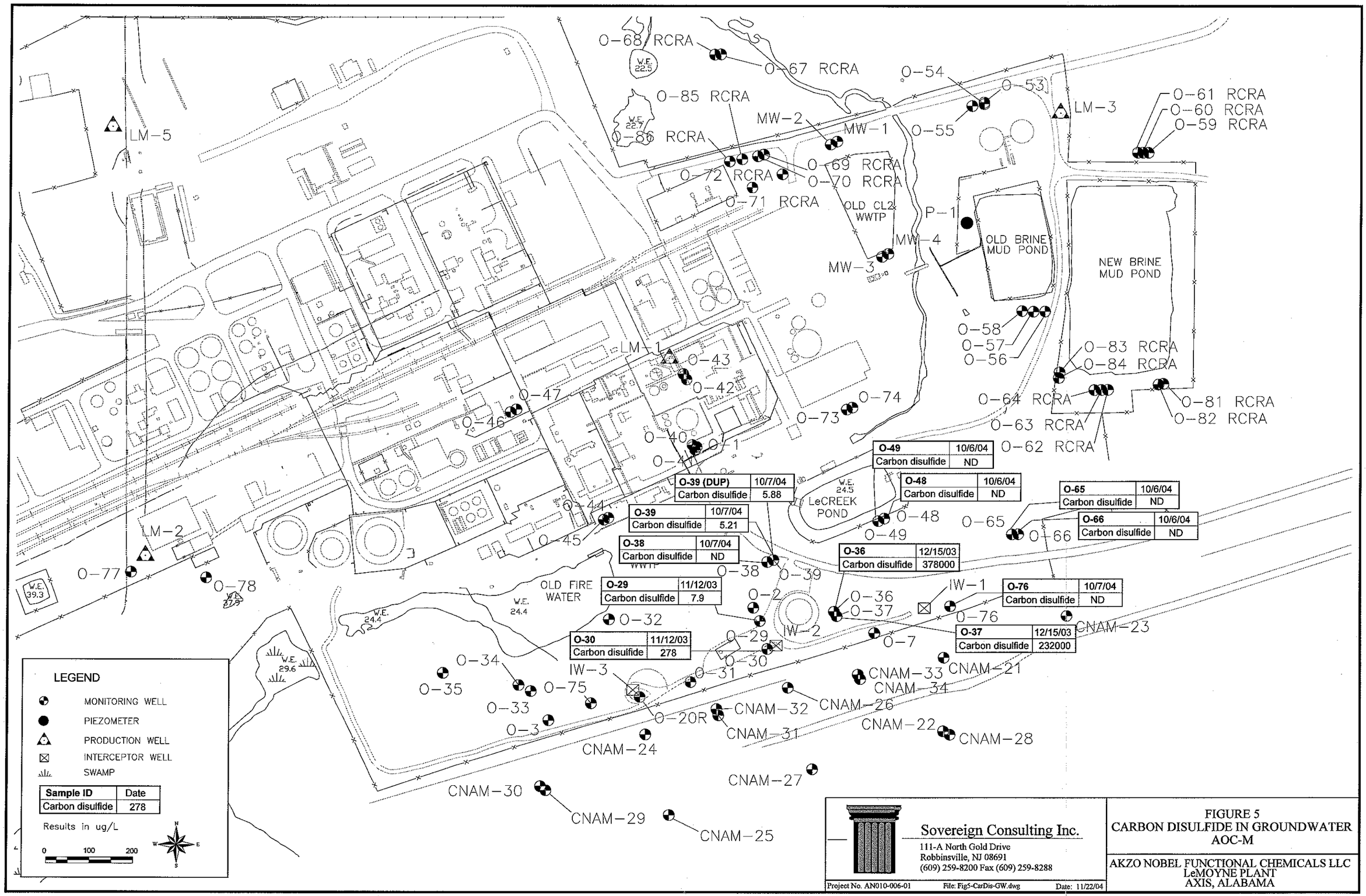
Project No. File: Projects\Aoc-setup.apr Date: 11/22/04

FIGURE 4

AOC M LOCATION MAP

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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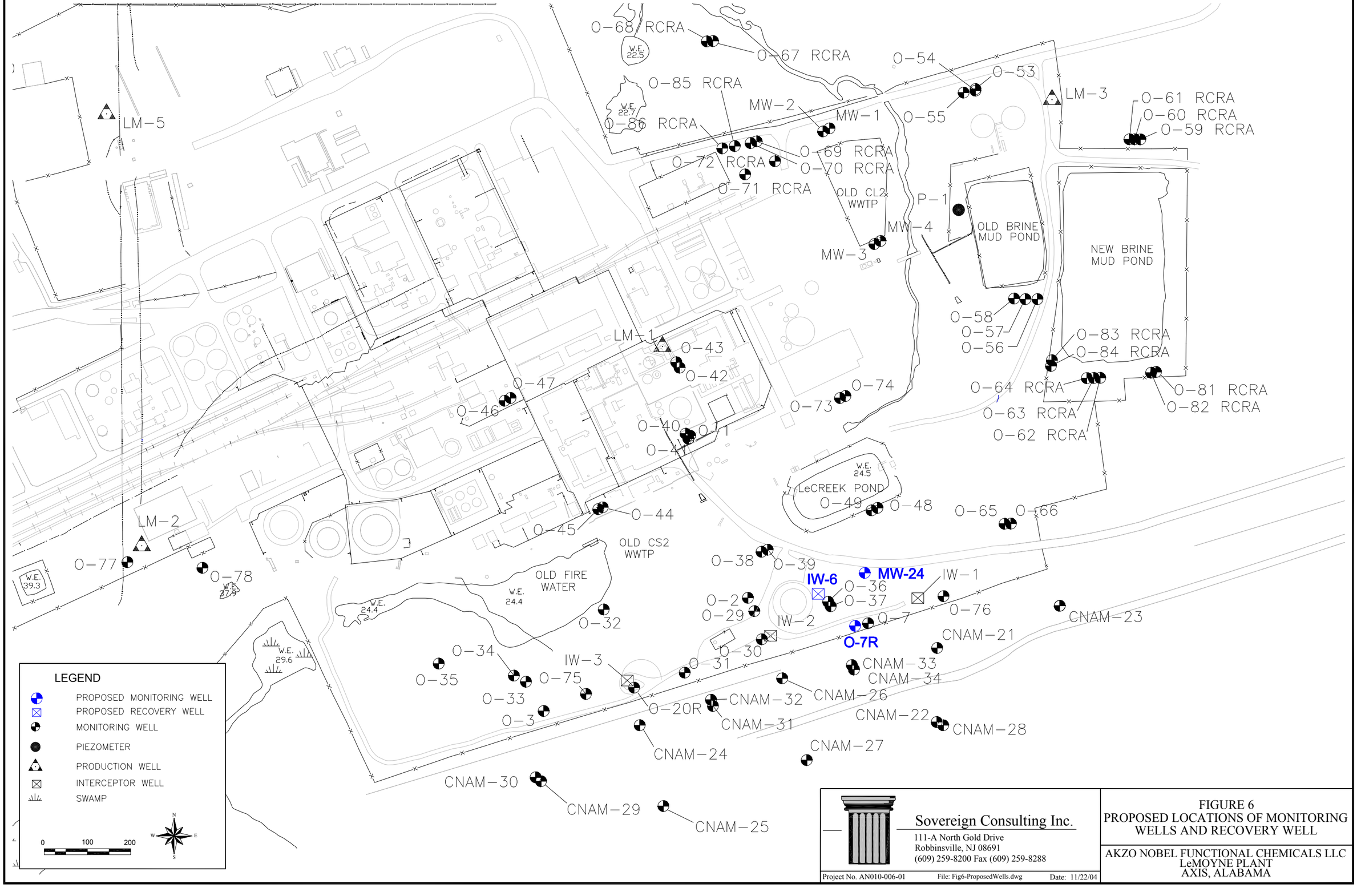
Project No. AN010-006-01 | File: Fig5-CarDis-GW.dwg | Date: 11/22/04

FIGURE 5
CARBON DISULFIDE IN GROUNDWATER
AOC-M

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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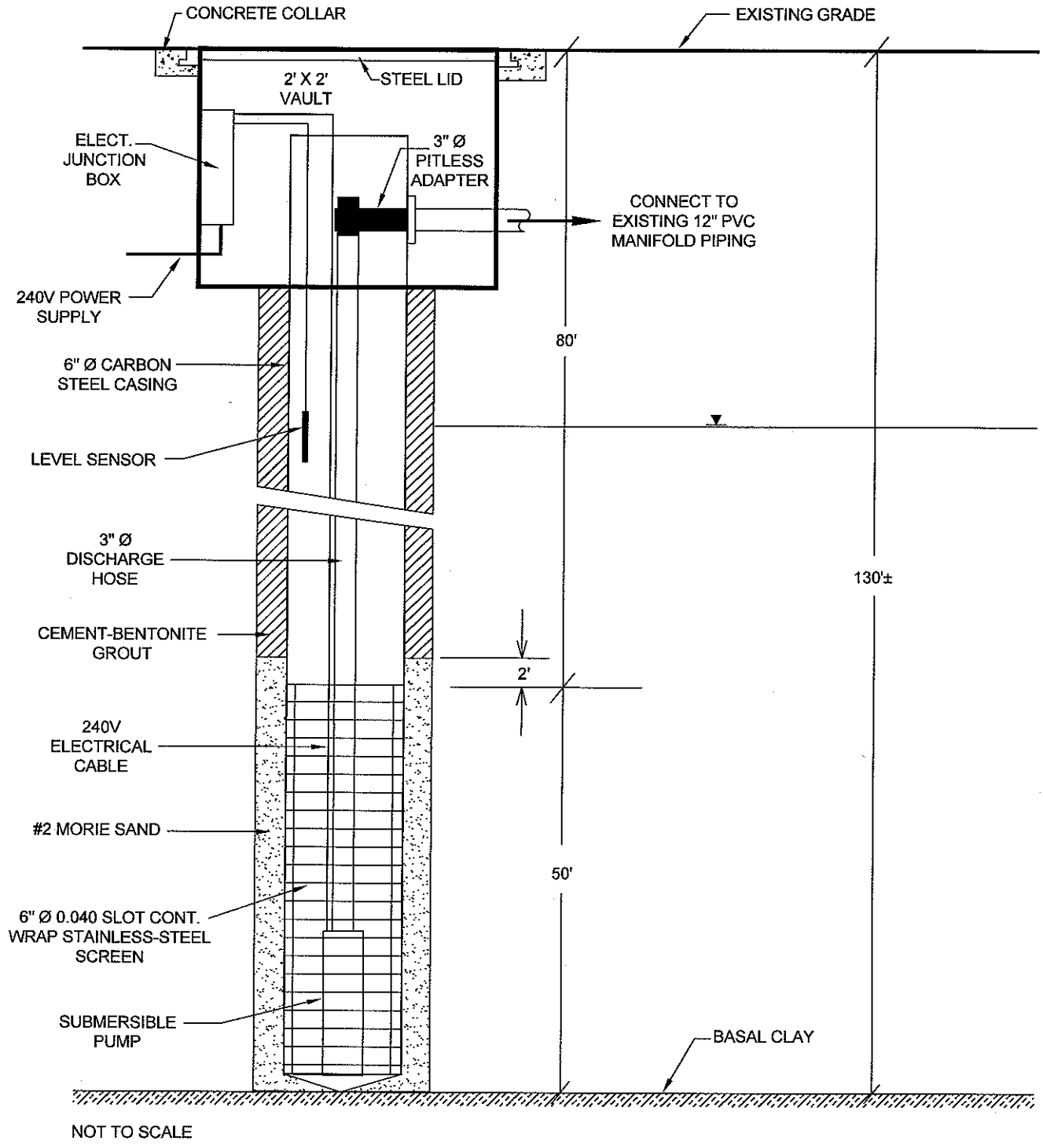
Project No. AN010-006-01 File: Fig6-ProposedWells.dwg Date: 11/22/04

