OSP, LLC
Bessemer, Alabama
EPA I.D. Number ALD 004 017 869

FACT SHEET

A draft modification to the Alabama Hazardous Waste Management and Minimization Act (AHWMMA) permit has been prepared for the OSP, LLC facility. This hazardous waste facility is located in Bessemer, 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 OSP, LLC's ability to comply with the hazardous waste management requirements of the AHWMMA, as amended. OSP, LLC 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 (September 27, 2019).

II. PROCEDURES FOR REACHING A FINAL DECISION

The Alabama Department of Environmental Management (ADEM or Department) is proposing to modify the OSP, LLC permit for post-closure care for one closed landfill unit which has been closed as a single landfill unit with wastes and/or contaminated soils remaining in-place and two mixed-waste vaults.

ADEM Admin. Code r. 335-14-8-.08(6)(b)1. requires that the public be given a 45-day comment period for each draft permit. The comment period will begin on BEGIN DATE, which is the date of publication of the public notice in major local newspaper(s) of general circulation, and will end on END DATE. 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

The Department has initiated a modification to the permit under the requirements of AHWMMA for post-closure care. OSP, LLC consists of one hazardous waste landfill and two mixed waste vaults. The estimated volume of the landfill is approximately 76,000 cubic yards or 91,200 tons. Also the facility consists of two concrete mixed waste vaults, where contaminated slag (Cesium 137) was placed. These mixed waste were put to use in 1935 and ceased operation on 1987. The hazardous waste which was managed in the landfill were D005, D006, D008, D009, D018, D035, D038, D039,

and D040. The landfill 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 for the landfill and corrective action for groundwater contamination.

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 OSP, LLC has been completed and SWMUs have been identified. All SWMUs are recommended for further sampling and corrective action if necessary.
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IV. SUMMARY OF PROPOSED MODIFICATIONS

The frequency of inspections should be monthly as per permit application Table 1, Appendix C and not weekly as in the permit because of Department's oversight.

V. CHANGES TO THE EXISTING PERMIT

The specific changes to the permit are explained below.

Section/Appendix	**Reason**
Cover-Page	
Signature Page	Change of date
Permit Section II.C.2.	Change frequency from weekly to monthly
Permit Section VI. II.C.2	Change frequency from weekly to monthly

VI. TECHNICAL CONTACT

Naveen C. Sharma
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
334-270-5608

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 protection of public health or the environment, for any imminent and substantial endangerment to human health, welfare, or the environment.

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 submit an application for a new permit for both post-closure and Solid Waste Management Unit (SWMU) corrective action 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 Rule 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 Rules 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.

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) includes 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 Rules 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 their 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;

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 Rule 335-14-2-Appendix I or the methods specified in Appendix F 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 Appendix F of the permit application, or an alternative method approved by ADEM. [ADEM Admin. Code Rule 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 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 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 Rules 335-14-5-.05(5)(b) and 335-14-8-.03(1)(j)2.]

c. The Permittee shall maintain at the facility records for 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 individual(s) who performed the sampling or measurements;

iii. The date(s) analyses were performed;

iv. The 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 OSP, LLC 1200 Abernathy Rd. NE, Atlanta GA 30328.

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

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

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

11. Signatory Requirements

All applications, reports or information submitted to the Department shall be signed and certified in accordance with ADEM Admin. Code Rules 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 Rule 335-14-8-.04(1) or ADEM Admin. Code Rule 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 Rules 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.

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.

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 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 Rule 335-14) signed by the Permittee and a professional engineer registered in the State of Alabama 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; 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 Rule 335-14-8-.03(1)(1)2.]

14. The Permittee shall assure that all measures necessary to maintain and/or achieve compliance with all applicable requirements of ADEM Admin. Code Rules 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. In the event that 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 Rule 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 Rules 335-14-1, 335-14-2, 335-14-5, and 335-14-8, unless this permit specifically 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 Rule 335-14-8-.03(3)(b)2. in order 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).

"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.

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

“Land Use Controls,” for the purposes of this permit, is as defined by ADEM Admin. Code Rule 335-15-1-.02.

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

“Mixed waste,” for the purposes of this permit, means a solid waste that is a mixture of hazardous waste (as defined in ADEM Admin. Code Rule 335-14-2-.01(3)) and radioactive waste (as defined in 10 CFR 61.2). The radioactive component of mixed waste is subject to regulation by the Atomic Energy Act (AEA)/Nuclear Regulatory Commission (NRC). The non-radioactive chemically hazardous component of mixed waste is subject to regulation by the AHWMMA and ADEM Admin. Code Rule 335-14.

“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 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.

I.F. WASTE MINIMIZATION

1. Certification Requirements

   Pursuant to ADEM Admin. Code Rule 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,

   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 Rule 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), (5), and (10).

2. All cost estimates must be updated annually as required by ADEM Admin. Code Rule 335-14-5-.08(3)(b), (5)(b), and (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 Rule 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 Rule 335-14-8-.04(2) at least 60 calendar days prior to the proposed change in facility design or operation.

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

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

PART II

POST-CLOSURE CARE

II.A. POST-CLOSURE CARE PERIOD

The post-closure care period shall extend for a period of 30 years from the date of initial post-closure permit issuance unless shortened or extended pursuant to ADEM Admin. Code Rule 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 Section II of the permit application and as required by ADEM Admin. Code Rules 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 Rules 335-14-5-.02(5) and as described in Section I.E. 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 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 Rule 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 Rule 335-14-5-.14(10).

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 2.2 of the permit application, the post-closure care plan as described in Section 2.0 of the permit application, and as required by ADEM Admin. Code Rule 335-14-5-.07.

2. Monitoring and Inspection

   The Permittee shall inspect the closed hazardous waste management units listed in Table II.1 at least monthly and after storms to detect any evidence of deterioration or improper operation as described in Section 2.2 of the permit application and as required under ADEM Admin. Code Rules 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.

TABLE II.1

POST-CLOSURE CARE UNITS

UNIT NAME	UNIT DESCRIPTION	CLOSED-IN-PLACE CAPACITY (QUANTITY)	DESCRIPTION OF UNIT*	LOCATION OF UNIT*
Landfill	On-Site Foundry Landfill	76,000 yds^3	Section II.D	Fig. 2 & 3
Mixed Waste Vaults	Cesium 137 Contaminated Waste Storage Vaults	125 yds^3	Section 4.28**	Fig. 3

* Location in permit application containing description (text) and location (figure) of unit.
** Description is located in June 2008 RCRA Facility Assessment (RFA).

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. and the Compliance Monitoring Program contained in Permit Condition III.D.

2. The Permittee shall commence 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 Rules 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 2 and 3 of the permit application, and any other groundwater monitoring wells specified by Permit Condition III.B.1.d.

      i. All groundwater monitoring wells shall be maintained in accordance with the plans and specifications presented in Section 3.0. of the permit application and in accordance with ADEM Admin. Code Rule 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 III.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

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

b. Groundwater monitoring wells MW-1, MW-1A, MW-2, MW-2A, MW-3, MW-3A shall define the point of compliance for the on-site foundry landfill closed as a landfill.

c. The Permittee shall maintain groundwater monitoring well(s) MW-5 and MW-5A as the background monitoring well(s) for the entire facility as specified in Section 3.0. 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 Rules 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).

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 Section 3.0. and Appendix E of the permit application and ADEM Admin. Code Rule 335-14-5-.06(8)(g).

3. Groundwater Protection Standard

   a. The groundwater protection standard, as required under ADEM Admin. Code Rule 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 Rule 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 Rule 335-14-5-.06(11)(f).

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 Rules 335-14-5-.06(8)(d), (e), and (g):

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

   b. Samples shall be analyzed according to the procedures specified in Appendix F 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.3.

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

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

e. All samples taken 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 quarterly 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 modification, 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 [RESERVED]

III.D. COMPLIANCE MONITORING PROGRAM

The requirements of this Condition are applicable to the hazardous waste landfill and the two mixed waste storage vaults. Except as specified otherwise in this permit, the Compliance Monitoring Program shall be implemented in accordance with Section 3.0 of the permit application and ADEM Admin. Code Rule 335-14-5-.06(10).

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.3. of this permit, on an annual basis in accordance with Permit Condition III.B.5. throughout the compliance monitoring period. 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. throughout the compliance monitoring period. This schedule shall begin within 120 calendar days of the effective date of this permit.

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 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 point of compliance and background wells and analyze, in accordance with Permit Condition III.B.5., for the constituents listed in ADEM Admin. Code Rule 335-14-5-Appendix IX, at the beginning of the compliance period and thereafter on an annual basis throughout the compliance period.

2. Reporting and Response Requirements

In addition to the recordkeeping and reporting requirements specified in Permit Condition III.B.6., the Permittee shall perform statistical evaluation of monitoring well analytical data for each monitoring event pursuant to Permit Condition III.B.5. and ADEM Admin. Code Rule 335-14-5-.06(10)(d).

a. If the Permittee determines, pursuant to Permit Conditions III.D.1.c. and III.B.5. and ADEM Admin. Code Rules 335-14-5-.06(10)(d) and 335-14-5-.06(10)(g), that any constituent(s) listed in ADEM Admin. Code Rule 335-14-5-Appendix IX but not listed in Table III.3 of this permit is detected at any point of compliance or background well, he or she must comply with ADEM Admin. Code R. 335-14-5-.06(10)(g).

b. If the Permittee determines pursuant to Permit Conditions III.B.5. and III.D.1. and ADEM Admin. Code Rule 335-14-5-.06(10)(d) that any concentration limits listed in Table III.3. of this permit exceeded in any monitoring well at the point of compliance, he or she must comply with ADEM Admin. Code R. 335-14-5-.06(10)(h):

III.E. CORRECTIVE ACTION MONITORING PROGRAM [RESERVED]

TABLE III.1

MONITORING WELL DESIGNATIONS

WELL NUMBER	WELL TYPE *	WELL LATITUDE	WELL LONGITUDE	WELL DEPTH (ft)	GROUND ELEVATION (ft. MSL)	TOP-OF-RISER ELEVATION (ft. MSL)	SCREENED INTERVAL (ft. blgs)	MONITORED ZONE	SAMPLING FREQUENCY
MW-1	POC	33°25’14”N	86°58’31”W	41.5	456.11	458.98	31.3 – 41.3	Bedrock	Semi-annual
MW-1A	POC	33°25’14”N	86°58’31”W	15.0	455.93	458.99	9.9 – 14.9	Upper	Semi-annual
MW-2	POC	33°25’17”N	86°58’29”W	42.0	456.56	459.14	31.8 – 41.8	Bedrock	Semi-annual
MW-2A	POC	33°25’17”N	86°58’29”W	12.3	458.09	458.76	7.2 – 12.2	Upper	Semi-annual
MW-3	POC	33°26’19”N	86°58’24”W	60.7	457.70	460.33	40.0 – 50.0	Bedrock	Semi-annual
MW-3A	POC	33°26’19”N	86°58’24”W	17.0	457.77	460.62	11.9 – 16.9	Upper	Semi-annual
MW-5	BKG	33°24’52”N	86°58’52”W	40.9	469.04	471.94	30.0 – 40.0	Bedrock	Semi-annual
MW-5A	BKG	33°24’52”N	86°58’52”W	13.5	468.94	472.37	8.4 – 13.4	Upper	Semi-annual

* Well Type:
POC - Point of Compliance Wells
BKG - Background Wells

TABLE III.2

GROUNDWATER QUALITY MONITORING CONSTITUENTS*

HAZARDOUS CONSTITUENT
Arsenic
Barium
Cadmium
Chromium
Cyanide
Lead
Nickel
Sulfide
Zinc
Gross Alpha
Gross Beta

Monitoring is required on a semi-annual basis for the constituents listed herein which is a subset of the Groundwater Protection Standard listed in Table III.3 for which monitoring is required on an annual basis.

TABLE III.3

GROUNDWATER PROTECTION STANDARD

HAZARDOUS CONSTITUENT	CONCENTRATION LIMIT (mg/L)
Acenapthene	5.3E-2
Anthracene	1.80E-1
Arsenic	1.00E-2
Barium	2.00
Beryllium	4.00E-3
Cadmium	5.00E-3
p-Chloro-m-cresol	1.41E-1
Chromium	1.00E-1
Copper	1.30
Cyanide	2.00E-1
Di-n-butyl phthalate	9.0E-2
Fluoranthene	8.0E-2
Lead	1.50E-2
Naphthalene	6.20E-4
Nickel	1.00E-1
Phenanthrene	4.69E-2
Pyrene	1.2E-2
Sulfide	MDL
Zinc	6E-1
Gross Alpha	15 pCi/L
Gross Beta	50 pCi/L

Monitoring is required on an annual basis for the constituents listed herein.

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 investigation 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 Rule 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 Rule 335-14-8-.02(5)(b)19.

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.2 or SWMUs or AOCs identified in Permit Condition IV.A.3 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 a RCRA Facility Investigation (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.

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;

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;

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

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 Alabama Environmental Investigation and Remediation Guidance.

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 Alabama Environmental Investigation and Remediation Guidance.

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 120 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.

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 Rule 335-14-5-.06(12), which is achieved through IM, shall be in accordance with ADEM Admin. Code Rule 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;

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/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 therefore. 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.

4. All submittals required by this permit shall be signed and certified in accordance with ADEM Admin. Code Rule 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 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 his/her 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 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.

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):

SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA

There are no required RFI activities at this time

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	UNIT COMMENT

There are no SWMUs or AOCs requiring no further action at this time.

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 I, II, III and IV of this permit.

SWMU/AOC NUMBER	SWMU/AOC NAME	UNIT COMMENT	POTENTIALLY AFFECTED MEDIA
SWMU 6	Landfill	• Operated from 1974 – 1987 • Wastes Managed: D005, D006, D008, D009, D018, D035, D038, D039, and D040	Soils, Air, Groundwater, Surface Water
SWMU 23	Cesium 137 Contaminated Waste Storage Vaults	• Operated from 1935 – 1987 • Waste Managed: Cesium 137 wastes, D006, and D008.	Waste is located in a vault. There is no evidence of a release to any media.