FIGURE 6
PROPOSED LOCATIONS OF MONITORING WELLS AND RECOVERY WELL

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA



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Project No. | File: Fig7-Well-Schematic.dwg | Date: 11/22/04

FIGURE 7
PROPOSED GROUNDWATER RECOVERY WELL SCHEMATIC
(IW-6)

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

NORTH LANDFILL

LE CREEK

SOUTH LANDFILL

PROPERTY LINE

HALBY SITE

MW-9 MW-8

O-79 O-80

IW-5

LM-5

O-68 RCRA

O-67 RCRA

O-85 RCRA

O-86 RCRA

MW-2

MW-1

O-54

O-53

O-55

LM-3

O-61 RCRA

O-60 RCRA

O-59 RCRA

O-72 RCRA

O-69 RCRA

O-70 RCRA

O-71 RCRA

OLD CL2 WWTP

P-1

MW-4

MW-3

OLD BRINE MUD POND

NEW BRINE MUD POND

O-58

O-57

O-56

O-83 RCRA

O-84 RCRA

O-81 RCRA

O-82 RCRA

O-64 RCRA

O-63 RCRA

O-62 RCRA

LM-1

O-43

O-42

O-47

O-46

O-74

O-73

O-40

O-41

PROPOSED RECOVERY WELL AND UNDERGROUND PIPING

LECREEK POND

O-49

O-48

O-65

O-66

LM-2

O-77

O-78

O-45

O-44

OLD CS2 WWTP

OLD FIRE WATER

O-38

O-39

IW-6

MW-24

IW-1

O-36

O-37

O-76

O-2

O-29

IW-2

O-7

O-30

O-7R

O-32

O-34

O-35

O-75

IW-3

O-33

O-3

O-20R

CNAM-24

CNAM-32

CNAM-31

CNAM-26

CNAM-33

CNAM-34

CNAM-21

CNAM-23

CNAM-22

CNAM-28

CNAM-27

CNAM-30

CNAM-29

CNAM-25

CNAM-1

O-6

O-51

P-2

O-52

XYS GWIP

MW-19

MW-20

EXISTING 12"ø PVC PIPING (TYPICAL)

PROPERTY LINE

TRANSITION FROM UNDERGROUND TO ABOVEGROUND

CNAM-2

MW-22

IW-4

MW-21

MW-23

CNAM-3

LEGEND

- FLOW DIRECTION THROUGH PIPING
- PROPOSED MONITORING WELL
- PROPOSED RECOVERY/INTERCEPTOR WELL
- MONITORING WELL
- PIEZOMETER
- PRODUCTION WELL
- RECOVERY/INTERCEPTOR WELL
- SWAMP

0 200 400

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Project No. AN010-006-01 File: Fig8-RW-piping.dwg Date: 11/22/04

FIGURE 8
LAYOUT OF EXISTING & PROPOSED RECOVERY/INTERCEPTOR WELLS & PIPING

AKZO NOBEL FUNCTIONAL CHEMICALS LLC
LeMOYNE PLANT
AXIS, ALABAMA

Table 1 - Summary of Carbon Disulfide Concentrations in Groundwater - AOC M												
Well ID	O-29	O-30	O-36	O-37	O-38	O-39	O-39 dup	O-48	O-49	O-65	O-66	O-76
Screened Interval, ft.	58-88	97-117	108-128	74-94	99-119	69-89	69-89	100-120	59-79	68-78	97-117	54-114
Sample Date	11/12/2003	11/12/2003	12/15/2003	11/12/2003	10/7/2004	10/7/2004	10/7/2004	10/6/2004	10/6/2004	10/6/2004	10/6/2004	10/7/2004
Carbon Disulfide, ug/L	7.9	278	378000	232000	<5.0	5.21	5.88	<5.0	<5.0	<5.0	<5.0	<5.0

USEPA Region 9 PRG for carbon disulfide = 1,000 ug/L

APPENDIX A
GROUNDWATER SAMPLING LOGS
OCTOBER 6-7, 2004

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: CMI AOC M
Project Number: AKZ24138
Boring ID: O-38
Site Location: Axis, AL

Start Date: 10/07/04 Finish Date: 10/07/04
Sample Technician: Brian Kittrell
Purge/Sample Method: Submersible Pump with Surge block /Teflon Bailer
Well Diameter: 4"
Total Depth of Well (ft 118.60
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 93.68
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 61.15

Water Level Measurements		
Date	Time	Water Level (TOC)
10/6/2004		24.92
10/7/2004		24.94

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (mS/cm)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/7/2004 13:56	18	5.8	0.110	22	1.3	N/A	N/A	Clear
14:07	51	5.8	0.110	22	0.87	N/A	N/A	Clear
14:17	81	5.7	0.110	22	0.90	N/A	N/A	Clear
14:37	141	5.8	0.110	22	0.79	N/A	N/A	Clear
14:57	201	5.8	0.100	22	0.99	N/A	N/A	Clear
								No Odor

Sample Identification: O-38

Weather Conditions During Sampling: Cloudy 84 degrees

Comments:

Signature: Brian Kittrell Date: 10/21/2004

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/7/2004	15:07	(2) 40 mL VOA's	HCL

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: CMI AOC M
Project Number: AKZ24138
Boring ID: O-39
Site Location: Axis, AL

Start Date: 10/07/04 Finish Date: 10/07/04
Sample Technician: Brian Kittrell
Purge/Sample Method: Submersible Pump with Surge block /Teflon Bailer
Well Diameter: 4"
Total Depth of Well (ft 89.10
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 64.80
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 42.30

Water Level Measurements		
Date	Time	Water Level (TOC)
10/6/2004		24.30
10/7/2004		24.31

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (mS/cm)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/7/2004 15:19	6	5.8	0.140	22	>200	N/A	N/A	Turbide
15:30	39	5.8	0.140	22	5.0	N/A	N/A	Clear
15:33	48	5.8	0.140	22	3.50	N/A	N/A	Clear
15:40	69	5.7	0.150	22	7.4	N/A	N/A	Clear
15:45	84	5.7	0.150	22	10.1	N/A	N/A	Clear
15:50	99	5.7	0.155	22	3.5	N/A	N/A	Clear
15:59	126	5.7	0.160	22	0.99	N/A	N/A	Clear
								Slight Odor

Sample Identification: O-39

Weather Conditions During Sampling: Cloudy 84 degrees

Comments:

Signature: Brian Kittrell Date: 10/21/2004

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/7/2004	16:13	(2) 40 mL VOA's	HCL

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: CMI AOC M
Project Number: AKZ24138
Boring ID: O-48
Site Location: Axis, AL

Start Date: 10/06/04 Finish Date: 10/06/04
Sample Technician: Brian Kittrell
Purge/Sample Method: Submersible Pump /Teflon Bailer
Well Diameter: 4"
Total Depth of Well (ft 122.05
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 97.37
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 63.56

Water Level Measurements		
Date	Time	Water Level (TOC)
10/6/2004		24.68

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (mS/cm)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/6/2004 11:56	63	6.0	0.050	22	N/A	N/A	N/A	Clear
12:17	126	5.9	0.070	21	N/A	N/A	N/A	Clear
12:39	192	5.9	0.075	21	N/A	N/A	N/A	Clear
12:49	222	5.9	0.070	21	N/A	N/A	N/A	Clear
								No Odor

Sample Identification: O-48

Weather Conditions During Sampling: Sunny 86 degrees

Comments:

Signature: Brian Kittrell Date: 10/21/2004

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/6/2004	12:53	(2) 40 mL VOA's	HCL

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: CMI AOC M
Project Number: AKZ24138
Boring ID: O-49
Site Location: Axis, AL

Start Date: 10/06/04 Finish Date: 10/06/04
Sample Technician: Brian Kittrell
Purge/Sample Method: Submersible Pump /Teflon Bailer
Well Diameter: 4"
Total Depth of Well (ft 82.05
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 56.60
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 36.95

Water Level Measurements		
Date	Time	Water Level (TOC)
10/6/2004		25.45

WELL DEVELOPMENT/PURGING DATA

Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (mS/cm)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/6/2004 13:09	39	4.7	0.260	22	N/A	N/A	N/A	Clear
13:21	75	5.2	0.200	22	N/A	N/A	N/A	Clear
13:33	111	5.2	0.200	22	N/A	N/A	N/A	Clear
13:39	129	5.2	0.200	22	N/A	N/A	N/A	Clear
								No Odor

Sample Identification: O-49

Weather Conditions During Sampling: Sunny 86 degrees

Comments:

Signature: Brian Kittrell Date: 10/21/2004

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/6/2004	13:41	(2) 40 mL VOA's	HCL

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: CMI AOC M
Project Number: AKZ24138
Boring ID: O-65
Site Location: Axis, AL

Start Date: 10/06/04 Finish Date: 10/06/04
Sample Technician: Brian Kittrell
Purge/Sample Method: Submersible Pump /Teflon Bailer
Well Diameter: 4"
Total Depth of Well (ft 81.30
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 53.22
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 34.74

Water Level Measurements		
Date	Time	Water Level (TOC)
10/6/2004		28.08

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (mS/cm)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/6/2004 15:15	39	4.8	0.310	21	N/A	N/A	N/A	Clear
15:27	72	4.8	0.300	21	N/A	N/A	N/A	Clear
15:39	108	4.8	0.330	21	N/A	N/A	N/A	Clear
								No Odor

Sample Identification: O-65

Weather Conditions During Sampling: Sunny 86 degrees

Comments:

Signature: Brian Kittrell Date: 10/21/2004

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/6/2004	15:43	(2) 40 mL VOA's	HCL