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

*There are no CMI activities at this time.

2. Remedial Cleanup Levels

   [RESERVED]

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. Where the owner of such property will not allow a deed restriction to be imposed, the Permittee shall notify the Department within 14 calendar days of receipt of written notification by the 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 non-residential uses.

b. Maintain the survey plat as described in Condition V.B.5.a. of this permit and in the CMS Report 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 residential land uses.

6. Notice to Title of Real Property

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

a. Record in the probate judges office of the county in which the property is located or a portion thereof a deed, restrictive covenant or some other instrument that is normally examined during a title search that will in perpetuity notify any potential purchaser of the property that:

i. The land is contaminated with hazardous constituents in concentrations that exceed residential 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;

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 institutional control.

b. Submit to the Department a certification, signed by the Permittee in accordance with Permit Condition I.C.11., that the notice 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 deed notice 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 residential 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 deed notice 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 CMI Plan approved by the Department, is greater than 180 calendar days, the Permittee shall provide ADEM with progress reports according to the schedule approved by ADEM in the CMI Plan. The progress reports shall, at a minimum, contain the following information:

a. A description of the portion of CMI completed;

b. Summaries of and deviations from the approved CMI 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. Hazardous 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 notice to deed 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 Rule 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 on an annual basis, unless otherwise approved by the Department, beginning 180 calendar days following the Department's approval of the Final CMI Report. The CM Effectiveness Reports shall include, at a minimum, the following:

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 institutional controls per Condition V.C.

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 independent professional engineer registered in the State of Alabama 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.

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

There are no CMI activities required at this time

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.	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.	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	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 and annually as required by ADEM Admin. Code Rules 335-14-5-.08(3)(b), (5)(b), and (10)(b)
I.I.	Submit a written request for a permit modification pursuant to the requirements of ADEM Admin. Code Rule 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 monthly, after storms, and in accordance with the inspection schedule.
III.B.1.a.iii.	Notification of damaged groundwater monitoring wells.	Immediately in writing. The well must be repaired within 30 calendar days of damage, and repair report must be submitted within 30 calendar days of repair.
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 within 90 calendar days prior to installation of additional groundwater monitoring well(s).

PERMIT CONDITION	ITEM	DUE DATE
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 quarterly thereafter. See permit condition for start/stop/resume provisions.
III.D.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 beginning within 120 calendar days of the effective date of this permit.
III.D.1.a.	Sample all point of compliance wells and background wells and analyze for the constituents listed in Table III.3. of this permit.	Annually beginning within 120 calendar days of the effective date of this permit.
III. D.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. D.1.c.	Sample all point of compliance and background wells and analyze, in accordance with Permit Condition III.B.5., for the constituents listed in ADEM Admin. Code Rule 335-14-5-Appendix IX	At the beginning of the compliance period and annually thereafter throughout the compliance period.
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 Permit Condition 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

PERMIT CONDITION	ITEM	DUE DATE
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 120 calendar days after this Permit has been approved.
IV. F.1.a	Submit IM Work Plan	Within 30 calendar days upon notification by the Department.
IV. F.3.b	Submit IM Report	Within 90 calendar days of completion of IM.
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. D.3.a	Begin submitting annual CM Effectiveness Reports	180 calendar days following the Department's approval of the Final CMI Report
V. D.4.	Submit a Final Report of Corrective Measures (FRCM)	Within 90 calendar days following attainment of cleanup levels or goals

August 22, 2018

Alabama Department of Environmental Management
Environmental Services Branch
Land Division
P.O. Box 301463
Montgomery, Alabama 36130-1463

Attn: Mr. Clethes Stallworth, Chief

Re: Part B Post-Closure Care Permit Renewal Application
OSP, L.L.C.
Closed Landfill
2023 St. Louis Avenue
Bessemer, Jefferson County, Alabama
USEPA ID No. ALD 004 017 869
Project No. E1187198

Dear Mr. Stallworth:

Terracon Consultants, Inc. has prepared the enclosed *Renewal Application for Part B Post-Closure Permit* for the above-referenced site.

Two copies and an electronic copy on a cd of the application are enclosed. If you have any questions concerning this report or need additional information, please call me at (205) 942-1289

Sincerely,
Terracon Consultants, Inc.

Terrell W. Rippstein, AL-PG #8
Principal Geologist

Frank M. Nowicki
Senior Project Professional

cc w/ encl.: U.S. EPA Region IV

Part B Post Closure Care Permit Renewal Application
Closed Landfill

OSP, LLC

2023 St. Louis Avenue

Bessemer, Jefferson County, Alabama

USEPA ID. No: ALD 004 017 869

August 22, 2018

Project No. E1187198

Prepared for:
OSP, LLC
Atlanta, GA

Prepared by:
Terracon Consultants, Inc.
Birmingham, AL

August 22, 2018

OSP, LLC
1200 Abernathy Road, Suite 1200
Atlanta, Georgia 30328

Attn: Dr. Greg Hollod
Vice President EHS

Re: Part B Post-Closure Care Permit Renewal Application
OSP, L.L.C.
Closed Landfill
2023 St. Louis Avenue
Bessemer, Jefferson County, Alabama
USEPA ID No. ALD 004 017 869
Project No. E1187198

Dear Dr. Hollod:

Terracon Consultants, Inc. has prepared the enclosed *Renewal Application for Part B Post-Closure Permit* for the above-referenced site.

Terracon appreciates the opportunity to work with you on this project. If you have any questions concerning this report, please call me at (205) 942-1289.

Sincerely,
Terracon Consultants, Inc.

Terrell W. Rippstein, AL-PG #8
Principal Geologist

for:
Frank M. Nowicki
Senior Project Professional

Terracon

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.

Greg Hollod, PhD
VP EHS

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Part B Post-Closure Care Permit Renewal Application
Closed Landfill
2023 St. Louis Avenue
Bessemer, Jefferson County, Alabama
USEPA ID No. ALD 004 017 869

1.0 GENERAL DESCRIPTION

As per the Alabama Hazardous Wastes Management and Minimization Act (AHWMMA) Post-Closure Care Permit dated February 26, 2009 Modification 1, dated August 10, 2012, this renewal application for the Part B Post-Closure Care Permit is hereby submitted.

1.1 Proposed Action

This proposed action is filed by OSP, LLC (OSP), Atlanta, Georgia. It addresses the criteria required for renewal of the application for a Part B permit under the guidelines of 40 CFR 270 and Rule 335-14-8-.02(5) of the State of Alabama Administrative Codes for the use of an on-site landfill. This landfill was used for the disposal of general foundry waste which, at one time, included the disposal of untreated cupola baghouse dust. Untreated baghouse dust has not been placed in the landfill since 1988.

A complete Part A form addressing the information required by Rule 335-14-8-.02(4) is included as Appendix A.

1.2 General Description of the Facility and Surrounding Area

The facility and the surrounding area are shown on the following figures:

Figure 1 Site Location Map
Figure 2 Site Layout Map
Figure 3 Monitoring Wells and SWMUs
Figure 4 Flood Insurance Map
Figure 5 Wind Rose Diagram
Figure 6 Surrounding Land Use Map
Figure 7 Schools Location Map
Figure 8 Potentiometric Surface Map, July 19, 2018

These maps contain information required to comply with Rule 335-14-8-.02(5)(b)l9.

1.2.1 Site Location

The OSP Closed Landfill and Cesium Vaults are located at 2023 St. Louis Avenue in the northeast 1/4 of Section 5, Township 19 South, Range 4 West, in Bessemer, Jefferson County, Alabama (Figure 1) at 33.42130° N latitude and 86.97413° W longitude. The facility is located on the western edge of the Bessemer city limits.

1.2.2 Site History

In 1889, Shickle, Harrison, and Howard of St. Louis organized the Howard-Harrison Iron Company, Bessemer, Alabama, sending men from its St. Louis plant to install four circular pits and two jib cranes per pit. Workers turned out pipe in 12 foot lengths in 4- through 48-inch diameters. The plant was run by Harrison until 1897 when it joined the American Pipe and Foundry Company the following year and in 1899 merged with U.S. Pipe and Foundry. This foundry was renamed the Bessemer Plant. In 1921 U.S. Pipe purchased the rights to DeLavaud's centrifugal casting method. The pit casting was replaced by the DeLavaud method in the late 1920's and early 1930's. The Bessemer Pipe Plant was sold in 2012. OSP, LLC retained ownership of the closed landfill and the Cesium Vaults.

1.2.3 Site Description

SWMU 6 - Closed Landfill is located on the western portion of the facility property (Figure 2). The closed landfill occupies approximately 7 acres with topographic relief ranging up to 30 feet. Figure 2 shows the monitoring wells including the Point-Of-Compliance for the site.

Current Solid Waste Management Units (SWMUs) are listed in Table 1 and presented on Figure 3. These units are described in more detail in Section 6.0 of this report.

1.2.4 Topography and Arial Photographs

The topography of the site is relatively flat and slopes generally towards the northwest towards Valley Creek. Figures 1 and 3 include topographic information for the site and surrounding area. Figure 4 illustrates the flood zones surrounding the closed landfill. And a Wind Rose Diagram for Birmingham (adjacent to Bessemer) for the years 2008 through July 2017 is presented on Figure 5. Aerial Photographs for the years 1960, 1966, 1971, 1977, 1998, and post-1998 are included as Appendix B.

1.2.5 Surrounding Land Use

The land use within a four-mile radius of the property was examined using Google Earth Map. Based on review of the map, the facility is located within the city limits of Bessemer, Alabama. The city of Hueytown is located approximately two miles from the facility and is the only other

incorporated municipality that falls within the four-mile radius. The land use within the four-mile radius is heavily developed and is a mixture of residential, commercial and industrial properties.

The site is located in an urban area and is bordered by industrial, commercial and undeveloped properties. A surrounding land use map is presented as Figure 6. A description of properties adjoining the subject site is as follows:

North: Valley Creek, then undeveloped and residential property.

Northeast: Unnamed tributary to Valley Creek, then railroad, then commercial property

East: 18th Avenue North, then former Williams Bridge facility and residential property.

Southeast: 18th Avenue North, then former Williams Bridge facility.

South: 19th Street North, then residential property.

Southwest: 19th Street North, then residential property.

West: Valley Creek, then residential property.

Northwest: Valley Creek, then undeveloped and residential property.

1.2.6 Estimated Population and Schools

The estimated population within a four-mile radius of the site is 50,000. The subject property is surrounded by residential, commercial, and industrial properties. Residential property is located adjacent to the southwest portion of the OSP property.

Google Earth program identified 43 schools located within a four-mile radius of the facility. Figure 5 shows the schools located within a 4-mile radius of the site. The historical Pipe Shop School is located on the southern end of the OSP facility. The closest active school is Five Points Elementary School, which is located approximately 0.4 miles northwest of the subject property. Two other schools, Robertstown Elementary School and McNeil Junior High School, are located within a mile of the OSP Facility.

1.2.7 Public Water Supply

Based on review of Geological Survey of Alabama (GSA) Special Map 224 entitled *"Groundwater Availability in Jefferson County"* (1990) and Water Resources Institute Report 88-4133 entitled *"Geohydrogeology and Susceptibility of Major Aquifers to Contamination; Area 4"* (1988), and information from the City of Bessemer, seven municipal, public, or industrial use water wells and twenty-two domestic use wells are located within the four mile radius. Public information from the

City of Bessemer indicates that the potable public water supply is derived from a surface water source. The surface water source is the Black Warrior River.

The USGS 7.5-minute topographic map for the Bessemer Quadrangle (Figure 1) denotes a water well on the adjacent U.S. Pipe property. However, an interview with personnel at U.S. Pipe indicated this well is also no longer in existence. In addition, the well at the former Williams Bridge property is no longer operational.

1.2.8 Surface Water Bodies, State Parks, Wildlife Preserves, and Flood Insurance Maps

The closest water body is Valley Creek located adjacent to the facility on the north and northwest boundaries of the property (Figure 1). Several creeks, intermittent streams, springs, lakes, and unnamed ponds are located within a four-mile radius of the facility.

Based on a review of the Bessemer, Concord, and Greenwood, Alabama 7.5-minute USGS topographic quadrangle maps, there are no state parks, and/or wildlife preserves located within a four-mile radius of the facility.

Valley Creek is located adjacent to the northern and western property boundaries of the site and generally flows to the southwest. The flood studies for Valley Creek by the Federal Insurance Administration of the Federal Emergency Management Agency (FEMA) indicate the majority of the Bessemer Pipe Plant lies in Zone X, which are areas that lie outside the 500 year flood plain. Some non-production areas located near Valley Creek are located in zone AE which are floodway areas. The 100-year flood plane is shown on Figure 4.

1.2.9 Previous Reports

Annual Groundwater Monitoring Reports have been submitted to ADEM every September since the original Part B Post Closure Permit was issued in March 1998.

1.3 Contingency Plan

There are currently no employees or buildings on the site; therefore, a contingency plan is not required.

1.4 Seismic Standard Information

The Bessemer Pipe Plant is located in Jefferson County, Alabama. Appendix VI of 40 Code of Federal Regulations (CFR) 264, which specifies potential seismic problem areas, does not list Jefferson County as a potential seismic problem area. Based on 40 CFR 270.14(b)(11)(i), no

further information is required to demonstrate compliance with seismic standard 40 CFR 264.18(a).

1.5 Security Procedures and Equipment

Access to the landfill and cesium vaults is through the U.S. Pipe facility. The U.S. Pipe facility property is restricted from the surrounding area by fences and has 24-hour guard service. U.S. Pipe employees are required to clock-in or show identification when reporting for work. Visitors and contractors entering the facility must sign a log sheet at the plant entrance and obtain a visitor's pass. These logs are kept on file at the U.S. Pipe plant.

2.0 POST CLOSURE PLAN

2.1 General Information

The post-closure care plan for the OSP, LLC site provides for maintenance and complies with other applicable requirements of the applicable regulations. The post-closure care will comply with ADEM Code R. 335-14-5 and 335-14-8. This care consists of maintaining the integrity and effectiveness of the final cover (including making repairs to the cover as necessary), maintaining an adequate grass cover, protecting and maintaining surveyed benchmarks and warning signs, and conducting required groundwater monitoring.

2.2 Inspection Schedule

OSP provides monitoring and maintenance of the landfill cover throughout the post-closure care period. At a minimum, monitoring consists of regular inspections of the landfill for structural deterioration and discharges that could cause or enable the release of hazardous waste constituents and adversely affect the environment or threaten human health. The schedule of monitoring and maintenance is presented in Appendix C.

2.3 General Design Considerations

The original landfill surface has been reconfigured through grading, backfilling, and then capping with non-hazardous material to achieve stable slopes, a nearly flat top, and a cap. A grass cover has been established over the cap to prevent erosion. Capping and grassing of the landfill has eliminated the problem of wind-blown particulate matter.

2.4 Liner System and Leachate Collection and Removal System

Installation of a liner system and leachate collection and removal system is not applicable for this landfill. For the design of the closure cover, the permeability of the natural soils was compared

to the permeability of the closure cover. From this comparison it was determined that the permeability of the closure cover would be less than the natural soils. Therefore, it was concluded that neither system was necessary.

2.5 Run-on Run-off Control System

As part of the closure activities at the landfill, a berm was constructed around the base of the landfill to protect the landfill from run-on and the effects of the 100-year flood of Valley Creek. This berm was designed and constructed with a minimum elevation of 466 feet above mean sea level to ensure that flood waters from a 100 year flood (464 msl) would not overflow into the landfill berm. Also, the landfill is located at a higher elevation than the surrounding land surface, thereby making the threat of run-on improbable (Figure 2).

Surface run-off from the landfill is controlled by water diversions and berms (Figure 2). The surface area of the landfill is approximately six acres, and has been so constructed to drain uniformly toward the outer perimeter. The berm surrounding the landfill was designed to control storm water run-off for a 24-hour, 25 year storm event according to the previous information provided by Environmental Management and Engineering, Inc. during the initial permit application. In Jefferson County, this is equivalent to 7 inches of rain in 24 hours. Run-off calculations are included in Appendix D.

The berms will be routinely maintained to ensure that adequate run-on/run-off controls are in good condition.

2.6 Vegetative Cover

To prevent erosion, a vegetative cover has been established on the berms, slopes, and crown of the landfill. Prior to grassing the landfill, soil/waste samples were collected and composited into a single sample. This sample was then sent to the soils laboratory located at Auburn University for the appropriate analysis to determine recommended soil amendments. After application of the proper amounts of soil amendments, the berms, slopes, and crown of the landfill were planted with a mixture of rye, bermuda grass, and legumes. The surface of the landfill was then mulched with hay to hold the seed in place and prevent erosion. On some slopes, erosion netting was applied to hold the mulch in place. The vegetative cover is cut and fertilized as necessary to maintain healthy growth.

2.7 Groundwater Monitoring Plan

Compliance groundwater monitoring is presently ongoing at the Bessemer Pipe Plant. The Compliance Monitoring Program is included as Appendix E. The Sampling and Analysis Plan is included as Appendix F.

The monitoring wells which are located in metals handling areas or areas of high traffic have barricades in place to protect them from being damaged by plant operations. Each well is marked and has a locking cap to prevent unauthorized access. Inspection of the wells is a part of the regular inspection program.

2.8 Post-Closure Land Use

During the post-closure period, the landfill will remain closed and access will be controlled. The facility is fenced, and 24-hour security is present at the entrance gate to the facility.

Routine maintenance to repair possible erosion of cap material on the top and slopes of the landfill will be performed as warranted (to be determined during the regularly scheduled inspections).

2.9 Specific Post-Closure Plan Requirements

2.9.1 Surface Impoundment

There are no hazardous waste surface impoundments at the OSP site; therefore, this section is not applicable for the Post-Closure Plan.

2.9.2 Waste Pile

This Post-Closure Plan is for a landfill at the OSP Bessemer facility. No waste piles are present at this site. Therefore, this section is not applicable to the Post-Closure Plan.

2.9.3 Landfill

The post-closure landfill procedures consist of a maintenance program that will ensure the integrity of the landfill cap, vegetative cover, and run-off control structures. Maintenance of the landfill site will be carried out by conducting periodic inspections to check for erosion damage, the condition of vegetative cover, the integrity of safety and run-off control structures, and subsequently perform any repairs. A discussion of the inspection and maintenance program is presented in Appendix C.

2.9.4 Land Treatment Facility

There are no existing or proposed land treatment facilities at the OSP site, and this section is not applicable to the Post-Closure Plan.

2.9.5 Preparedness and Prevention Requirements

OSP does not wish to request a waiver of the preparedness and prevention requirement under 40 CFR 264 Subpart C and ADEM Administrative Code R.335-14-5-.03.

Due to the inert characteristics of cupola baghouse dust and general foundry waste, special requirements for fire control, emergency communications, or special arrangements with local authorities are unnecessary for the OSP landfill. Nevertheless, all heavy equipment that is used in the landfill area will be equipped with fire extinguishers, and two-way radios will be available to heavy equipment operators. Because the closed landfill is an open area, special aisle space to allow for the unobstructed movement of personnel, fire protection equipment, or decontamination equipment is not applicable.

2.9.6 Traffic and Vehicle Information

Up to the time of closure, foundry wastes, including treated (stabilized) baghouse dust, were transported to the landfill in trucks. Disposal of untreated baghouse dust was discontinued in 1988. Because the treated dust was no longer classified as hazardous**,** the disposal of hazardous materials in the landfill was effectively ended. Upon completion of closure activities in 1988, transportation of all materials onto the closed landfill was discontinued.

2.9.7 Notices Required for Disposal Facilities

2.9.7.1 Notice to Local Zoning Authority

A survey plat indicating the type, location, and quantity of hazardous waste within the disposal area with respect to permanently surveyed benchmarks was submitted to the Jefferson County Zoning Office on December 10, 1991. After OSP filed the zoning change application and paid the application fee, the zoning office returned an officially received and stamped landfill plat to OSP on January 10, 1992.

2.9.7.2 Notice in Deed to Property

On January 9, 1992, a "Declaration of Restriction" was filed by OSP at the Bessemer City Courthouse. The "Declaration of Restriction" will serve to notify any potential purchaser that:

- the property has been used to manage hazardous waste; and
- use of the land is restricted to activities that will not disturb the integrity of the final cover system or monitoring system during the post closure care period.

2.9.7.3 Notice of Certification of Post-Closure Care

OSP will notify ADEM within 60 days after completion of the established 30-year post-closure care period.

2.9.8 Estimated Post-Closure Costs and Financial Assurance Mechanism for Post-Closure

Estimated post closure costs to be incurred for the waste management are included as Appendix G. These estimates were prepared in accordance with ADEM Administrative Code R.335-14-5-.08(5) and include provisions for; third party costs, labor rates, inspection costs, and administrative costs. Based on our review of the estimated costs, we do not see the need to change the estimated costs.

To meet the requirements of 40 CFR 265.145 and ADEM Administrative Code R.335-14-5.08(6), Financial Assurance for Post-Closure, OSP has provided a letter of credit with a standby trust fund. Documentation that ADEM has approved the financial mechanism is presented in Appendix H.

3.0 GROUNDWATER MONITORING PROGRAM

3.1 General Information

Eight monitoring wells are presently located on the site (Figure 3). These monitoring wells are constructed of 2-inch-I.D. PVC and are designated MW-1, MW-1A, MW-2, MW-2A, MW-3, MW-3A, MW-5, and MW-5A.

Groundwater sampling for this facility commenced in July 1998. The site has been in Compliance Monitoring since July 1998.

3.2 Soils and Geology

OSP's Bessemer Pipe Plant is located in the Birmingham-Big Canoe Valley Physiographic District of the Alabama Valley and Ridge Physiographic Province. The Cambrian-aged Conasauga Formation underlies the facility, and is composed of a thin-to-medium bedded massive crystalline limestone with numerous thin partings of green to gray shale. A geologic map previously presented in the initial Part B Permit Application is included as Appendix I. The estimated thickness of this formation is 1,100 to 1,900 feet.

The OSP Bessemer Pipe Plant is located in the Birmingham Big Canoe Valley physiographic district of the Alabama Valley and Ridge physiographic section. This district trends from the

northeast to the southwest and is located on the northwest side of the Valley and Ridge physiographic section. Bedrock at the facility lies approximately 15 feet below the land surface. Structurally, the facility is located in the Blount Mountain Syncline. Bedrock consists of a dark bluish gray to brownish gray limestone belonging to the Conasauga Formation of the Cambrian System. The Blount Mountain Syncline is an asymmetrical to overturned syncline with a southwest-northwest regional trend. It is bounded on the northwest by the Opossum Thrust Fault and on the southeast by the Birmingham Anticline. The axial trace of the syncline is located approximately 1/2 mile south of the plant.

In the area of the facility, structure of the bedrock is complex due to faulting. According to published reports by the Geological Survey of Alabama (Geological Survey Atlas Series, Jefferson County Engineering Geology, page 57), strike of the bedrock is due north with a dip of 200 to the east. There are two dominant and four minor fracture/joint sets reported in the bedrock. The trend of the four most prevalent fracture sets is N 25DE, N 18DE, N 22CW and N 46CW. A geologic cross-section previously presented in the initial Part B Permit Application is included as Appendix J.

The surficial soils at the Bessemer Pipe Plant consist primarily of various types of fill emplaced during the development of this area. The original (native) soils underling the fill were formed as the limestone bedrock weathered to a loamy-clay residuum.

3.3 Hydrogeology

The major regional aquifer is the Knox-Shady Aquifer (Planert and Pritchett, 1989). Although the Knox-Shady Aquifer comprises rock units of the Knox Group, Ketona Dolomite, Conasauga Formation, Shady Dolomite, and Weisner Quartzite, immediately beneath the facility, the Conasauga Formation is present.

There are potentially two zones of groundwater movement beneath the site; these zones occur within the fill/soil (shallow flow zone) and the bedrock (bedrock flow zone). Due to the heterogeneous and anisotropic nature of area soils and bedrock, the rate and direction of groundwater flow varies from one zone to another, as well as within each zone. However, the two flow zones are believed to be in hydraulic communication for at least some portion of the year.

In the shallow flow zone, groundwater travels along pathways of primary porosity, within the interstitial voids between the individual grains of sand, silt and clay in the soil. Groundwater in this zone also travels through macropores created by roots and organisms. The clay-rich native soil beneath the fill may retard or locally prevent the downward movement of water, resulting in discontinuous and impermanent perched water bodies. The direction and rate of groundwater movement in this zone is also controlled by the presence of solution openings and/or solution-enlarged joints and bedding planes near the top of the bedrock.

In the predominantly carbonate bedrock, groundwater travels through pathways of secondary porosity such as solution cavities and solution-enlarged joints and bedding planes, as well as along the contacts between individual limestone and shale units.

Figure 7 is the potentiometric surface map for the most recent (July 19, 2018) groundwater monitoring event and illustrates intermediate flow zone.

Environmental Management & Engineering, Inc. conducted slug tests during Groundwater Quality Assessment activities in 2002, which were previously submitted to the ADEM. The hydraulic conductivity (K) for the shallow flow zone is 1.678×10^{-5} feet/second (ft/sec). The K for the deep flow zone is 3.39×10^{-7} ft/sec.

3.4 Groundwater Monitoring Data

The groundwater monitoring data collected from January 2009 to July 2017 under the current Part B Post-Closure Permit is included as Appendix K. The 2018 report has not been prepared.

3.5 Contaminant Plume Description

Groundwater Monitoring has been conducted under the current Part B post Closure Permit since July 1998. There is no contaminant plume at the site. The site is under Compliance Monitoring.

3.6 General Monitoring Program Requirements

The regulated hazardous waste landfill unit has been closed. As a result, there will be no significant leaching of any contained materials by the infiltration of precipitation on the landfill during the post-closure period. The post-closure program to monitor the regulated unit is described below.

3.6.1 Description of Wells

Eight monitoring wells are presently located on the site (Figure 3). These monitoring wells are constructed of 2-inch-I.D. PVC and are designated MW-1, MW-1A, MW-2, MW-2A, MW-3, MW-3A, MW-5, and MW-5A. The monitoring wells have been surveyed and mapped.

Monitoring well information including well type, latitude, longitude, well depth, ground surface elevation, top of casing elevation, screened interval, and monitoring zone/aquifer is presented in Table E-1 in Appendix E. Boring logs and well schematics are included in Appendix E-A of Appendix E.

C.6.2 Description of Sampling/Analysis Procedures

The site is currently under Compliance Monitoring. The Compliance Groundwater Monitoring program is included in Appendix E, and the Sampling and Analysis Plan is included as Appendix F.

C.6.3 Procedures for Establishing Background Quality

Monitoring wells MW-5 and MW-5A are the background monitoring wells for the post-closure period. The data will be evaluated according to statistical procedures to obtain a comparison database for the other, downgradient monitoring wells. Groundwater quality for the background wells will be updated and reported as required in Appendix E. Quality assurance/quality control sample data will be obtained semi-annually and provided to ADEM in the groundwater monitoring reports.

C.6.4 Statistical Procedures

Compliance Monitoring is currently being conducted at the site. The statistical analysis being conducted during Compliance Monitoring is discussed in Appendix E.

C.7 Description of Compliance Monitoring Program

The Compliance Monitoring Program is included as Appendix E.