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: CMI AOC M
Project Number: AKZ24138
Boring ID: O-66
Site Location: Axis, AL

Start Date: 10/06/04 Finish Date: 10/06/04
Sample Technician: Brian Kittrell
Purge/Sample Method: Submersible Pump /Teflon Bailer
Well Diameter: 4"
Total Depth of Well (ft 119.05
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 90.20
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 58.88

Water Level Measurements		
Date	Time	Water Level (TOC)
10/6/2004		28.85

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (mS/cm)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/6/2004 14:14	60	6.1	0.120	21	N/A	N/A	N/A	Clear
14:34	120	6.3	0.120	21	N/A	N/A	N/A	Clear
14:54	180	6.1	0.120	21	N/A	N/A	N/A	Clear
								Slight Sulfur Odor

Sample Identification: O-66

Weather Conditions During Sampling: Sunny 86 degrees

Comments:

Signature: Brian Kittrell Date: 10/21/2004

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/6/2004	14:56	(2) 40 mL VOA's	HCL

Eco-Systems, Inc.
Environmental Engineers and Scientists

Groundwater Sample Collection Log

Project Name: CMI AOC M
Project Number: AKZ24138
Boring ID: O-76
Site Location: Axis, AL

Start Date: 10/07/04 Finish Date: 10/07/04
Sample Technician: Brian Kittrell
Purge/Sample Method: Submersible Pump with Surge block /Teflon Bailer
Well Diameter: 4"
Total Depth of Well (ft 117.25
Approximate Depth of Water Column
(h= TD of well - water level [TOC]): 90.32
Calculated Well Volume (V=6hd²)
(V = vol in gal; D = well diam. in ft): 58.96

Water Level Measurements		
Date	Time	Water Level (TOC)
10/6/2004		26.93
10/7/2004		27.18

WELL DEVELOPMENT/PURGING DATA								
Date/Time	Cumulative Volume (gal)	pH	Specific Conductivity (mS/cm)	Temperature (Celsius)	Turbidity (NTU)	D.O. (mg/l)	ORP (mv)	Comments
10/7/2004 11:48	12	4.4	0.080	21	>200	N/A	N/A	Turbide
11:56	36	4.3	0.080	21	35	N/A	N/A	Cloudy
12:04	60	4.3	0.090	21	32	N/A	N/A	Cloudy
12:11	81	4.4	0.100	21	13	N/A	N/A	Clear
12:20	108	4.3	0.100	21	5.1	N/A	N/A	Clear
12:26	126	4.4	0.100	21	2.7	N/A	N/A	Clear
12:38	162	4.5	0.110	21	2.1	N/A	N/A	Clear
12:49	195	4.6	0.100	21	1.8	N/A	N/A	Clear
12:59	210	4.6	0.110	21	0.77	N/A	N/A	Clear
13:09	240	4.6	0.110	21	1.9	N/A	N/A	Clear
								No Odor

Sample Identification: O-76

Weather Conditions During Sampling: Cloudy 84 degrees

Comments:

Signature: Brian Kittrell Date: 10/21/2004

GROUNDWATER SAMPLE CONTAINERS			
Date	Time	Sample Container	Preservative
10/7/2004	13:20	(2) 40 mL VOA's	HCL

APPENDIX B

REPLICATED AND RECALIBRATED GROUNDWATER MODEL

NOVEMBER 2004

Replication and Recalibration of the 1986 Groundwater Flow Model for the Akzo Nobel Functional Chemicals LLC, LeMoyne Plant, Axis, Alabama

The purpose of this report is to describe the steps taken to replicate the groundwater flow model originally prepared for the former Stauffer Chemical Company Site, Axis, Alabama (now Akzo Nobel Functional Chemicals LLC) and to recalibrate the model to water levels measured during 2004. The model was originally constructed and calibrated by Geraghty & Miller, Inc. as described in their 1992 report entitled "Preliminary Design Report, Stauffer Chemical Company Sites, Ground-Water Operable Unit, VOLUME II, Development of Ground-Water Flow Models". The electronic data files for the model are no longer available; therefore, the report and accompanying figures and plates from Geraghty & Miller's report were used to replicate the original model.

Model Replication

The original modeling study actually consisted of two models, a coarse regional model and a more finely gridded local model. The latter model was replicated and is described in this report. The model was referred to in the Geraghty & Miller report as the SCC Site model.

The groundwater model consisted of 98 rows, 98 columns, and 2 layers. The report and accompanying figures, plates, and tables documented the model fairly well; however, there were several pieces of information that were not described. These undocumented features are summarized below:

- The row and column spacings were not tabulated. These had to be measured from Plate 12, which was plotted at a scale of 1 inch equals approximately 1,000 feet. The accuracy of the measurements is approximately +/- 25 feet for any individual row or column width.
- The elevations of the bottoms and tops of the two layers were not described at all, even in the text.
- The water levels assigned to river and constant head boundaries were not described.
- The conductances assigned to river boundaries were not described.

The first step in replicating the model was to measure the row and column spacings on Plate 12 of the original report. Row and column spacings were then imported to a generic 98 row and 98 column model created in the Groundwater Vistas software (ESI, 2004). A constant elevation of -90 ft was assigned to the base of layer 2 and a constant elevation of -40 ft was assigned to the base of layer 1.

The second step was to assign boundary conditions (rivers, wells, and constant heads) to the grid. These were located based on plates from the report. While the locations were easily determined, the water levels and conductances for rivers were not described in the report.

The water levels assigned to the constant heads surrounding each layer were obtained from visual observation of contoured water levels computed by the model. River water levels were estimated using Table 3 of the original model. Table 3 listed surface water elevations at key points in the area. These were interpolated and extrapolated to the boundary cells in the model. Pumping rates for wells were obtained from Table 1. River conductance values were estimated initially from the size of the grid cell and the hydraulic conductivity of the aquifer. The Geraghty & Miller report states that that method was used by the original modelers to estimate conductance values. The report further states that the conductances were modified during calibration; however, the chapter on model calibration does not describe what changes were made. Figure 1 shows the model grid and boundary conditions in the first layer.

Horizontal and vertical hydraulic conductivity values were described in detail in the report. Three zones of horizontal hydraulic conductivity and two zones of vertical hydraulic conductivity were described. These zones were placed in the model according to plates in the original report. The values assigned to these zones were obtained from the calibration discussion.

Calibration targets were assigned based on data contained in Table 6 of the Geraghty & Miller report. This table lists the row, column, and layer of the target, its name, and the water level measured in that well in 1986.

After all of the model boundary conditions and properties were assigned, the model was run to compute the water table surface for the 1986 calibration. The first attempt resulted in too little drawdown around the pumping wells. The goal of the analysis was to use the same physical properties as the original model where ever possible. Therefore, only model parameters that were undocumented were modified during the replication of the model. The two most important undocumented parameters were the conductance of rivers and the base elevations of the model layers.

River conductances were initially varied to reduce the connection between the surface water and the aquifer. This resulted in more drawdown, but the model was still not computing enough drawdown. The next modification was to change the elevation of the base of layer 2. Cross-section A-A′ of the original report indicated that this layer sloped upwards towards the river on the east. The base of layer 2 was assumed to be at an elevation of -95 ft on the west side of the model and the entire layer was sloped upward at a rate of 0.0025 ft/ft toward the east. This resulted in a base elevation of -55 ft at the river edge, which seemed to match the cross-section.

Once the layer elevation modification was completed, the water levels matched the original model more closely. A final change was made to further reduce the conductance of the smaller streams, and the model then matched the original calibration fairly well. Figure 2 shows the computed water table surface in layer 1 and Table 1 shows the residuals (errors) at each target well for the replicated model and for the original model. In general, the degree of error between field-measured water levels and those computed by the model are good for both model versions. The original model achieved a better match than the replicated model; however, the differences are generally minor.

Model Recalibration

The replicated model was recalibrated to water level and pumping data from April through June, 2004. In order to be consistent with the original 1986 calibration, the first step was to simply modify boundary conditions without changing any of the aquifer properties. Water levels measured in monitoring wells were averaged over the period from April through June 2004 and were used as calibration targets in the new model, as shown in Table 2. New pumping rates were established in the model as shown in Table 3.

Simply replacing the pumping rates did not produce a very good calibration because the heads assigned around the boundaries of the model were not consistent with the new flow regime in 2004. The next step was to modify the water levels along the western boundary and in the Mobile River. The water levels along the western edge of the model were dropped by 3.7 feet from the 1986 levels. The river elevation was raised by 6.7 feet from the 1986 values. The amount that each boundary was modified was chosen during calibration to match the 2004 water levels.

It was further noted that during 2004, groundwater flow in areas away from the pumping wells was moving from west to east. In order to take advantage of this regional flow condition, the north and south boundaries of the model were changed from constant-head to no-flow. That is, the assumption in 2004 is that groundwater flows parallel to the north and south boundaries of the model. In 1986, these northern and southern constant head boundaries allowed water to move into the model in response to the much greater pumping demand. Since the pumping rate in 2004 is less than half of the rate in 1986, groundwater is no longer pulled in across these model boundaries.

An analysis of precipitation was also conducted as part of the recalibration effort. The original calibration was to water levels measured in November 1986. The average precipitation from September through November 1986 was 6.4 inches per month. The average monthly precipitation from March through June 2004 was 5.5 inches/month, a decrease of about 23 percent. Therefore, the recharge was decreased by 23 percent in the 2004 recalibration. This was further refined during the recalibration so that the 2004 recharge was 16 percent lower than in 1986.

The changes outlined above produced a reasonable calibration. To arrive at the final calibration, the 1986 and 2004 calibration periods were combined and other aquifer parameters were modified. This was done because the replication of the original model was not perfect due to a lack of information about the original model. Slight modifications were then made to the aquifer hydraulic conductivity. The hydraulic conductivity of a small portion of the aquifer west of the site was increased by 10 percent and river conductance values were decreased in upstream areas. These modifications produced a much better match for both the 1986 and 2004 calibrations, as shown in Table 2 and Figure 3. (graph)

The goal of any calibration is to have the model-computed water levels equal those water levels measured in the field. This can never be achieved, so there will always be some difference between the model and field measurements. The differences between the measured water levels and those computed by the model are called residuals. A residual is

computed as the field measurement minus the model-computed value. A negative residual means that the model is over-predicting the water level and a positive residual is where the model-computed levels are too low.

In some cases, water levels measured in wells cannot be matched very well by the model. Rather than remove these wells from the analysis, they are assigned a weight so that the larger errors do not bias the calibration. This can happen because the techniques used to calibrate models try to minimize the sum of squared residuals. When a small number of wells have large residuals, the square of the residual will dominate the calibration process and the result is to focus on the small areas around these wells. In the current analysis, 6 out of 118 water level measurements were reduced in significance using weights as shown in Table 2. These include O-27 and P-2 for 1986, and MW-14, MW-9, CCM-5, CCM-6 for 2004.