C.8 List of Indicator Parameters, Waste Constituents, Reaction Products to be Monitored

Under the current Part B Post Closure Permit, the background and point of compliance monitoring wells are sampled and analyzed for the constituents presented in Table III.2. of the current Part B Post Closure Care Permit (Appendix L) during the January semi-annual sampling event. In addition, a subset of Appendix IX constituents are also analyzed during the July sampling event. These constituents and the GWPS are presented on Table III.3 of the current Part B Post Closure Care Permit (Appendix M). The list of constituents to be analyzed during Compliance Monitoring is included in the Compliance Monitoring Program (Appendix E).

D. RECORD KEEPING AND REPORTING

Records of the analyses for groundwater performed and records of the groundwater surface elevations will be maintained throughout the life of the waste management unit and throughout the post-closure care period as well. The records will be kept at the OSP, LLC office located at 1200 Abernathy Road NE, Atlanta, Georgia 30328.

The description of the Compliance Monitoring Program and the reporting requirements is described in Appendix E.

5.0 RELEASE MANAGEMENT PROGRAM

5.1 Detection Monitoring Program

This section is reserved until Compliance Monitoring has been completed per the Department's requirements. OSP, in consultation with the Department, will then submit an *Application for Post-Closure Permit Modification* as appropriate.

5.2 Compliance Monitoring Program

The Compliance Monitoring Program is included as Appendix E.

5.3 Corrective Action Program

If it is determined that a corrective action program is necessary, OSP will submit to ADEM within 180 days, an application for permit modification to establish a corrective action program. This program will be developed in compliance with 40 CFR 264.100 and ADEM Admin. Code R.335-14-.06(10) and will consist of corrective action to ensure the landfill is in compliance with any groundwater protection standard promulgated by ADEM. OSP will prepare an engineering feasibility plan for corrective action and submit it to ADEM for approval.

OSP will begin the corrective action within a reasonable time period after the groundwater protection standard is exceeded and will coordinate this action with ADEM.

Corrective action measures will be terminated when the concentrations of hazardous constituents are reduced to a level below the specified concentration limit. If the corrective action measures are ongoing at the end of the compliance period, corrective action will be continued as long as necessary to achieve compliance with the groundwater protection standard. Corrective action will be terminated when it can be demonstrated that the groundwater protection standard has not been exceeded for a period of three consecutive years.

In conjunction with the corrective action program, OSP will establish and implement a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. Unless otherwise required by ADEM, this monitoring program will be based on the requirements for the compliance monitoring program.

OSP will prepare a report in writing addressing the effectiveness of the corrective action program. This report will be prepared semi-annually and submitted to ADEM.

If it is determined that the corrective action program no longer satisfies the requirement of the permit, within 90 days, OSP will submit an application to ADEM for a permit modification to make any appropriate changes to the program.

6.0 OTHER UNITS

In this section, present process units are identified. In addition, relevant information for these units is included. A list of the present process units is presented on Table 1. The table includes the date the unit began operating, unit dimension, waste handled, unit function, frequency pickup, source and destination of waste handled, volume of waste handled, release controls, history of releases, and previous investigation activities.

6.1 Previously Identified Solid Waste Management Units (SWMUs)

The SWMUs found during the previously submitted RCRA Facility Assessment (RFA) and listed in Appendix A-2 of the current Part B Post-Closure Care Permit are listed below. These units require no further action.

- SWMU 6 Closed Landfill
- SWMU 23 Cesium 137 Storage Vaults

These SWMUs have either been previously investigated or required no investigation. Currently, none of these SWMUs require any additional sampling.

6.2 Newly Identified SWMUs

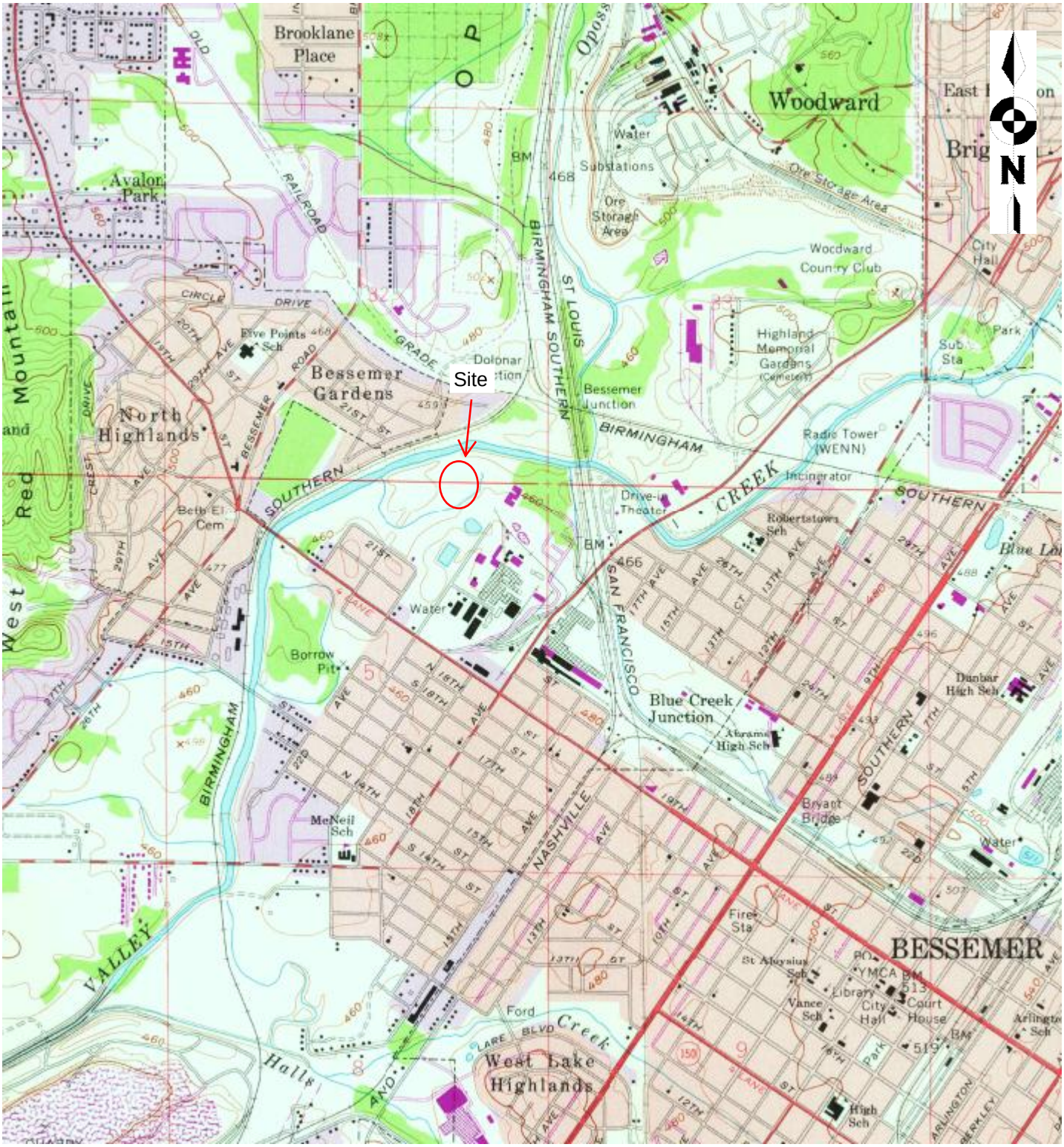
OSP conducted a reconnaissance of the OSP site. No new SWMU or AOCs were observed.

TABLES

Table 1: SWMU Information

SWMU/AOC	Previously Identified / Still Present?	Date Unit Began Operating	Dimension of Unit	Waste Handled	Unit Function	Frequency of Pick Up	Source and Destination of Waste Handled	Volumes of Waste Handled	Release Controls	History of Releases	Previous Investigation Activities
SWMU 6 - Closed Part B Landfill	Yes/Yes	pre 1980	550' x 800'	Baghouse Dust and Foundry Waste	closed	NA	NA	NA		No	Hydrogeologic investigation
SWMU 23 - Cesium 127 Storage Vaults	Yes/Yes	1988	30' x 40'	Cesium 127	store Cesium 127 waste	NA	Onsite storage in Vaults	NA	Concrete contaiment vault	No	none

FIGURES

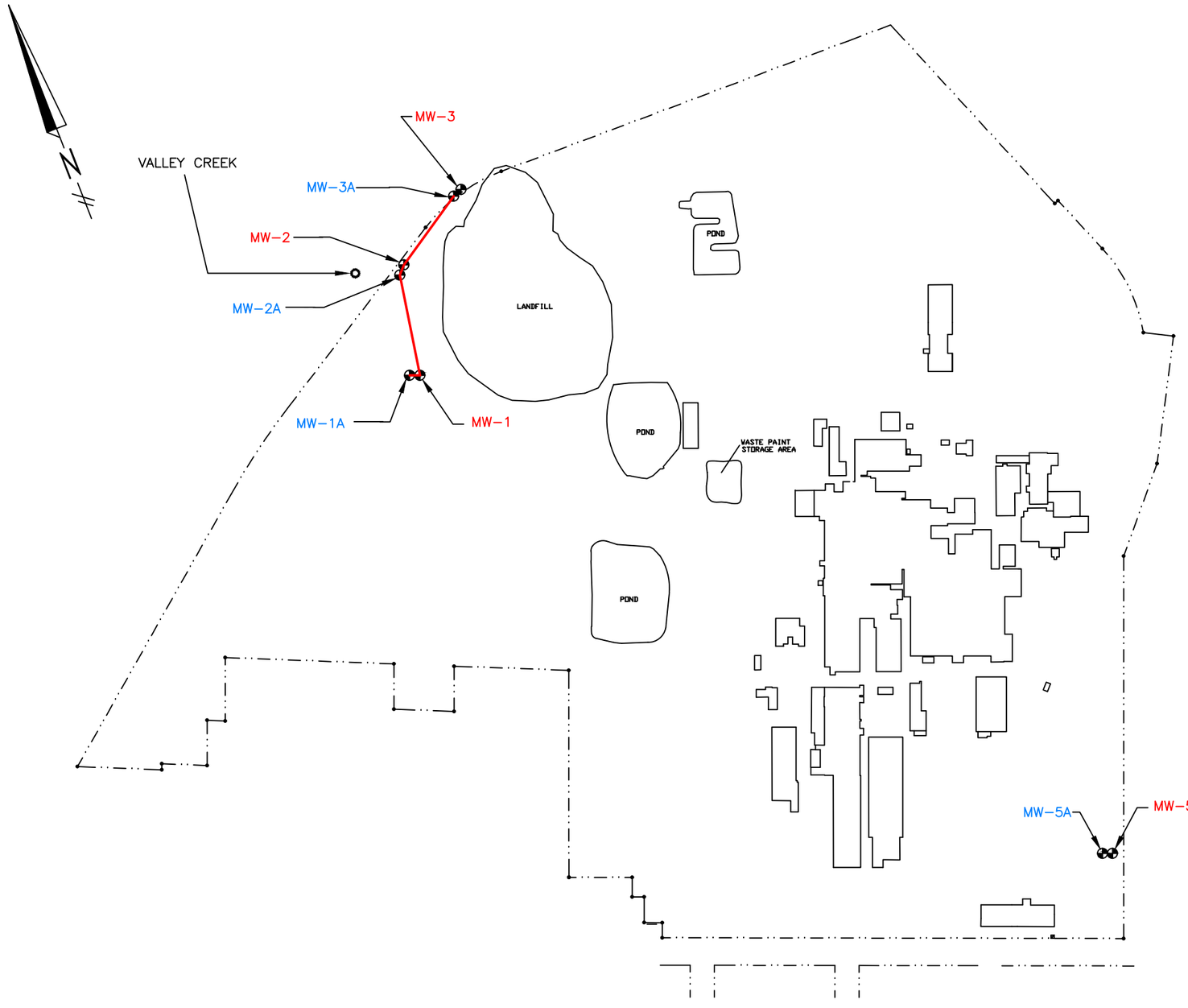


Terracon

PART B PERMIT RENEWAL
OSP, LLC
CLOSED LANDFILL
BESSEMER, ALABAMA
PROJECT NO. E1187198

FIGURE 1
Site Location Map

Source:
USGS 7.5-Minute Topographic Quadranle
Bessemer, AL Dated 1959, Photorevised 1970 and 1978



LEGEND

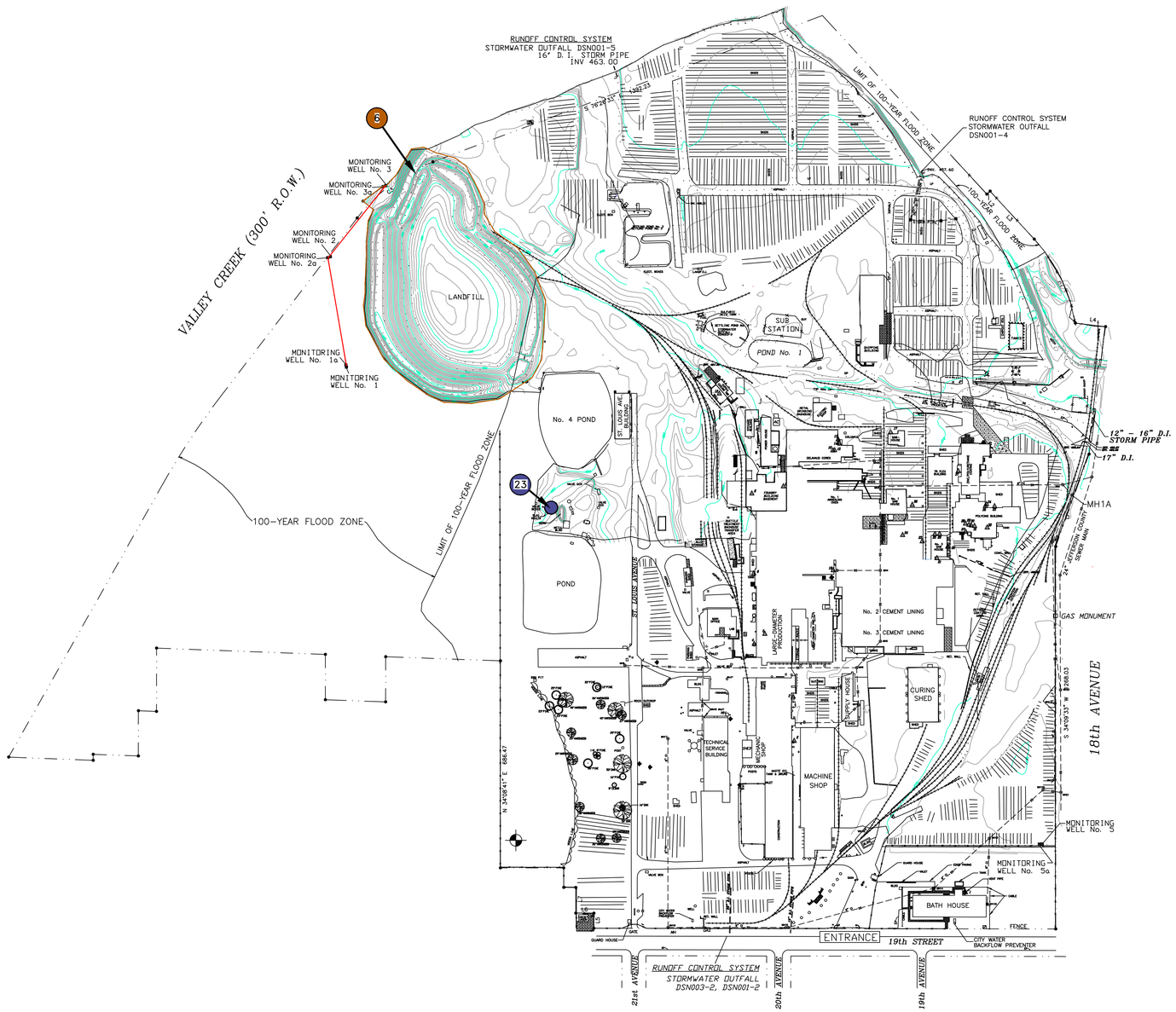
- MONITORING WELL LOCATIONS
- POINT OF COMPLIANCE

Terracon

PROJECT
OSP, LLC
CLOSED LANDFILL
2023 ST LOUIS AVENUE
BESSEMER, ALABAMA
PROJECT NO.: E1187198

FIGURE 2
SITE LAYOUT MAP

SCALE: 1" = 400'



LEGEND

- POINT OF COMPLIANCE
- 6 SWMU 6– CLOSED PART B LANDFILL
- 23 SWMU 23 – CESIUM 127 STORAGE VAULTS

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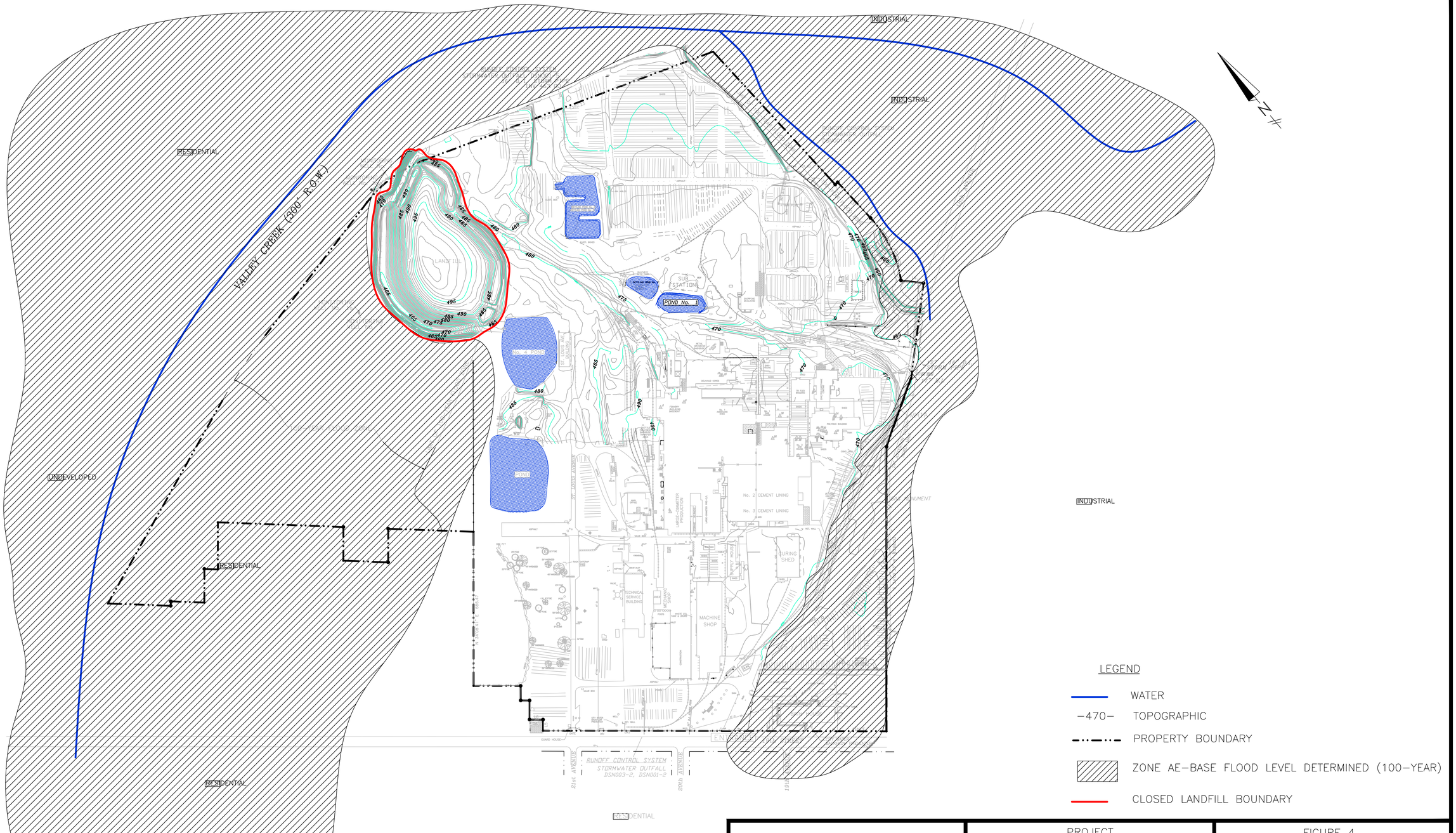
PROJECT
OSP, LLC
CLOSED LANDFILL
BESSEMER, ALABAMA
PROJECT NO.: E1187198

FIGURE 3
MONITORING WELLS and SWMUS

SCALE: 1" = 200'



LEGEND

- WATER
- −470− TOPOGRAPHIC
- PROPERTY BOUNDARY
- ZONE AE−BASE FLOOD LEVEL DETERMINED (100−YEAR)
- CLOSED LANDFILL BOUNDARY

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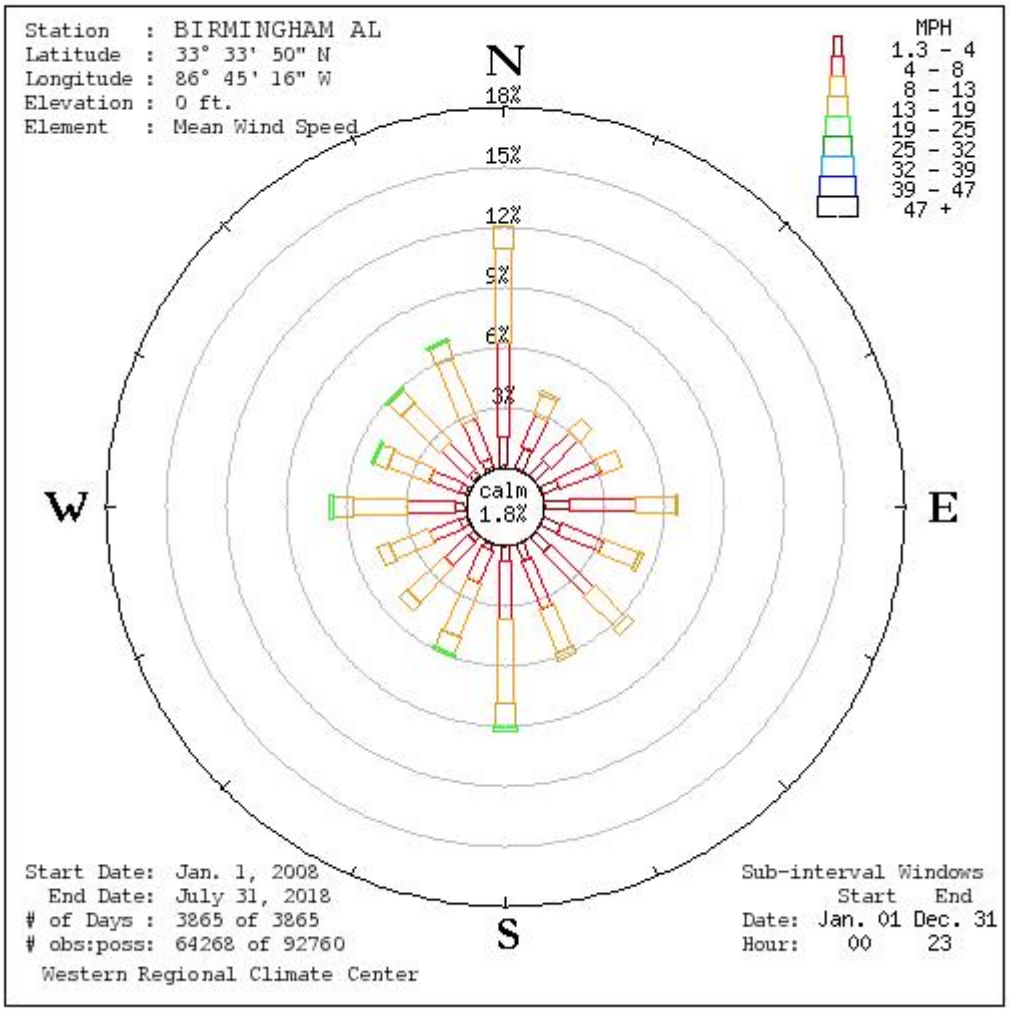
PROJECT
OSP, LLC
CLOSED LANDFILL
BESSEMER, ALABAMA
PROJECT NO.: E1187198

FIGURE 4
Flood Insurance Map

SCALE: 1" = 200'

BIRMINGHAM AL



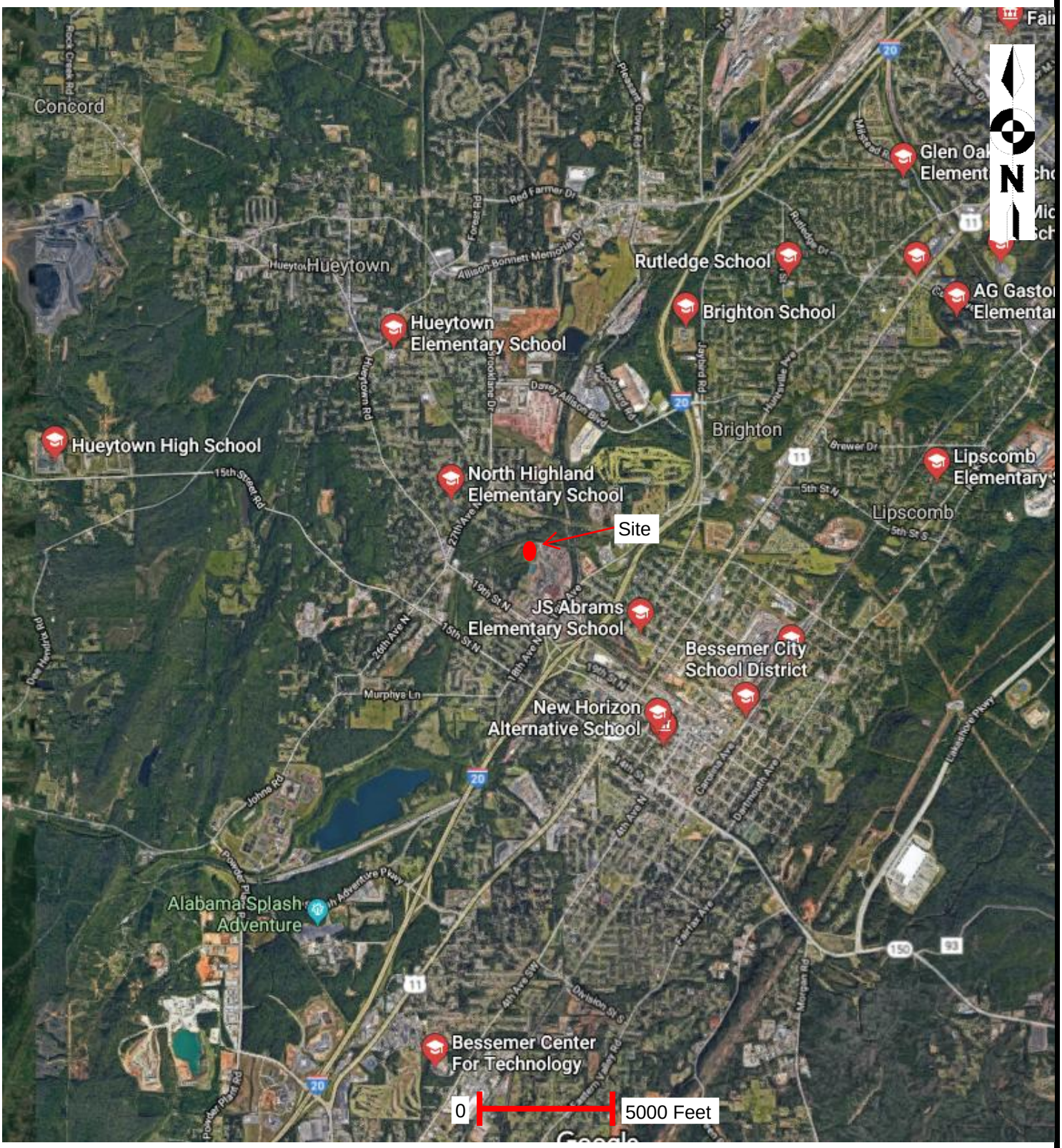
Terracon	**PART B PERMIT RENEWAL** **OSP, LLC** **CLOSED LANDFILL** **BESSEMER, ALABAMA** PROJECT NO. E1187198	**FIGURE 5** **WIND ROSE DIAGRAM** **Source:** **https://wrcc.dri.edu/cgi-bin/wea_windrose2.pl**