Calibration quality is judged, at least in part, by a statistical analysis of the residuals at calibration targets. In the case of the recalibration, the calibration targets represent both the 1986 and 2004 time frames. While there is no standard in the industry on what constitutes an acceptable calibration, two numerical criteria have been used to judge the overall quality of the calibration. The first is dividing the mean residual by the range in water levels in all of the targets. The mean residual considers both positive and negative residuals, which when balanced out, should be close to zero. The goal for this statistic is to be less than 5 percent of the range in head. By normalizing the statistic to the range in water levels at the site, the same goal can be used at any site in the country. The second calibration goal divides the residual standard deviation by the range in head. This statistic should be less than 10 percent. These goals have been proposed and have been accepted throughout the country by U.S. EPA and various state and local agencies. The use of these statistics in judging a calibration has never been questioned.

The residual mean divided by the range in water levels for the calibration to 1986 and 2004 was less than 0.1 percent. The residual standard deviation divided by the range in water levels was 3 percent. Both are well below the calibration goals described above. Figure 3 shows this graphically where the measured water levels are plotted versus the model-computed water levels. In a perfect calibration, the points would lie along a straight line at a 45 degree angle. Since no calibration is perfect, there will always be some degree of scatter about that ideal line. In this case, the scatter is minor as reflected in the statistics.

The final set of aquifer parameters and boundary conditions are summarized in Table 4. Figure 4 shows the hydraulic conductivity zones in layer 1 and Figure 5 shows the hydraulic conductivity zones in layer 2. Figure 6 shows the vertical hydraulic conductivity zones in layers 1 and 2. The positions of the zones are the same as the original model. The only change to the hydraulic conductivity distribution in the model was a ten percent increase in hydraulic conductivity for zone 2.

Predicted Capture Zones

The calibrated model was used to predict flow paths within the aquifer using 2004 pumping rates. The results are presented in Figure 7. Flow is generally from west to east with most particles being captured by pumping wells. Groundwater beneath most of the Akzo Nobel site is captured by on-site interceptor wells IW1, IW2, and IW3.

Table 1. Comparision between original calibration and replicated calibration.

Well	*Layer*	*Observed*	*Computed*	*Residual (new)*	*Residual (old)*
CCM-3	1	-5.22	-5.02	-0.20	0.17
CCM-6	2	-1.51	-0.90	-0.61	-0.30
CCM-7	1	-2.94	-2.04	-0.90	0.42
O-16	2	-0.21	-0.07	-0.14	-0.08
O-17	1	11.80	15.16	-3.36	-2.67
O-18	2	-4.53	-3.45	-1.08	-0.12
O-21	1	-4.87	-4.76	-0.11	0.42
O-22	1	-5.67	-7.73	2.06	1.85
O-23	1	-3.68	-5.85	2.17	2.08
O-24	1	-1.64	-2.84	1.20	0.99
O-25	2	-5.33	-2.70	-2.63	-1.60
O-26	1	10.31	8.93	1.38	1.59
O-27	2	-16.75	-4.97	-11.78	-8.49
O-31	1	-12.44	-14.33	1.89	0.44
O-33	1	-10.73	-11.86	1.13	0.22
O-35	1	-9.85	-10.85	1.00	0.05
O-38	1	-12.39	-13.75	1.36	0.21
O-42	1	-9.24	-10.19	0.95	0.74
O-44	1	-10.25	-11.05	0.80	0.40
O-46	1	-8.73	-9.89	1.16	0.42
O-48	1	-11.65	-13.15	1.50	0.77
O-5	1	11.89	14.86	-2.97	-1.60
O-50	1	-3.37	-4.48	1.11	1.90
O-51	1	-3.76	-6.03	2.27	2.72
O-52	1	-5.51	-7.87	2.36	2.52
O-53	1	-7.94	-8.97	1.03	0.89
O-56	1	-9.79	-10.96	1.17	0.80
O-59	1	-8.99	-10.17	1.18	0.84
O-6	1	-7.47	-7.69	0.22	-0.17
O-62	1	-10.71	-12.01	1.30	0.71
O-66	1	-12.39	-13.94	1.55	0.16
O-68	1	-6.70	-7.47	0.77	0.80
O-70	1	-7.49	-8.54	1.05	0.92
O-74	1	-10.47	-12.15	1.68	0.58
O-80	2	-5.42	-3.35	-2.07	-1.45
CNAM-1	1	-13.10	-14.18	1.08	-0.14
CNAM-2	1	-13.28	-14.10	0.82	-0.31
CNAM-22	1	-13.56	-14.47	0.91	-0.49
CNAM-23	1	-13.22	-14.10	0.88	-0.34
CNAM-25	1	-12.42	-12.96	0.54	-0.70
CNAM-3	1	-13.48	-15.34	1.86	0.75
CNAM-30	1	-11.73	-11.75	0.02	-0.93
CNAM-32	1	-13.41	-14.26	0.85	-0.57
CNAM-34	1	-14.04	-14.93	0.89	-0.52
MW-4	1	-12.98	-12.32	-0.66	-1.33
OW-2	1	-11.76	-13.98	2.22	0.78
OW-3	1	-10.71	-13.57	2.86	1.49
OW-7	1	-12.87	-15.69	2.82	1.69
MW-A	1	11.68	11.89	-0.21	0.04
MW-E	1	8.71	7.45	1.26	2.81
MW-F	1	11.34	11.40	-0.06	0.09
MW-J	1	10.49	10.77	-0.28	0.57
MW-18	1	-5.41	-7.18	1.77	1.26
MW-19	1	-4.10	-5.19	1.09	0.85
MW-23	1	-4.56	-4.19	-0.37	-0.54
MW-27	1	-2.46	-3.07	0.61	0.25
MW-30	1	0.49	0.07	0.42	0.60
MW-33	1	2.49	2.56	-0.07	-0.18
MW-34	1	-3.88	-3.38	-0.50	-1.22
P-2	1	13.53	19.87	-6.34	-5.60
Residual Mean				**0.31**	**0.09**
Residual Standard Deviation				**2.21**	**1.73**
Sum of Squared Residuals				**299.44**	**176.39**
Absolute Mean Residual				**1.46**	**1.07**
Minimum Residual				**-11.78**	**-8.49**
Maximum Residual				**2.86**	**2.81**
Range in Observed Water Levels				**30.28**	**30.28**
Standard Deviation/Range				**0.07**	**0.06**

Table 2. Residuals at Monitoring Wells for the Combined 1986/2004 Calibration.

Name	Time	Layer	Observed	Computed	Weight	Residual
CCM-3	1986	1	-5.22	-4.54	1	-0.68
CCM-6	1986	2	-1.51	-0.65	1	-0.86
CCM-7	1986	1	-2.94	-1.65	1	-1.29
O-16	1986	2	-0.21	0.10	1	-0.31
O-17	1986	1	11.80	14.81	1	-3.01
O-18	1986	2	-4.53	-2.67	1	-1.86
O-21	1986	1	-4.87	-4.38	1	-0.49
O-22	1986	1	-5.67	-7.22	1	1.55
O-23	1986	1	-3.68	-5.42	1	1.74
O-24	1986	1	-1.64	-2.55	1	0.91
O-25	1986	2	-5.33	-2.09	1	-3.24
O-26	1986	1	10.31	8.59	1	1.72
O-27	1986	2	-16.75	-15.52	0.1	-1.23
O-31	1986	1	-12.44	-13.55	1	1.11
O-33	1986	1	-10.73	-11.07	1	0.34
O-35	1986	1	-9.85	-10.06	1	0.21
O-38	1986	1	-12.39	-13.04	1	0.65
O-42	1986	1	-9.24	-9.57	1	0.33
O-44	1986	1	-10.25	-10.35	1	0.10
O-46	1986	1	-8.73	-9.21	1	0.48
O-48	1986	1	-11.65	-12.49	1	0.84
O-5	1986	1	11.89	14.46	1	-2.57
O-50	1986	1	-3.37	-4.15	1	0.78
O-51	1986	1	-3.76	-5.64	1	1.88
O-52	1986	1	-5.51	-7.42	1	1.91
O-53	1986	1	-7.94	-8.49	1	0.55
O-56	1986	1	-9.79	-10.41	1	0.62
O-59	1986	1	-8.99	-9.66	1	0.67
O-6	1986	1	-7.47	-6.81	1	-0.66
O-62	1986	1	-10.71	-11.43	1	0.72
O-66	1986	1	-12.39	-13.26	1	0.87
O-68	1986	1	-6.70	-7.00	1	0.30
O-70	1986	1	-7.49	-8.04	1	0.55
O-74	1986	1	-10.47	-11.52	1	1.05
O-80	1986	2	-5.42	-2.72	1	-2.70
CNAM-1	1986	1	-13.10	-13.44	1	0.34
CNAM-2	1986	1	-13.28	-13.45	1	0.17
CNAM-22	1986	1	-13.56	-13.73	1	0.17
CNAM-23	1986	1	-13.22	-13.41	1	0.19
CNAM-25	1986	1	-12.42	-12.15	1	-0.27
CNAM-3	1986	1	-13.48	-14.62	1	1.14
CNAM-30	1986	1	-11.73	-10.94	1	-0.79
CNAM-32	1986	1	-13.41	-13.47	1	0.06
CNAM-34	1986	1	-14.04	-14.18	1	0.14
MW-4	1986	1	-12.98	-11.73	1	-1.25
OW-2	1986	1	-11.76	-13.16	1	1.40
OW-3	1986	1	-10.71	-12.74	1	2.03
OW-7	1986	1	-12.87	-14.94	1	2.07
MW-A	1986	1	11.68	11.87	1	-0.19
MW-E	1986	1	8.71	7.48	1	1.23
MW-F	1986	1	11.34	11.39	1	-0.05
MW-J	1986	1	10.49	10.74	1	-0.25
MW-18	1986	1	-5.41	-6.31	1	0.90
MW-19	1986	1	-4.10	-4.31	1	0.21
MW-23	1986	1	-4.56	-3.26	1	-1.30
MW-27	1986	1	-2.46	-2.17	1	-0.29
MW-30	1986	1	0.49	0.97	1	-0.48
MW-33	1986	1	2.49	3.33	1	-0.84
MW-34	1986	1	-3.88	-2.63	1	-1.25
P-2	1986	1	13.53	14.14	0.1	-0.61
O-18	2004	2	12.34	11.57	1	0.77
O-20R	2004	1	7.46	7.11	1	0.35
O-23	2004	1	6.77	6.97	1	-0.20
O-25	2004	2	10.79	11.64	1	-0.85

Name	Time	Layer	Observed	Computed	Weight	Residual
O-29	2004	1	7.03	6.19	1	0.84
O-30	2004	1	6.31	6.22	1	0.09
O-31	2004	1	7.30	6.98	1	0.32
O-33	2004	2	8.50	8.38	1	0.12
O-34	2004	1	8.85	8.47	1	0.38
O-40	2004	2	8.43	7.97	1	0.46
O-41	2004	1	8.44	7.94	1	0.50
O-46	2004	2	9.25	8.92	1	0.33
O-47	2004	1	9.24	8.90	1	0.34
O-48	2004	2	7.48	7.02	1	0.46
O-49	2004	1	7.45	7.02	1	0.43
O-53	2004	2	7.71	8.36	1	-0.65
O-55	2004	1	8.42	8.38	1	0.04
O-56	2004	2	8.12	7.93	1	0.19
O-58	2004	1	8.15	7.94	1	0.21
O-65	2004	1	7.59	7.33	1	0.26
O-66	2004	2	7.63	7.36	1	0.27
O-67	2004	1	8.93	9.06	1	-0.13
O-68	2004	2	8.97	9.08	1	-0.11
O-73	2004	1	8.00	7.72	1	0.28
O-74	2004	2	7.98	7.72	1	0.26
O-79	2004	1	9.89	11.34	1	-1.45
O-80	2004	2	10.02	11.26	1	-1.24
O-83	2004	1	8.60	7.81	1	0.79
O-84	2004	2	8.03	7.80	1	0.23
MW-1	2004	2	8.56	8.61	1	-0.05
MW-3	2004	1	8.27	8.23	1	0.04
MW-4	2004	2	8.32	8.23	1	0.09
MW-5	2004	2	6.40	6.92	1	-0.52
MW-6	2004	1	7.04	6.93	1	0.11
MW-7	2004	2	7.23	7.20	1	0.03
MW-8	2004	2	10.00	11.56	1	-1.56
MW-9	2004	1	9.91	10.14	0.1	-0.23
MW-20	2004	1	8.54	7.53	1	1.01
NM-1	2004	1	7.08	7.20	1	-0.12
NM-2	2004	1	7.08	7.18	1	-0.10
CNAM-22	2004	2	7.85	7.51	1	0.34
CNAM-23	2004	1	7.87	7.55	1	0.32
CNAM-27	2004	1	7.97	7.60	1	0.37
CNAM-28	2004	1	8.08	7.55	1	0.53
CNAM-29	2004	1	8.79	8.68	1	0.11
CNAM-30	2004	2	8.70	8.70	1	0.00
CCM-5	2004	1	7.12	7.59	0.1	-0.47
CCM-6	2004	2	5.76	6.21	0.1	-0.45
CCM-7	2004	1	10.31	10.48	1	-0.17
MW-10	2004	2	9.61	10.38	1	-0.77
MW-11	2004	2	9.67	10.55	1	-0.88
MW-12	2004	1	9.70	10.75	1	-1.05
MW-13	2004	1	11.28	10.90	1	0.38
MW-14	2004	1	9.58	9.71	0.1	-0.13
MW-15	2004	2	9.23	10.27	1	-1.04
MW-16	2004	1	9.34	10.29	1	-0.95
MW-17	2004	2	9.33	10.42	1	-1.09
MW-18	2004	1	9.39	10.44	1	-1.05
Residual Mean						**-0.01**
Residual Standard Deviation						**0.96**
Sum of Squared Residuals						**107.68**
Absolute Residual Mean						**0.70**
Minimum Residual						**-3.24**
Maximum Residual						**2.07**
Range in Measured Water Levels						**30.28**
Standard Deviation/Range						**0.03**
Residual Mean/Range						**-0.000168098**

Table 3. Pumping Rates Assigned in the 1986 and 2004 Models.

1986 Rates

Name	Rate (cubic ft/day)	Rate (gpm)
HC-2	64492	335
HC-1	64492	335
HC-3	52941	275
ATOCHEM-3	0	0
ATOCHEM-1	30417	158
ATOCHEM-2	0	0
CC-12	45818	238
LM-10	38503	200
LM--6	86631	450
LM-5	0	0
LM-7	28877	150
LM-2	82781	430
IW-3	61604	320
IW-2	86631	450
IW-1	72193	375
CNA-9	105882	550
CNA-14	105882	550
CNA-13	105882	550
CNA-10	105882	550
CNA-15	105882	550
CNA-6	0	0
CNA-8	105882	550
CNA-11	105882	550
CNA-7	105882	550
CNA-5	105882	550
CNA-4	105882	550
CNA-16	9626	50
CNA-3	0	0
CNA-17	105882	550
DUP-3	17326	90
EWELLS	0	0
EWELLS	0	0
DUP-1	96257	500
DUP-2	17326	90
TOTAL	**2,020,620**	**10,496**

2004 Rates

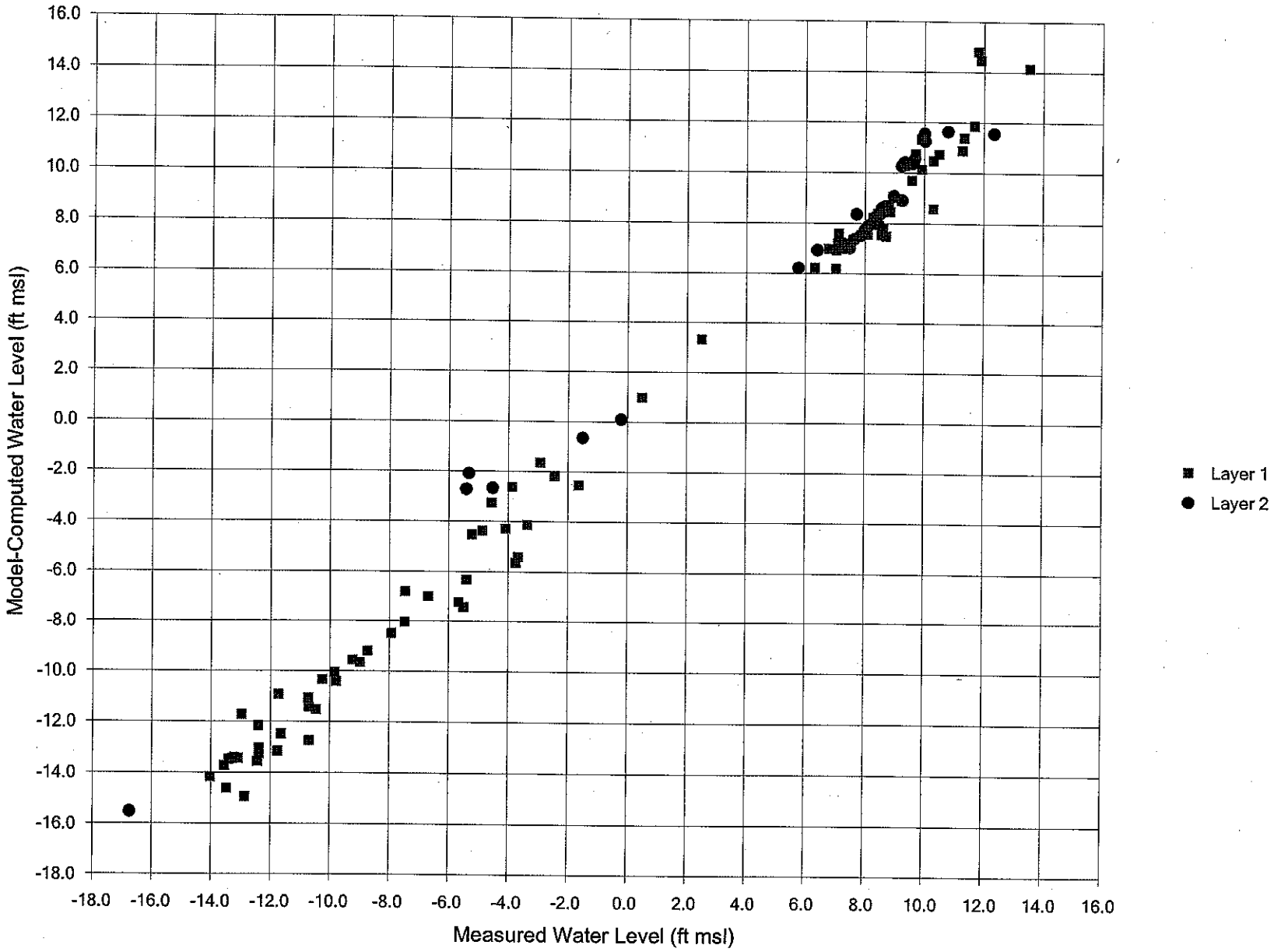
Name	Rate (cubic ft/day)	Rate (gpm)
PW-2	74118	385
PW-1	0	0
PW-3	0	0
ATOCHEM-3	25990	135
ATOCHEM-1	86631	450
ATOCHEM-2	13090	68
CC-12	0	0
LM-10	0	0
LM--6	48128	250
LM-5	0	0
LM-7	57754	300
LM-2	0	0
IW-3	61026	317
IW-2	63529	330
IW-1	57946	301
CNA-9	0	0
CNA-14	0	0
CNA-13	0	0
CNA-10	0	0
CNA-15	0	0
CNA-6	0	0
CNA-8	0	0
CNA-11	0	0
CNA-7	0	0
CNA-5	0	0
CNA-4	0	0
CNA-16	0	0
CNA-3	0	0
CNA-17	0	0
DW-3	17326	90
DW-1	86631	450
DW-2	17326	90
IW4	55636	289
IW5	15594	81
E-1	9626	50
E-4	8278	43
CNA-18	62567	325
CNA-19	62567	325
TOTAL	**823,763**	**4,279**

Table 4. Model Parameters for the Recalibrated Model and the Original Replicated Model.

Parameter	Zone	Units	Final Value	Original Value*
Horizontal Hydraulic Conductivity	1	ft/d	238	238
Horizontal Hydraulic Conductivity	2	ft/d	**60.5**	**55**
Horizontal Hydraulic Conductivity	3	ft/d	17	17
Vertical Hydraulic Conductivity	1	ft/d	155	155
Vertical Hydraulic Conductivity	2	ft/d	0.0039	0.0039
River Conductance	1	ft2/d	**1970**	**6560**
River Conductance	2	ft2/d	146	146
River Conductance	3	ft2/d	0.5	0.5
River Conductance	4	ft2/d	0.5	0.5
River Conductance	5	ft2/d	**25**	**50**
River Conductance	6	ft2/d	500	500
River Conductance	7	ft2/d	0.5	0.5
River Conductance	8	ft2/d	75	75

* Original value is from the replicated model. River conductance is not known from the 1992 report.

Figure 3. Simulated vs. Measured Water Levels for 1986 and 2004 Calibration.



ATTACHMENT 1

PACE ANALYTICAL SERVICES, INC.