Terracon

PART B PERMIT RENEWAL
OSP, LLC
CLOSED LANDFILL
BESSEMER, ALABAMA
PROJECT NO. E1187198

FIGURE 6
Surrounding Land Use

Source:
Google Maps

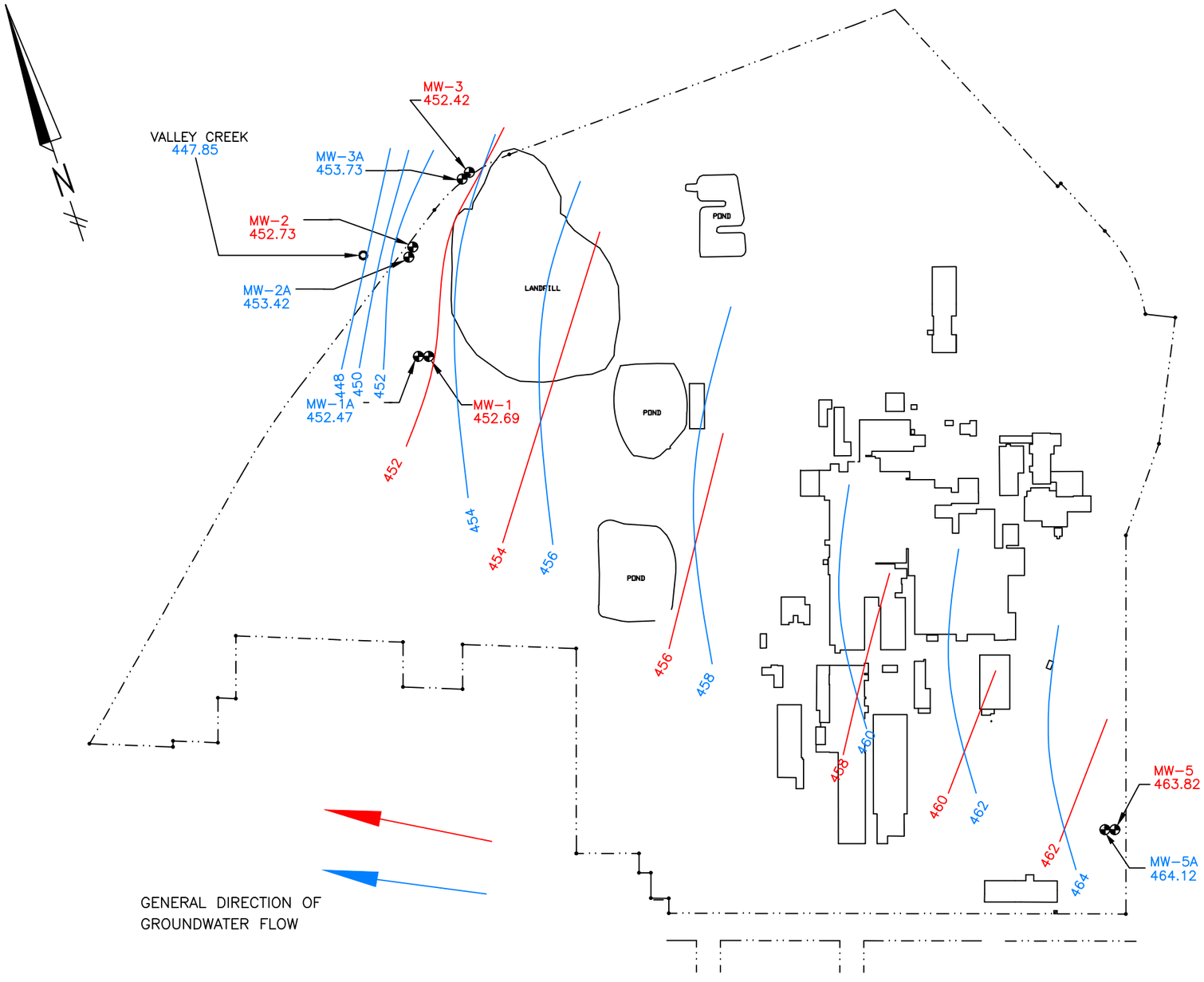


Terracon

PART B PERMIT RENEWAL
OSP, LLC
CLOSED LANDFILL
BESSEMER, ALABAMA
PROJECT NO. E1187198

FIGURE 7
Schools Location Map

Source:
Google Maps



LEGEND

- SHALLOW FLOW ZONE
- BEDROCK FLOW ZONE
- MONITORING WELL LOCATIONS
- CONTOUR INTERVAL = 2 FEET
- CONTOUR INTERVAL = 2 FEET

Terracon

PROJECT

Part B Permit Renewal
OSP, LLC
CLOSED LANDFILL
BESSEMER, ALABAMA
PROJECT NO.: E1187198

FIGURE 8
POTENTIOMETRIC SURFACE MAP
July 19, 2018

SCALE: 1" = 400'

APPENDIX A
PART A

OMB# 2050-0024; Expires 01/31/2017

SEND COMPLETED FORM TO: The Appropriate State or Regional Office.

United States Environmental Protection Agency
RCRA SUBTITLE C SITE IDENTIFICATION FORM

1. Reason for Submittal

MARK ALL BOX(ES) THAT APPLY

Reason for Submittal:

- ☐ To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location)
- ☐ To provide a Subsequent Notification (to update site identification information for this location)
- ☒ As a component of a First RCRA Hazardous Waste Part A Permit Application
- ☐ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment #_____)
- ☐ As a component of the Hazardous Waste Report (If marked, see sub-bullet below)
  - ☐ Site was a TSD facility and/or generator of >1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations)

2. Site EPA ID Number

EPA ID Number A L D 0 0 4 0 1 7 8 6 9

3. Site Name

Name: OSP, LLC

4. Site Location Information

Street Address: 2023 St. Louis Avenue

City, Town, or Village: Bessemer | **County:** Jefferson

State: Alabama | **Country:** USA | **Zip Code:** 36130

5. Site Land Type

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

6. NAICS Code(s) for the Site (at least 5-digit codes)

A. 3 3 1 5 1 1 | **C.** | **B.** | **D.**

7. Site Mailing Address

Street or P.O. Box: 1200 ABERNATHY ROAD NE

City, Town, or Village: ATLANTA

State: GEORGIA | **Country:** USA | **Zip Code:** 30328

8. Site Contact Person

First Name: Nancy | **MI:** | **Last:** Bourne

Title: Senior Director Risk Management

Street or P.O. Box: 1200 ABERNATHY ROAD NE

City, Town or Village: ATLANTA

State: GEORGIA | **Country:** USA | **Zip Code:** 30328

Email: nbourne@muellerwp.com

Phone: 770-206-4262 | **Ext.:** | **Fax:**

9. Legal Owner and Operator of the Site

A. Name of Site's Legal Owner: OSP, LLC | **Date Became Owner:** 2/2012

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

Street or P.O. Box: 1200 ABERNATHY ROAD NE

City, Town, or Village: ATLANTA | **Phone:**

State: GEORGIA | **Country:** USA | **Zip Code:** 30328

B. Name of Site's Operator: SAME | **Date Became Operator:** 9/23/2005

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

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; Complete all parts 1-10.

Y ☐ N ☑ **1. Generator of Hazardous Waste**
If "Yes," mark only one of the following – a, b, or c.

- ☐ a. LQG: Generates, in any calendar month, 1,000 kg/mo (2,200 lbs/mo.) or more of hazardous waste; **or** Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs/mo) of acute hazardous waste; **or** Generates, in any calendar month, **or** accumulates at any time, more than 100 kg/mo (220 lbs/mo) of acute hazardous spill cleanup material.
- ☐ b. SQG: 100 to 1,000 kg/mo (220 – 2,200 lbs/mo) of non-acute hazardous waste.
- ☐ c. CESQG: Less than 100 kg/mo (220 lbs/mo) of non-acute hazardous waste.

If "Yes" above, indicate other generator activities in 2-10.

Y ☐ N ☑ **2. Short-Term Generator** (generate from a short-term or one-time event and not from on-going processes). If "Yes," provide an explanation in the Comments section.

Y ☐ N ☑ **3. United States Importer of Hazardous Waste**

Y ☐ N ☑ **4. Mixed Waste (hazardous and radioactive) Generator**

Y ☐ N ☑ **5. Transporter of Hazardous Waste**
If "Yes," mark all that apply.

- ☐ a. Transporter
- ☐ b. Transfer Facility (at your site)

Y ☐ N ☑ **6. Treater, Storer, or Disposer of Hazardous Waste** Note: A hazardous waste Part B permit is required for these activities.

Y ☐ N ☑ **7. Recycler of Hazardous Waste**

Y ☐ N ☑ **8. 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

Y ☐ N ☑ **9. Underground Injection Control**

Y ☐ N ☑ **10. Receives Hazardous Waste from Off-site**

B. Universal Waste Activities; Complete all parts 1-2.

Y ☐ N ☑ **1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste managed at your site. If "Yes," mark all that apply.**

- a. Batteries ☐
- b. Pesticides ☐
- c. Mercury containing equipment ☐
- d. Lamps ☐
- e. Other (specify) _____ ☐
- 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; Complete all parts 1-4.

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

❖ You can ONLY Opt into Subpart K if:

- you are at least one of the following: a college or university; a teaching hospital that is owned by or has a formal affiliation agreement with a college or university; or a non-profit research institute that is owned by or has a formal affiliation agreement with a college or university; AND
- you have checked with your State to determine if 40 CFR Part 262 Subpart K is effective in your state

Y☐ N☑ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories **See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:**

☐ **a. College or University**

☐ **b. Teaching Hospital that is owned by or has a formal written affiliation agreement with a college or university**

☐ **c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university**

Y☐ N☑ 2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

11. Description of Hazardous Waste

A. 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.

D80						

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please list the waste codes of the State-Regulated 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.

D80						

12. 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 261.2(a)(2)(ii), 40 CFR 261.4(a)(23), (24), or (25)?

If "Yes," you must fill out the Addendum to the Site Identification Form: Notification for Managing Hazardous Secondary Material.

13. Comments

The D80 landfill is closed and is operating under a Part B Permit.

14. 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. For the RCRA Hazardous Waste Part A Permit Application, all owner(s) and operator(s) must sign (see 40 CFR 270.10(b) and 270.11).

Signature of legal owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
Nancy Bourne	Nancy Bourne Sr. Dir. Risk Mgmt	May 9, 2019

EPA ID Number | A | L | D | 0 | 0 | 4 | 0 | 1 | 7 | 8 | 6 | 9 |

OMB#: 2050-0024; Expires 01/31/2017

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact	**First Name:** Nancy	**MI:**	**Last Name:** Bourne	
	Contact Title: Senior Director Risk Management			
	Phone: 770-206-4262	**Ext.:**	**Email:** nbourne@muellerwp.com	
2. Facility Permit Contact Mailing Address	**Street or P.O. Box:** 1200 ABERNATHY ROAD NE			
	City, Town, or Village: ATLANTA			
	State: GEORGIA			
	Country: USA	**Zip Code:** 30328		
3. Operator Mailing Address and Telephone Number	**Street or P.O. Box:** SAME			
	City, Town, or Village:			
	State:	**Phone:**		
	Country:	**Zip Code:**		
4. Facility Existence Date	**Facility Existence Date (mm/dd/yyyy):** 12/1973			

5. Other Environmental Permits

A. Facility Type *(Enter code)*	B. Permit Number	C. Description

6. Nature of Business: Post-Closure Part B Landfill

7. Process Codes and Design Capacities – Enter information in the Section on Form Page 3

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 8.

B. PROCESS DESIGN CAPACITY – For each code entered in Item 7.A; enter the capacity of the process.

1. **AMOUNT – Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.**
2. **UNIT OF MEASURE – For each amount entered in Item 7.B(1), enter the code in Item 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.**

C. PROCESS TOTAL NUMBER OF UNITS – Enter the total number of units for each corresponding process code.

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
Disposal		
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectares-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
Storage		
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
Treatment		
T01	Tank Treatment	Gallons Per Day; Liters Per Day
T02	Surface Impoundment	Gallons Per Day; Liters Per Day
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Metric Tons Per Hour; or Million BTU Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTUs Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; or Million BTU Per Hour
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used in the Recovery of Sulfur Values from Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
T94	Containment Building Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
Miscellaneous (Subpart X)		
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; or Million BTU Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V
Short Tons Per Hour	D
Short Tons Per Day	N
Metric Tons Per Hour	W
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	X
Million BTU Per Hour	X
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
BTU Per Hour	I

7. Process Codes and Design Capacities (Continued)

EXAMPLE FOR COMPLETING Item 7 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY		C. Process Total Number of Units	For Official Use Only					
					(1) Amount (Specify)	(2) Unit of Measure							
X	1	S	0	2	533.788	G	001						
	1	D	8	0	(closed) 0.0	A	001						
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	9												
1	0												
1	1												
1	2												
1	3												

Note: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the line sequentially, taking into account any lines that will be used for "other" process (i.e., D99, S99, T04, and X99) in Item 8.

8. Other Processes (Follow instructions from Item 7 for D99, S99, T04, and X99 process codes)

Line Number (Enter #s in sequence with Item 7)		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY		C. Process Total Number of Units	For Official Use Only					
					(1) Amount (Specify)	(2) Unit of Measure							
X	2	T	0	4	100.00	U	001						

9. Description of Hazardous Wastes - Enter Information in the Sections on Form Page 5

A. EPA HAZARDOUS WASTE NUMBER – Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in Item 9.A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Item 9.A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in Item 9.B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all listed hazardous wastes.

For non-listed waste: For each characteristic or toxic contaminant entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. **Enter the first two as described above.**
2. **Enter "000" in the extreme right box of Item 9.D(1).**
3. **Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 9.E.**

2. PROCESS DESCRIPTION: If code is not listed for a process that will be used, describe the process in Item 9.D(2) or in Item 9.E(2).

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. **Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.**
2. **In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter "included with above" and make no other entries on that line.**
3. **Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.**

EXAMPLE FOR COMPLETING Item 9 (shown in line numbers X-1, X-2, X-3, and X-4 below) – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
X	3	D	0	0	1	100	P	T	0	3	D	8	0				
X	4	D	0	0	2												Included With Above

9. Description of Hazardous Wastes *(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)*

Line Number		A. EPA Hazardous Waste No. (Enter code)	B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES	
					(1) PROCESS CODES (Enter Code)	(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
	1	D 0 0 8				
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
1	0					
1	1					
1	2					
1	3					
1	4					
1	5					
1	6					
1	7					
1	8					
1	9					
2	0					
2	1					
2	2					
2	3					
2	4					
2	5					
2	6					
2	7					
2	8					
2	9					
3	0					
3	1					
3	2					
3	3					
3	4					
3	5					
3	6					

9. Description of Hazardous Wastes *(Continued. Use additional sheet(s) as necessary; number pages as 5a, etc.)*

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter Code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)

10. 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.

11. Facility Drawing

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

12. 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).

13. Comments

APPENDIX B
AERIAL PHOTOGRAPHS

Sec 5 T 4 S R 3 W

30-43
1-25-60

Sec 19 S T 4 R 3

Section 4
T 19S
R 4 W

Section 4
Township 19 south
Range 4 west
Section 4

Sec 4 T 19S R4W

APPENDIX C
INSPECTION SCHEDULE

APPENDIX C - INSPECTION SCHEDULE

OSP, LLC will conduct regular inspections of the landfill for structural deterioration, equipment failure, operator errors, and discharges that could cause or lead to the release of hazardous waste constituents and adversely affect the environment or threaten human health. Table 1 presents the schedule for inspecting monitoring equipment, safety and emergency equipment, security devices, decontamination equipment, and the landfill area. Since the facility is closed, a copy of the inspection schedule will be kept at the OSP, LLC headquarters in Atlanta, Georgia and their consultant's office.

In compliance with Rule 335-14-5-.14(11)(b) which is applicable to landfills, the most important requirement of this inspection process will be the inspection of the landfill slopes for signs of instability. To accomplish this, the inspector will be familiar with the important indicators of slope movement and surface erosion. Results of each inspection will be recorded on inspection log sheets entitled, "Periodic Inspection Forms" (Figure 1).

Upon completion of the inspection log sheets, they will be scanned and filed electronically at the OSP, LLC headquarters. OSP, LLC or their consultant will also insert the inspections in a three-ring binder and maintain them. The inspector should note the presence of any cracks, bulges or surface movement of material on the inspection form. He should also:

- describe the approximate width and length of each crack found on the slope or crest;
- record the size of any bulging;
- record the overall size of any surface displacement; and
- record the location of each sign of instability on a sketch of the landfill.

Another condition that will be observed and noted by the inspector while inspecting the landfill is surface erosion. To ensure the integrity of the landfill cover, it will be necessary to catch the formation of erosion gullies at their earliest stage of development to prevent deep cutting into the landfill.

In addition to inspecting the landfill to ensure its integrity, it will also be necessary to inspect the monitoring wells located around the landfill, and the security barriers and signs. The inspector will report any evidence of tampering or damage that is observed during his routine inspections.

TABLE 1
POST-CLOSURE INSPECTION SCHEDULE

Area/Equipment	Specific Item	Potential Problems	Inspection Frequency
Monitoring Equipment	Groundwater Monitoring Wells	Damage to inner casing, functioning locks Absent or damaged protective housing Missing well cap Vandalized equipment	Semi-Annually
Security Devices	Facility fence Entrance Gates Warning signs	Corrosion, collision damage, holes Corrosion, collision damage, holes Vandalism, damage	Quarterly
Landfill Area	Crest slopes, and berms Cap Sprinkler system	Cracks, erosion gullies Cracks in the cap, erosion gullies, bulging or other signs of movement Leaks, and functioning properly	Monthly

PERIODIC INSPECTION FORM

OSP, LLC Bessemer Landfill

Inspector's Name: _____

Date: _____ Time: _____

Date of Last Inspection: _____

Circle or write in Appropriate Response

Cracks or scarps in crest	Yes	No
Sloughing or bulging	Yes	No
Major slope erosion problems	Yes	No
Cracks or scarps in slope	Yes	No
Surface movements	Yes	No
Erosion of toe	Yes	No
Damage or vandalism to monitoring wells	Yes	No
Damage or vandalism to security fence	Yes	No
Damage or vandalism to security signs	Yes	No
Are there any existing environmental or human health hazards	Yes	No

Any major adverse changes in these items could result in a potential hazard to human health or the environment and should be reported to the VP EHS for further evaluation. Adverse conditions noted in these items should be described (extent, location, volume, observations, and the nature of remedial actions) in the space below or on attached additional sheets. A sketch showing locations of any adverse conditions should also be attached.

Inspection Category	Comments
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

APPENDIX D
RUN-OFF CALCULATIONS

CALCULATION WORK SHEET

Runoff Volume Calculations (Closure Conditions)

Bessemer Pipe Plant

Unified Soil Classification = SM

SCS Soil Hydrologic Group = C

24 hr - 25 yr Storm in Jefferson Co. = 7.0 in. (P)

Closure Conditions:

Area = 6.2 acres

Land Condition = Bare ground

SCS Method:

CN = 91

$$S = \frac{1000}{CN} - 10 = \frac{1000}{91} - 10 = 0.99$$

$$\text{Runoff Volume} = \frac{(P-0.2S)^2}{(P+0.6S)} = \frac{(7-(.2*.99))^2}{(7+(.6*.99))} = 6.09 \text{ inches}$$

Total Runoff = 6.2 ac X 6.09 in X ft/12 in

= 3.15 ac-ft

= 137062 ft^3

CALCULATION WORK SHEET

Retention Behind Berm (Closure Conditions)

Bessemer Pipe Plant

Height of Berm (ft)	Cumulative Storage Volume (ft^3)
0	-
2	7520
4	30080
8	75200
10	142880
12	225600

$$\text{Depth Behind Berm} = \frac{2}{142880-75200} = \frac{X}{137062-75200}$$

$$X = 1.83$$

$$\text{Depth} = 8 + 1.83 = 9.83 \approx 10.0$$

$$\text{Free Board} = 1.5 \text{ ft}$$

$$\text{Total Height of Berm} = 1.5 + 10 = 11.5 \text{ ft}$$

CALCULATION WORK SHEET

Runoff Volume Calculations (Post Closure Conditions)

Bessemer Pipe Plant

Unified Soil Classification = SM

SCS Soil Hydrologic Group = C

24 hr - 25 yr Storm in Jefferson Co. = 7.0 in. (P)

Post Closure Conditions:

Area = 6.2 acres

Land Condition = Grass

SCS Method:

CN = 74

$$S = \frac{1000}{CN} - 10 = \frac{1000}{74} - 10 = 3.51$$

$$\text{Runoff Volume} = \frac{(P-0.2S)^2}{(P+0.6S)} = \frac{(7-(.2*3.51)^2}{(7+(.6*3.51)} = 4.36 \text{ inches}$$

Total Runoff = 6.2 ac X 4.36 in X ft/12 in

= 2.25 ac-ft

= 98034 ft^3

CALCULATION WORK SHEET

Retention Behind Berm (Post Closure Conditions)

Bessemer Pipe Plant

Height of Berm (ft)	Cumulative Storage Volume (ft^3)
0	-
2	7520
4	30080
8	75200
10	142880
12	225600

$$\text{Depth Behind Berm} = \frac{2}{142880-75200} = \frac{X}{98034-75200}$$

$$X = 0.67$$

$$\text{Depth} = 8 + 0.67 = 8.67$$

8.67 is less than the design depth of 10 feet, Therefore, the design is adequate.

APPENDIX E
COMPLIANCE MONITORING PROGRAM – CLOSED LANDFILL

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

Appendix E – Compliance Monitoring Program

OSP, LLC
Bessemer, Alabama
Facility ID No. ALD 004 017 869
Terracon Project No.: E1187198

1.0 BACKGROUND AND GENERAL OVERVIEW

The Compliance Monitoring Program includes the collection and analysis of groundwater samples, as well as reporting requirements.

2.0 OBJECTIVE

OSP, L.L.C. (OSP) proposes the following *Compliance Monitoring Program* for the permitted units that will meet the requirements of Alabama Department of Environmental Management (ADEM) Administrative Code R. 335-14-5-.06(11). The objective of the *Compliance Monitoring Program* is to devise a strategy that, when implemented, will minimize or prevent the further migration of monitored volatile organic contaminants and limit human and environmental exposure to acceptable risk levels of these contaminants.

3.0 COMPLIANCE MONITORING PROGRAM

A Compliance Monitoring Program is currently instituted at the OSP Bessemer site since hazardous constituents from the waste management unit were detected in the groundwater at the point of compliance at a concentration significantly greater than background, as stated in ADEM Administrative Code R. 335-14-5-.06(9)(h)4.

This Compliance Monitoring Program includes the following:

- OSP will monitor the groundwater to determine whether the regulated unit is in compliance with the groundwater standards under ADEM Administrative Code R. 335-14-5-.06(3).
- The groundwater protection standard will be specified by ADEM in the facility permit. Proposed GWPS are presented in Section III.C. below.
- The point of compliance is established at the hydraulically down-gradient wells established by the reevaluation of the groundwater monitoring plan. Point of Compliance (POC) monitoring wells are MW-1, MW-1A, MW-2, MW-2A, MW-3, and MW-3A.

- Monitoring wells MW-5 and MW-5A have been established as the background monitoring wells.
- The concentrations of hazardous constituents identified in the permit will be determined for each well at the compliance point semi-annually during the compliance period.
- The groundwater flow direction and rate will be determined annually.
- Samples from selected monitoring wells will be analyzed annually for a reduced list of Administrative Code R. 335-14-5-Appendix IX constituents. The full list of Appendix IX constituents should be analyzed every five years throughout the compliance period. The full list of Appendix IX constituents were analyzed in July of 2018; therefore the next Appendix IX analysis should be scheduled for July 2023 (ADEM Administrative Code R. 335-14-5-.06(10)(g). If any hazardous constituents are found in the groundwater that are not identified in the permit, then the concentrations of these additional constituents will be reported to ADEM with 7 days; and
- A determination will be made regarding whether a statistically significant increase has occurred, according to the statistical procures established in the compliance monitoring program (Section 3.7 below).

If it is determined that the groundwater protection standard is being exceeded at any monitoring well at the point of compliance, OSP will:

- Notify ADEM of this finding with 7 days: and
- Submit to ADEM an application for a permit modification establishing a corrective action program meeting the requirements of Administrative Code R. 335-14-5-.06(11) with 180 days.

If OSP wishes to demonstrate that the increase was a result of a source other than the regulate unit, or was cause by error in sampling, analysis or evaluation, the following will be performed:

- Notify ADEM of this intention within seven (7) days of the detection of the statistically significant increase at the point of compliance;
- Within 90 days, submit a report to ADEM which demonstrate that a source other than the regulated unit caused the increase, or that the increase was the result of error in sampling, analysis or evaluation;
- With 90 days, submit to the department an application for a permit modification to make appropriate changes to the detection monitoring system at the facility;
- Continue to monitor in accordance with the compliance monitoring program; and
- If sulfide is the only constituent detected above the GWPS for any sampling event, then the Permittee is not obligated to submit any supplemental notification of exceedances for that particular sampling event.

3.1 Monitoring Wells

A total of 8 monitoring wells are presently located on the site (Figure E-1). These monitoring wells are constructed of 2-inch-I.D. PVC and are designated MW-1, MW-1A, MW-2, MW-2B, MW-3, MW-3A, MW-5, and MW-5A. Boring logs, including monitoring well construction schematics, are included as Appendix E-A. Monitoring well information including well number, type, latitude, longitude, regulatory unit(s) monitored, depth, ground elevation, top-of-casing elevation, screened interval, and monitored zone are included on Table E-1.

3.2 Monitored Constituents

The constituents presented in Table E-2 are the Groundwater Quality Monitoring Constituents proposed for analysis of groundwater samples collected from the listed POC and BKG wells during the Compliance Monitoring. The constituents listed in Table E-2 are consistent with the Groundwater Quality Monitoring Constituents presented in Table III.2. of the current *Post-Closure Care Permit*.

The proposed Groundwater Quality Monitoring Constituents are: arsenic; barium; cadmium; chromium; cyanide; lead; nickel; sulfide; zinc; gross alpha; and gross beta.

3.3 Water-Level and Limited Natural Attenuation Parameter Measurements

The depth to groundwater in each of the 8 maintained monitoring wells will be measured quarterly using a decontaminated electronic water-level indicator. The groundwater level will be measured from the top-of-casing (TOC) of each well, which is surveyed relative to mean sea level. The TOC elevations are presented on Table E-1. A groundwater elevation will then be calculated by subtracting the measured depth to groundwater from the TOC elevation. Potentiometric surface maps for each set of groundwater elevations will be prepared and submitted during reporting (Section 3.8, below).

Field parameters to be measured in the groundwater samples collected from the monitoring wells listed in Table E-1 during Compliance Monitoring include those listed in Table E-3. These field parameters include those listed in Section III.D.b. of the current *Post-Closure Care Permit* and include temperature, specific conductance, and pH. Tables will be prepared for the field parameter data and submitted during reporting (Section 3.8 below).