LABORATORY ANALYSIS REPORT #2039937

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Pace Analytical™
New Orleans Laboratory

Report of Laboratory Analysis

Project Number: 2039937

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical™
New Orleans Laboratory

Sample Cross Reference Report

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Project: CMI-AOC-M

Project No.: 2039937

Sample ID	Lab ID	Matrix	Collection Date/Time		Received Date/Time	
0-48	20303541	Water	10/06/2004	12:53	10/07/2004	10:30
0-49	20303543	Water	10/06/2004	13:41	10/07/2004	10:30
0-65	20303544	Water	10/06/2004	15:43	10/07/2004	10:30
0-66	20303545	Water	10/06/2004	14:56	10/07/2004	10:30
TRIP BLANK	20303548	Water	10/06/2004		10/07/2004	10:30
EQUIPMENT BLANK	20304135	Water	10/07/2004	15:12	10/08/2004	10:15
O-38	20304132	Water	10/07/2004	15:07	10/08/2004	10:15
O-39	20304134	Water	10/07/2004	16:33	10/08/2004	10:15
O-39 DUPLICATE	20304133	Water	10/07/2004	16:13	10/08/2004	10:15
O-76	20304129	Water	10/07/2004	13:20	10/08/2004	10:15
TRIP BLANK 10/7	20304136	Water	10/07/2004		10/08/2004	10:15

Laboratory Certifications:
Louisiana Dept. of Health and Hospitals (ELAP)/Drinking Water LA 030013
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Kansas Dept. of Health & Environment/ELWHW - E-10286
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New Orleans Laboratory

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: 0-48 **Site:** None

Project: CMI-AOC-M **Project No.:** 2039937 **Sample Qu:**

Lab ID: 20303541 **Matrix:** Water **% Moisture:** n/a

Description: None **Prep Level:** Water **Batch:** 50627

Method: SW 8260 Volatile Organics **Units:** ug/L **Target List:** SR599MVWAT

Collected: 10/06/04 **Received:** 10/07/04

Prep Factor: 1 **Leached:** n/a **Prepared:** **Analyzed:** 10/18/04 17:47 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
DF denotes Dilution Factor of extract. The Prep Factor accounts for a non-routine sample size.
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Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.
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1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: 0-49 **Site:** None

Project: CMI-AOC-M **Project No.:** 2039937 **Sample Qu:**

Lab ID: 20303543 **Matrix:** Water **% Moisture:** n/a

Description: None **Prep Level:** Water **Batch:** 50627

Method: SW 8260 Volatile Organics **Units:** ug/L **Target List:** SR599MVWAT

Collected: 10/06/04 **Received:** 10/07/04

Prep Factor: 1 **Leached:** n/a **Prepared:** **Analyzed:** 10/18/04 18:11 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

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New Orleans Laboratory

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Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: 0-65 **Site:** None

Project: CMI-AOC-M **Project No.:** 2039937 **Sample Qu:**

Lab ID: 20303544 **Matrix:** Water **% Moisture:** n/a

Description: None **Prep Level:** Water **Batch:** 50627

Method: SW 8260 Volatile Organics **Units:** ug/L **Target List:** SR599MVWAT

Collected: 10/06/04 **Received:** 10/07/04

Prep Factor: 1 **Leached:** n/a **Prepared:** **Analyzed:** 10/18/04 18:35 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

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Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: 0-66 **Site:** None

Project: CMI-AOC-M **Project No.:** 2039937 **Sample Qu:**

Lab ID: 20303545 **Matrix:** Water **% Moisture:** n/a

Description: None **Prep Level:** Water **Batch:** 50627

Method: SW 8260 Volatile Organics **Units:** ug/L **Target List:** SR599MVWAT

Collected: 10/06/04 **Received:** 10/07/04

Prep Factor: 1 **Leached:** n/a **Prepared:** **Analyzed:** 10/18/04 18:59 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
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Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: TRIP BLANK
Site: None
Project: CMI-AOC-M
Project No.: 2039937
Sample Qu:
Lab ID: 20303548
Matrix: Water
% Moisture: n/a
Description: None
Prep Level: Water
Batch: 50627
Method: SW 8260 Volatile Organics
Units: ug/L
Target List: SR599MVWAT
Collected: 10/06/04
Received: 10/07/04
Prep Factor: 1
Leached: n/a
Prepared:
Analyzed: 10/18/04 19:24 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
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Saint Rose, LA 70087

Phone: 504.469.0333
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Client: Akzo Nobel Functional Chemical

Client ID: O-76 **Site:** None

Project: CMI-AOC-M **Project No.:** 2039937 **Sample Qu:**

Lab ID: 20304129 **Matrix:** Water **% Moisture:** n/a

Description: None **Prep Level:** Water **Batch:** 50627

Method: SW 8260 Volatile Organics **Units:** ug/L **Target List:** SR599MVWAT

Collected: 10/07/04 **Received:** 10/08/04

Prep Factor: 1 **Leached:** n/a **Prepared:** **Analyzed:** 10/19/04 10:26 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
DF denotes Dilution Factor of extract. The Prep Factor accounts for a non-routine sample size.
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Kansas Dept. of Health & Environment/ELWHW - E-10266
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1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: O-38 **Site:** None

Project: CMI-AOC-M **Project No.:** 2039937 **Sample Qu:**

Lab ID: 20304132 **Matrix:** Water **% Moisture:** n/a

Description: None **Prep Level:** Water **Batch:** 50627

Method: SW 8260 Volatile Organics **Units:** ug/L **Target List:** SR599MVWAT

Collected: 10/07/04 **Received:** 10/08/04

Prep Factor: 1 **Leached:** n/a **Prepared:** **Analyzed:** 10/18/04 22:12 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
DF denotes Dilution Factor of extract. The Prep Factor accounts for a non-routine sample size.
Reporting Limit is corrected for sample size, dilution and moisture content if applicable.
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Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: O-39 DUPLICATE
Site: None
Project: CMI-AOC-M
Project No.: 2039937
Sample Qu:
Lab ID: 20304133
Matrix: Water
% Moisture: n/a
Description: None
Prep Level: Water
Batch: 50627
Method: SW 8260 Volatile Organics
Units: ug/L
Target List: SR599MVWAT
Collected: 10/07/04
Received: 10/08/04
Prep Factor: 1
Leached: n/a
Prepared:
Analyzed: 10/18/04 22:36 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	5.88	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
DF denotes Dilution Factor of extract. The Prep Factor accounts for a non-routine sample size.
Reporting Limit is corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.
Regulatory limit denotes an actual regulatory limit or a client-requested notification limit.

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New Orleans Laboratory

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: O-39 **Site:** None

Project: CMI-AOC-M **Project No.:** 2039937 **Sample Qu:**

Lab ID: 20304134 **Matrix:** Water **% Moisture:** n/a

Description: None **Prep Level:** Water **Batch:** 50627

Method: SW 8260 Volatile Organics **Units:** ug/L **Target List:** SR599MVWAT

Collected: 10/07/04 **Received:** 10/08/04

Prep Factor: 1 **Leached:** n/a **Prepared:** **Analyzed:** 10/18/04 23:01 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	5.21	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
DF denotes Dilution Factor of extract. The Prep Factor accounts for a non-routine sample size.
Reporting Limit is corrected for sample size, dilution and moisture content if applicable.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.
For moisture results, wet denotes result is not corrected for moisture and n/a denotes not applicable.
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New Orleans Laboratory

Report of Laboratory Analysis

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: EQUIPMENT BLANK
Site: None
Project: CMI-AOC-M
Project No.: 2039937
Sample Qu:
Lab ID: 20304135
Matrix: Water
% Moisture: n/a
Description: None
Prep Level: Water
Batch: 50627
Method: SW 8260 Volatile Organics
Units: ug/L
Target List: SR599MVWAT
Collected: 10/07/04
Received: 10/08/04
Prep Factor: 1
Leached: n/a
Prepared:
Analyzed: 10/18/04 23:25 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
DF denotes Dilution Factor of extract. The Prep Factor accounts for a non-routine sample size.
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1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Client: Akzo Nobel Functional Chemical

Client ID: TRIP BLANK 10/7 | **Site:** None

Project: CMI-AOC-M | **Project No.:** 2039937 | **Sample Qu:**

Lab ID: 20304136 | **Matrix:** Water | **% Moisture:** n/a

Description: None | **Prep Level:** Water | **Batch:** 50627

Method: SW 8260 Volatile Organics | **Units:** ug/L | **Target List:** SR599MVWAT

Collected: 10/07/04 | **Received:** 10/08/04

Prep Factor: 1 | **Leached:** n/a | **Prepared:** | **Analyzed:** 10/18/04 23:49 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit	Reg. Limit
75-15-0	Carbon disulfide	1	ND	A99	5.00	

1 compound(s) reported

ND denotes Not Detected at or above the adjusted reporting limit.
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Laboratory Certifications:
Louisiana Dept. of Health and Hospitals (ELAP)/Drinking Water LA 030013
Florida Dept. of Health/Hazardous Waste - E87595
Kansas Dept. of Health & Environment/ELWHW - E-10266
LELAP (NELAP WW/HZ) - 02006
EQB - Certified Puerto Rico Chemist
U.S. Dept. of Agriculture Animal & Plant Health Inspection Services - Foreign Soil Import (U.S. Territories)

Pace Analytical™
New Orleans Laboratory

Report of Quality Control

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Method: Water GC/MS Volatile Organics **Project:** 2039937

Batch: 50627 **LCS:** 50627SZ1 10/18/2004 8:45:00 AM

Units: ug/L **MS:** 50627MS 10/18/2004 1:39:00 PM

Parameter Name	LCS Spike	LCS %Rec	LCSD %Rec	LCS RPD	MS Spike	MS %Rec	MSD %Rec	(1)MS RPD	DUP RPD	QC Limits LCS	QC Limits MS/MSD	Max RPD	Qu
Acetone (2-Propanone, Dimethyl keton	100	58	76	26 *	100	67	62	8		50 - 150	50 - 150	25	
Benzene	50	97	93	4	50	94	87	8		74 - 137	76 - 127	25	
Bromodichloromethane	50	107	112	5	50	111	103	7		70 - 130	61 - 150	25	
Bromoform	50	99	107	8	50	102	100	3		69 - 150	63 - 150	25	
Bromomethane (Methyl bromide)	50	110	114	4	50	110	111	1		53 - 140	51 - 144	25	
2-Butanone (Methyl ethyl ketone)	100	106	111	5	100	107	102	5		50 - 150	50 - 150	25	
Carbon disulfide	50	112	105	6	50	105	102	3		50 - 141	50 - 143	25	
Carbon tetrachloride	50	94	84	11	50	87	81	7		59 - 150	50 - 150	25	
Chlorobenzene	50	92	92	0	50	90	87	3		76 - 131	75 - 130	25	
Chloroethane	50	106	116	9	50	109	110	1		50 - 143	50 - 148	25	
Chloroform	50	115	115	1	50	114	109	4		74 - 133	69 - 137	25	
Chloromethane (Methyl chloride)	50	103	109	5	50	105	106	1		50 - 149	50 - 150	25	
1,2-Dibromo-3-chloropropane (DBCP)	50	91	96	5	50	85	92	7		50 - 150	50 - 150	25	
1,2-Dibromoethane (Ethylene dibromi	50	101	108	7	50	104	98	6		74 - 141	50 - 146	25	
Dichlorodifluoromethane (Freon 12)	50	76	50	41 *	50	45 *	58	25		50 - 150	50 - 150	25	Q1
Dibromochloromethane	50	94	99	5	50	95	90	6		73 - 150	68 - 150	25	
1,1-Dichloroethane	50	114	112	2	50	112	107	5		64 - 136	61 - 139	25	
1,2-Dichloroethane (Ethylene dichlorid	50	100	104	3	50	102	96	6		62 - 150	57 - 150	25	
1,1-Dichloroethene (Dichloroethylene)	50	107	97	10	50	99	95	4		50 - 140	61 - 145	25	
cis-1,2-Dichloroethene	50	110	111	0	50	107	102	5		52 - 143	50 - 150	25	
trans-1,2-Dichloroethene	50	106	101	5	50	103	97	6		52 - 135	50 - 139	25	
1,2-Dichloropropane	50	107	110	3	50	107	101	5		70 - 138	68 - 142	25	
cis-1,3-Dichloropropene	50	105	106	1	50	106	102	3		73 - 145	69 - 146	25	
trans-1,3-Dichloropropene	50	101	106	5	50	102	97	5		65 - 150	60 - 150	25	
Ethylbenzene	50	94	88	7	50	89	86	3		65 - 133	57 - 138	25	
2-Hexanone	100	81	84	4	100	86	79	8		50 - 150	50 - 150	25	
Isopropylbenzene (Cumene)	50	85	75	12	50	77	77	1		62 - 134	54 - 141	25	
Methylene chloride (Dichloromethane)	50	115	115	0	50	114	108	5		50 - 150	50 - 144	25	
4-Methyl-2-pentanone (MIBK)	100	90	93	3	100	89	85	5		50 - 150	50 - 150	25	
Methyl tert-butyl ether (MTBE)	50	81	76	6	50	71	73	3		50 - 142	50 - 150	25	
Styrene	50	97	89	8	50	95	91	4		50 - 134	56 - 143	25	
1,1,2,2-Tetrachloroethane	50	90	95	5	50	92	91	2		56 - 146	58 - 143	25	
Tetrachloroethene (Perchloroethylene)	50	97	83	15	50	84	81	3		50 - 150	50 - 150	25	
Toluene	50	102	97	5	50	99	93	6		73 - 133	76 - 125	25	
1,1,1-Trichloroethane (Methyl chlorofo	50	109	99	10	50	101	96	5		69 - 138	60 - 143	25	
1,1,2-Trichloroethane	50	104	112	8	50	108	101	7		75 - 146	70 - 149	25	
Trichloroethene (Trichloroethylene)	50	107	95	12	50	99	93	6		76 - 138	71 - 120	25	
Trichlorofluoromethane (Freon 11)	50	110	90	19	50	90	89	2		50 - 150	50 - 150	25	
Vinyl chloride (Chloroethene)	50	104	108	4	50	108	106	3		50 - 144	50 - 146	25	

*** denotes recovery outside of QC limits.**
MS spike concentrations are not corrected for moisture content of the spiked sample.
(1) MS RPD is calculated via SW-846 rules: on the basis of spiked sample concentrations rather than spike recoveries.

10/21/2004 09:19:50

Laboratory Certifications:
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New Orleans Laboratory

Report of Quality Control

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Method: Water GC/MS Volatile Organics **Project:** 2039937

Batch: 50627 **LCS:** 50627SZ1 10/18/2004 8:45:00 AM

Units: ug/L **MS:** 50627MS 10/18/2004 1:39:00 PM

Parameter Name	LCS Spike	LCS %Rec	LCSD %Rec	LCS RPD	MS Spike	MS %Rec	MSD %Rec	(1)MS RPD	DUP RPD	QC Limits LCS	QC Limits MS/MSD	Max RPD	Qu
m,p-Xylene	100	94	86	10	100	87	85	3		72 - 130	70 - 130	25	
o-Xylene	50	95	90	6	50	91	88	4		74 - 133	64 - 141	25	

* denotes recovery outside of QC limits.
MS spike concentrations are not corrected for moisture content of the spiked sample.
(1) MS RPD is calculated via SW-846 rules: on the basis of spiked sample concentrations rather than spike recoveries.

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Report of Batch Surrogate Recovery

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Method: Water GC/MS Volatile Organics

Report: 2039937

Batch: 50627

Lab ID	Type and Qualifiers	Sur 1 %Rec	Sur 2 %Rec	Sur 3 %Rec	Sur 4 %Rec	Sur 5 %Rec	Sur 6 %Rec	Sur 7 %Rec	Sur 8 %Rec
20303464	Sample	92	106	104					
20303465	Sample	92	107	105					
20303541	Sample	92	105	104					
20303543	Sample	90	107	104					
20303544	Sample	91	106	101					
20303545	Sample	92	108	103					
20303548	Sample	93	104	105					
20303630	Sample	92	109	106					
20304129	Sample	100	104	98					
20304132	Sample	93	106	100					
20304133	Sample	92	106	107					
20304134	Sample	93	108	103					
20304135	Sample	93	109	103					
20304136	Sample	101	105	108					
20306212	Sample	94	107	104					
[illegible]13	Sample	93	108	103					
20306214	Sample	93	107	103					
20306215	Sample	92	108	103					
20306216	Sample	92	105	101					
20306217	Sample	91	107	105					
20306218	Sample	104	106	104					
20306219	Sample	93	107	104					
50627BZ18	Blank	91	104	103					
50627BZ18A	Blank	93	105	107					
50627BZ19	Blank	100	102	100					
50627MS	Spike	95	93	102					
50627MSD	Spike Dup	93	95	100					
50627SZ18	LCS	95	95	101					
50627SZ18A	LCS	97	94	102					
50627SZ19	LCS	99	99	98					
QC limits:		76-120	74-127	66-124					

Sur 1: Toluene-d8 (S)
Sur 2: 4-Bromofluorobenzene (S)
Sur 3: Dibromofluoromethane (S)

* [illegible]rrogate recovery outside of QC limits.
D [illegible]urrogate recovery is outside of QC limits due to sample dilution, and is not considered an excursion.
A Lab ID consisting of a batch number with a B suffix is a method blank.
A Lab ID consisting of a batch number with a S suffix is an LCS.
A Lab ID with a MS suffix is a matrix spike.
A Lab ID with a MSD suffix is a matrix spike duplicate.

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10/21/2004 09:19:50

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Report of Method Blank

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Lab ID: 50627BZ18

Description: Water Method Blank **Project No.:** 2039937

Method: Water GC/MS Volatile Organics **Batch:** 50627 **Units:** ug/L

Prep Factor: 1 **Leached:** **Prepared:** **Analyzed:** 18-Oct-04 08:21 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit
67-64-1	Acetone (2-Propanone, Dimethyl keto	1	ND	A99	10.0
71-43-2	Benzene	1	ND		5.00
75-27-4	Bromodichloromethane	1	ND		5.00
75-25-2	Bromoform	1	ND		5.00
74-83-9	Bromomethane (Methyl bromide)	1	ND		5.00
78-93-3	2-Butanone (Methyl ethyl ketone)	1	ND	A99	10.0
75-15-0	Carbon disulfide	1	ND	A99	5.00
56-23-5	Carbon tetrachloride	1	ND		5.00
108-90-7	Chlorobenzene	1	ND		5.00
75-00-3	Chloroethane	1	ND		5.00
67-66-3	Chloroform	1	ND		5.00
74-87-3	Chloromethane (Methyl chloride)	1	ND		5.00
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	1	ND	A99	5.00
106-93-4	1,2-Dibromoethane (Ethylene dibromi	1	ND		5.00
75-71-8	Dichlorodifluoromethane (Freon 12)	1	ND		5.00
124-48-1	Dibromochloromethane	1	ND		5.00
75-34-3	1,1-Dichloroethane	1	ND		5.00
107-06-2	1,2-Dichloroethane (Ethylene dichlo	1	ND		5.00
75-35-4	1,1-Dichloroethene (Dichloroethylen	1	ND		5.00
156-59-2	cis-1,2-Dichloroethene	1	ND		5.00
156-60-5	trans-1,2-Dichloroethene	1	ND		5.00
78-87-5	1,2-Dichloropropane	1	ND	A00	5.00
10061-01-5	cis-1,3-Dichloropropene	1	ND		5.00
10061-02-6	trans-1,3-Dichloropropene	1	ND		5.00
100-41-4	Ethylbenzene	1	ND		5.00
591-78-6	2-Hexanone	1	ND	A99	10.0
98-82-8	Isopropylbenzene (Cumene)	1	ND		5.00
79-20-9	Methylacetate	1	ND		10.0
75-09-2	Methylene chloride (Dichloromethane	1	ND		5.00
108-10-1	4-Methyl-2-pentanone (MIBK)	1	ND	A99	10.0
1634-04-4	Methyl tert-butyl ether (MTBE)	1	ND	A99	5.00
100-42-5	Styrene	1	ND		5.00
79-34-5	1,1,2,2-Tetrachloroethane	1	ND		5.00
127-18-4	Tetrachloroethene (Perchloroethylen	1	ND		5.00
108-88-3	Toluene	1	ND		5.00
71-55-6	1,1,1-Trichloroethane (Methyl chlor	1	ND		5.00

ND denotes Not Detected at or above the reporting limit.
Dilution denotes Dilution Factor.
RL denotes sample Reporting Limit.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.

10/21/2004 09:19:51

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New Orleans Laboratory

Report of Method Blank

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Lab ID: 50627BZ18

Description: Water Method Blank **Project No.:** 2039937

Method: Water GC/MS Volatile Organics **Batch:** 50627 **Units:** ug/L

Prep Factor: 1 **Leached:** **Prepared:** **Analyzed:** 18-Oct-04 08:21 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit
79-00-5	1,1,2-Trichloroethane	1	ND		5.00
79-01-6	Trichloroethene (Trichloroethylene)	1	ND		5.00
75-69-4	Trichlorofluoromethane (Freon 11)	1	ND		5.00
75-01-4	Vinyl chloride (Chloroethene)	1	ND		5.00
1330-20-7	m,p-Xylene	1	ND		5.00
95-47-6	o-Xylene	1	ND		5.00

42 compound(s) reported

) denotes Not Detected at or above the reporting limit.
denotes Dilution Factor.
RL denotes sample Reporting Limit.
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10/21/2004 09:19:51

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Report of Method Blank

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Phone: 504.469.0333
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Lab ID: 50627BZ18A

Description: Water Method Blank **Project No.:** 2039937

Method: Water GC/MS Volatile Organics **Batch:** 50627 **Units:** ug/L

Prep Factor: 1 **Leached:** **Prepared:** **Analyzed:** 18-Oct-04 21:24 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit
67-64-1	Acetone (2-Propanone, Dimethyl keto	1	ND	A99	10.0
71-43-2	Benzene	1	ND		5.00
75-27-4	Bromodichloromethane	1	ND		5.00
75-25-2	Bromoform	1	ND		5.00
74-83-9	Bromomethane (Methyl bromide)	1	ND		5.00
78-93-3	2-Butanone (Methyl ethyl ketone)	1	ND	A99	10.0
75-15-0	Carbon disulfide	1	ND	A99	5.00
56-23-5	Carbon tetrachloride	1	ND		5.00
108-90-7	Chlorobenzene	1	ND		5.00
75-00-3	Chloroethane	1	ND		5.00
67-66-3	Chloroform	1	ND		5.00
74-87-3	Chloromethane (Methyl chloride)	1	ND		5.00
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	1	ND	A99	5.00
106-93-4	1,2-Dibromoethane (Ethylene dibromi	1	ND		5.00
75-71-8	Dichlorodifluoromethane (Freon 12)	1	ND		5.00
124-48-1	Dibromochloromethane	1	ND		5.00
75-34-3	1,1-Dichloroethane	1	ND		5.00
107-06-2	1,2-Dichloroethane (Ethylene dichlo	1	ND		5.00
75-35-4	1,1-Dichloroethene (Dichloroethylen	1	ND		5.00
156-59-2	cis-1,2-Dichloroethene	1	ND		5.00
156-60-5	trans-1,2-Dichloroethene	1	ND		5.00
78-87-5	1,2-Dichloropropane	1	ND	A00	5.00
10061-01-5	cis-1,3-Dichloropropene	1	ND		5.00
10061-02-6	trans-1,3-Dichloropropene	1	ND		5.00
100-41-4	Ethylbenzene	1	ND		5.00
591-78-6	2-Hexanone	1	ND	A99	10.0
98-82-8	Isopropylbenzene (Cumene)	1	ND		5.00
79-20-9	Methylacetate	1	ND		10.0
75-09-2	Methylene chloride (Dichloromethane	1	ND		5.00
108-10-1	4-Methyl-2-pentanone (MIBK)	1	ND	A99	10.0
1634-04-4	Methyl tert-butyl ether (MTBE)	1	ND	A99	5.00
100-42-5	Styrene	1	ND		5.00
79-34-5	1,1,2,2-Tetrachloroethane	1	ND		5.00
127-18-4	Tetrachloroethene (Perchloroethylen	1	ND		5.00
108-88-3	Toluene	1	ND		5.00
71-55-6	1,1,1-Trichloroethane (Methyl chlor	1	ND		5.00

ND denotes Not Detected at or above the reporting limit.
Dilution denotes Dilution Factor.
RL denotes sample Reporting Limit.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.

10/21/2004 09:19:51

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Report of Method Blank

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Phone: 504.469.0333
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Lab ID: 50627BZ18A

Description: Water Method Blank **Project No.:** 2039937

Method: Water GC/MS Volatile Organics **Batch:** 50627 **Units:** ug/L

Prep Factor: 1 **Leached:** **Prepared:** **Analyzed:** 18-Oct-04 21:24 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit
79-00-5	1,1,2-Trichloroethane	1	ND		5.00
79-01-6	Trichloroethene (Trichloroethylene)	1	ND		5.00
75-69-4	Trichlorofluoromethane (Freon 11)	1	ND		5.00
75-01-4	Vinyl chloride (Chloroethene)	1	ND		5.00
1330-20-7	m,p-Xylene	1	ND		5.00
95-47-6	o-Xylene	1	ND		5.00

42 compound(s) reported

ND denotes Not Detected at or above the reporting limit.
DF denotes Dilution Factor.
RL denotes sample Reporting Limit.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.

10/21/2004 09:19:51

Laboratory Certifications:
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Report of Method Blank

Pace Analytical Services, Inc.
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Phone: 504.469.0333
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Lab ID: 50627BZ19

Description: Water Method Blank **Project No.:** 2039937

Method: Water GC/MS Volatile Organics **Batch:** 50627 **Units:** ug/L

Prep Factor: 1 **Leached:** **Prepared:** **Analyzed:** 19-Oct-04 09:38 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit
67-64-1	Acetone (2-Propanone, Dimethyl keto	1	ND	A99	10.0
71-43-2	Benzene	1	ND		5.00
75-27-4	Bromodichloromethane	1	ND		5.00
75-25-2	Bromoform	1	ND		5.00
74-83-9	Bromomethane (Methyl bromide)	1	ND		5.00
78-93-3	2-Butanone (Methyl ethyl ketone)	1	ND	A99	10.0
75-15-0	Carbon disulfide	1	ND	A99	5.00
56-23-5	Carbon tetrachloride	1	ND		5.00
108-90-7	Chlorobenzene	1	ND		5.00
75-00-3	Chloroethane	1	ND		5.00
67-66-3	Chloroform	1	ND		5.00
74-87-3	Chloromethane (Methyl chloride)	1	ND		5.00
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	1	ND	A99	5.00
106-93-4	1,2-Dibromoethane (Ethylene dibromi	1	ND		5.00
75-71-8	Dichlorodifluoromethane (Freon 12)	1	ND		5.00
124-48-1	Dibromochloromethane	1	ND		5.00
75-34-3	1,1-Dichloroethane	1	ND		5.00
107-06-2	1,2-Dichloroethane (Ethylene dichlo	1	ND		5.00
75-35-4	1,1-Dichloroethene (Dichloroethylen	1	ND		5.00
156-59-2	cis-1,2-Dichloroethene	1	ND		5.00
156-60-5	trans-1,2-Dichloroethene	1	ND		5.00
78-87-5	1,2-Dichloropropane	1	ND	A00	5.00
10061-01-5	cis-1,3-Dichloropropene	1	ND		5.00
10061-02-6	trans-1,3-Dichloropropene	1	ND		5.00
100-41-4	Ethylbenzene	1	ND		5.00
591-78-6	2-Hexanone	1	ND	A99	10.0
98-82-8	Isopropylbenzene (Cumene)	1	ND		5.00
79-20-9	Methylacetate	1	ND		10.0
75-09-2	Methylene chloride (Dichloromethane	1	ND		5.00
108-10-1	4-Methyl-2-pentanone (MIBK)	1	ND	A99	10.0
1634-04-4	Methyl tert-butyl ether (MTBE)	1	ND	A99	5.00
100-42-5	Styrene	1	ND		5.00
79-34-5	1,1,2,2-Tetrachloroethane	1	ND		5.00
127-18-4	Tetrachloroethene (Perchloroethylen	1	ND		5.00
108-88-3	Toluene	1	ND		5.00
71-55-6	1,1,1-Trichloroethane (Methyl chlor	1	ND		5.00

denotes Not Detected at or above the reporting limit.
denotes Dilution Factor.
RL denotes sample Reporting Limit.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.

10/21/2004 09:19:51

Laboratory Certifications:
Louisiana Dept. of Health and Hospitals (ELAP)/Drinking Water LA 030013
Florida Dept. of Health/Hazardous Waste - E87595
Kansas Dept. of Health & Environment/ELWHW - E-10266
LELAP (NELAP WW/HZ) - 02006
EQB - Certified Puerto Rico Chemist
U.S. Dept. of Agriculture Animal & Plant Health Inspection Services - Foreign Soil Import (U.S. Territories)

Pace Analytical™
New Orleans Laboratory

Report of Method Blank

Pace Analytical Services, Inc.
1000 Riverbend Blvd, Suite F
Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Lab ID: 50627BZ19

Description: Water Method Blank **Project No.:** 2039937

Method: Water GC/MS Volatile Organics **Batch:** 50627 **Units:** ug/L

Prep Factor: 1 **Leached:** **Prepared:** **Analyzed:** 19-Oct-04 09:38 RMP

CAS Number	Parameter	Dilution	Result	Qu	Reporting Limit
79-00-5	1,1,2-Trichloroethane	1	ND		5.00
79-01-6	Trichloroethene (Trichloroethylene)	1	ND		5.00
75-69-4	Trichlorofluoromethane (Freon 11)	1	ND		5.00
75-01-4	Vinyl chloride (Chloroethene)	1	ND		5.00
1330-20-7	m,p-Xylene	1	ND		5.00
95-47-6	o-Xylene	1	ND		5.00

42 compound(s) reported

ND denotes Not Detected at or above the reporting limit.
DF denotes Dilution Factor.
RL denotes sample Reporting Limit.
Qu lists qualifiers. Specific qualifiers are defined at the end of the report.

10/21/2004 09:19:51

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Saint Rose, LA 70087

Phone: 504.469.0333
Fax: 504.469.0555

Project No.: 2039937

Analyte Qualifiers

Qualifier	Qualifier Description
A00	NELAC accreditation for this analyte is temporarily suspended pending updated proficiency testing results.
A99	This analyte is a poor performer by this method. The QC recovery data for this analyte may be poor or erratic as demonstrated by a performance-based statistical evaluation.

QC Qualifiers

Qualifier	Qualifier Description
Q1	The matrix spike recoveries are poor. Acceptable method performance for this analyte has been demonstrated by the laboratory control sample recovery.

10/21/2004 09:19:51

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CLIENT S/	LAB SAMF	MATRIX	COLLECTI	ANALYTE	SAMPLE F	ParaARL	UNITS	METHOD	DILUTION	ANALYZEI	PREPARE	HOLD TIM	PPM
0-48	20303541	Water	10/6/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	17:47	293 hours	
0-49	20303543	Water	10/6/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	18:11	293 hours	
0-65	20303544	Water	10/6/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	18:35	291 hours	
0-66	20303545	Water	10/6/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	18:59	292 hours	
TRIP BLAI	20303548	Water	10/6/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	19:24	307 hours	
O-76	20304129	Water	10/7/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/19/2004	10:26	285 hours	
O-38	20304132	Water	10/7/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	22:12	271 hours	
O-39 DUPI	20304133	Water	10/7/2004	Carbon dis	5.88	5	ug/L	SW 8260 \	1	10/18/2004	22:36	270 hours	0.00588
O-39	20304134	Water	10/7/2004	Carbon dis	5.21	5	ug/L	SW 8260 \	1	10/18/2004	23:01	271 hours	0.00521
EQUIPMEI	20304135	Water	10/7/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	23:25	272 hours	
TRIP BLAI	20304136	Water	10/7/2004	Carbon dis	ND	5	ug/L	SW 8260 \	1	10/18/2004	23:49	287 hours	

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