3.4 Groundwater Protection Standards

The GWPS for the constituents listed in Table E-2 and Table III.3. of the current *Post-Closure Care Permit* are presented on Table E-4. Table E-4 has been revised from Table III.3 of the

current Post Closure Care Permit. Any constituents on Table III.3 that had not been detected during the last 10 years was removed.

3.5 Monitoring Requirements

One groundwater sample will be collected from the monitoring wells listed on Table E-1 on a semi-annual basis (January and July). Each groundwater sample collected from the wells during the Corrective Action Monitoring will be analyzed for the constituents listed in Table E-2. The field parameters listed in Table E-3 will also be measured for each groundwater sample collected. In addition, during the July sampling event, the groundwater samples collected from the monitoring wells will be analyzed annually for a reduced list of Administrative Code R. 335-14-5-Appendix IX constituents presented in Table E-4. The full list of Appendix IX constituents should be analyzed every five years throughout the compliance period. The full list of Appendix IX constituents were analyzed in July of 2018; therefore the next Appendix IX analysis should be scheduled for July 2023 (ADEM Administrative Code R. 335-14-5-.06(10)(g).

In addition to the groundwater samples, a duplicate sample will be collected as a quality assurance sample. The duplicate sample will be analyzed for all of the constituents listed on Table E-2. Sampling and analytical procedures will follow the plan outlined in *Post-Closure Care Permit* Condition III.B.5 and Appendix F of the *Part B Application for Post-Closure Care*.

3.6 Analytical Results

Analytical data will be tabulated upon receipt of the laboratory reports. The laboratory reports and tabulated analytical data will be prepared and submitted during reporting (Section 3.8, below). After tabulation, the analytical data will then be compared to the GWPS (Table E-4). The comparison of POC groundwater data to the GWPS will be presented during routine reporting (Section 3.8., below).

3.7 Statistical Analysis

The effectiveness of the *Compliance Monitoring Program* will be assessed in general accordance with ADEM Administrative Code 335-14-6-.06(4)(b) by statistical studies of the groundwater samples collected from the monitoring wells listed in Table E-1. The statistical analysis conducted during the Compliance Action Monitoring (described above) is based on analysis of an annual database. The statistical analysis will be presented during routine reporting on an annual basis (Section 3.8., below).

For each indicator parameter listed in Table E-2, an arithmetic mean and variance will be calculated for each well monitored, and compare these results with its initial background arithmetic mean. The comparison must consider individually each of the wells in the monitoring system, and must use the Student's t-test at the 0.01 level of significance (see 335-14-6-Appendix

IV) to determine statistically significant increases over initial background. (c) 1. If the comparisons for the upgradient wells made under 335-14-6-.06(4)(b) show a significant increase, OSP must submit this information in accordance with 335-14-6-.06(5)(a)2.(ii).

If the comparisons for downgradient wells made under 335-14-6-.06(4)(b) show a significant increase, OSP must then immediately obtain additional groundwater samples from those downgradient wells where a significant difference was detected, split the samples in two and obtain analyses of all additional samples to determine whether the significant difference was a result of laboratory error.

If the analyses performed under 335-14-6-.06(4)(c)2. confirm the significant increase, then OSP must provide written notice to the Department within seven days of the date of such confirmation that the facility may be affecting groundwater quality.

Within 15 days after the notification under 335-14-6-.06(4)(d)1., OSP must develop a specific plan, based on the outline required under 335-14-6-.06(4)(a) and certified by a qualified geologist or geotechnical engineer, for a groundwater quality assessment at the facility. This plan must be placed in the facility operating record and be maintained until closure of the facility.

3.8 Reporting and Response Requirements

In addition to the recordkeeping and reporting requirements specified in Condition III.B.6. of the *Post-Closure Care Permit*, a *Compliance Monitoring Report* will be submitted to the Department annually (September, 60 days after collection of the July semi-annual groundwater samples). Each annual report will contain analytical data, field parameter measurements, water-level measurements, statistical analysis, and hydraulic control information collected during the reporting period.

Table E-1. Monitoring Well Specifications
OSP, LLC - Bessemer Closed Landfill

Monitoring Well	Well Type	Well Latitude	Well Longitude	Constituents Monitored	Well Depth (ft)	Ground Elevation (ft amsl)	Top-of-Casing Elevation (ft amsl)	Screened Interval (ft bls)	Monitored Zone
MW-1	POC	33°25'14"N	86°58'31"W	All	41.5	456.11	458.98	31.3-41.3	Bedrock
MW-1A	POC	33°25'14"N	86°58'31"W	All	15.0	455.93	458.99	9.9-14.9	Upper Saturated Zone
MW-2	POC	33°25'17"N	86°58'29"W	All	42.0	456.56	459.14	31.8-41.8	Bedrock
MW-2A	POC	33°25'17"N	86°58'29"W	All	12.3	458.09	458.76	7.2-12.2	Upper Saturated Zone
MW-3	POC	33°26'19"N	86°58'24"W	All	60.7	457.70	460.33	40.0-50.0	Bedrock
MW-3A	POC	33°26'19"N	86°58'24"W	All	17.0	457.77	460.62	11.9-16.9	Upper Saturated Zone
MW-5	BKG	33°24'52"N	86°58'52"W	All	40.9	469.04	471.94	30.0-40.0	Bedrock
MW-5A	BKG	33°24'52"N	86°58'52"W	All	13.5	468.94	472.37	8.4-13.4	Upper Saturated Zone

POC = Point of Compliance Well
BKG = Background Well
amsl = above mean sea level
bls = below land surface

Table E-2. Groundwater Quality Monitoring Constituents*
OSP, LLC - Bessemer Closed Landfill

Hazardous Constituent	Units**
Arsenic	All
Barium	All
Cadmium	All
Chromium	All
Cyanide	All
Lead	All
Nickel	All
Sulfide	All
Zinc	All
Gross Alpha	All
Gross Beta	All

* The constituents listed herein are a subset of the Groundwater Protection Standards listed in Table M-4 for which semi-annual monitoring is required.
** Identifies the unit(s) at which the given constituents must be monitored.

Table E-3. Additional Monitoring Parameters
OSP, LLC - Bessemer Closed Landfill

Parameter	Unit of Measure	Location
Temperature	(degrees F or C)	Field*
Specific Conductance	(Mhos/cm)	Field*
pH	(S.U.) Standard Units	Field*

* To be submitted as raw data in the annual reports required by condition III.B.6.b.

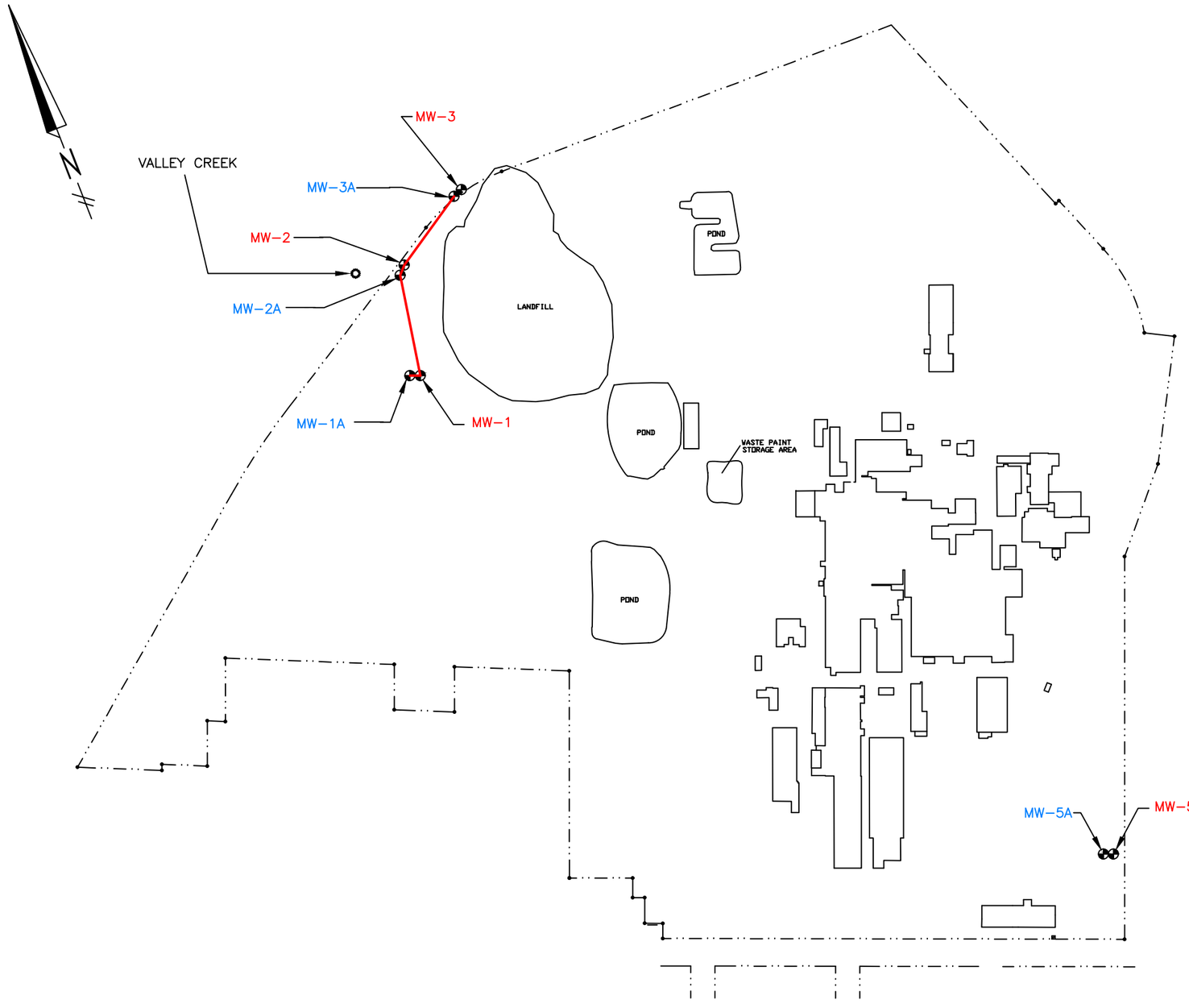
Table E-4. Groundwater Protection Standard
OSP, LLC - Bessemer Closed Landfill

Hazardous Constituent	Unit*	Concnetration Limit (mg/L)**
Acenapthene	All	0.053
Anthracene	All	0.18
Arsenic	All	0.01
Barium	All	2
Beryllium	All	0.004
Cadmium	All	0.005
p-Chloro-m-cresol	All	0.14
Chromium	All	0.1
Copper	All	1.3
Cyanide	All	0.2
Di-n-butyl phthalate	All	3.7
Fluoranthene	All	0.0008
Lead	All	0.015
Naphthalene	All	0.00017
Nickel	All	0.039
Phenanthrene	All	MDL
Pyrene	All	0.012
Sulfide***	All	MDL
Zinc	All	0.6
Gross Alpha	All	15pCi/L
Gross Beta	All	50 pCi/L

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

** Concentration limit is the higher of the limits listed below and the Method Detection Limit (MDL). The MDL for a specific constituent must not exceed the Drinking Water MCL if in existence for that constituent.

*** If sulfide is the only constituent detected above the GWPS for any sampling event, then the Permittee is not obligated to submit any supplemental notification of exceedances for that particular sampling event in Accordance with Appendix M Section III of the permit application and Condition III.D.2. of the permit.



LEGEND

- MONITORING WELL LOCATIONS
- POINT OF COMPLIANCE

Terracon

PROJECT
APPENDIX E
OSP
BESSEMER SITE
2023 ST LOUIS AVENUE
BESSEMER, ALABAMA
PROJECT NO.: E1187198

FIGURE E-1
SITE LAYOUT MAP

SCALE: 1" = 400'

SOIL BORING PROGRAM

EME Project No: USP-86-0170 Date: 1-18-89/1-23-89

Client: U. S. Pipe

Facility: Bessemer

Bore Area ID: _____ Bore No. MW 1 Total Bore Depth: 41.5

Bore Site Location: See Map

Note: See Bore Grid Plot Plan for Details

Boring Equipment Used: _____ Split Spoon Sampler X Auger

X Other water rotary (core barrel)

Lab Samples:	Sample No.	Depth Taken(ft)	Analysis Parameter	Results

Bore Description & Comments--Please note & describe any changes in soil color, texture, density, type & any areas of suspected contamination adjacent to the depth.

ft.	
0	gray to tan clay
2	reddish tan sandy clay with some gravel
13.6	gray limestone bedrock
17.8	rock
18.7	gray limestone (very soft)
20.8	gray limestone (more competent)
21.1	void
21.3	gray limestone (highly fractured)
22.5	void
31.5	gray limestone (fractured)
32.5	void
32.9	gray limestone
33.6	void
33.9	gray limestone
40.1	void
40.5	gray limestone
41.5	gray limestone

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co.
Project No.: USP-86-0170

Facility: Bessemer Pipe Plant
Geologist: T Floyd

Well No: MW-1
Static Water Elev.: 445.24' msl

Well Location: On Map
Elevation T.O.C.: 454.09' msl

Date of Drilling: 01-26-89

Bore Hole Dia.: 6.75" (0.56 ft)

Inner Casing and Screen

Casing Type: 34.7 ft of Scedule 40 PVC Triloc Casing

Screen Type: 10 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 41.5'
Date Placed: 01-26-89

Depth Top of Screen: 31.3'
Bottom Depth of Screen: 41.3'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand Volume: .55 ft^3 Method of Placement: Gravity Date: 01-26-89

Seal Type: Bentonite Pel. Volume: .07 ft^3 Method of Placement: Gravity Date: 01-26-89

Time Aged: 3 hr.

Back Fill Type: Bentonite Volume: 5.2 ft^3 Method of Placement: Tremie Date: 01-27-89

Outer Casing

Bottom Depth: 1.5'

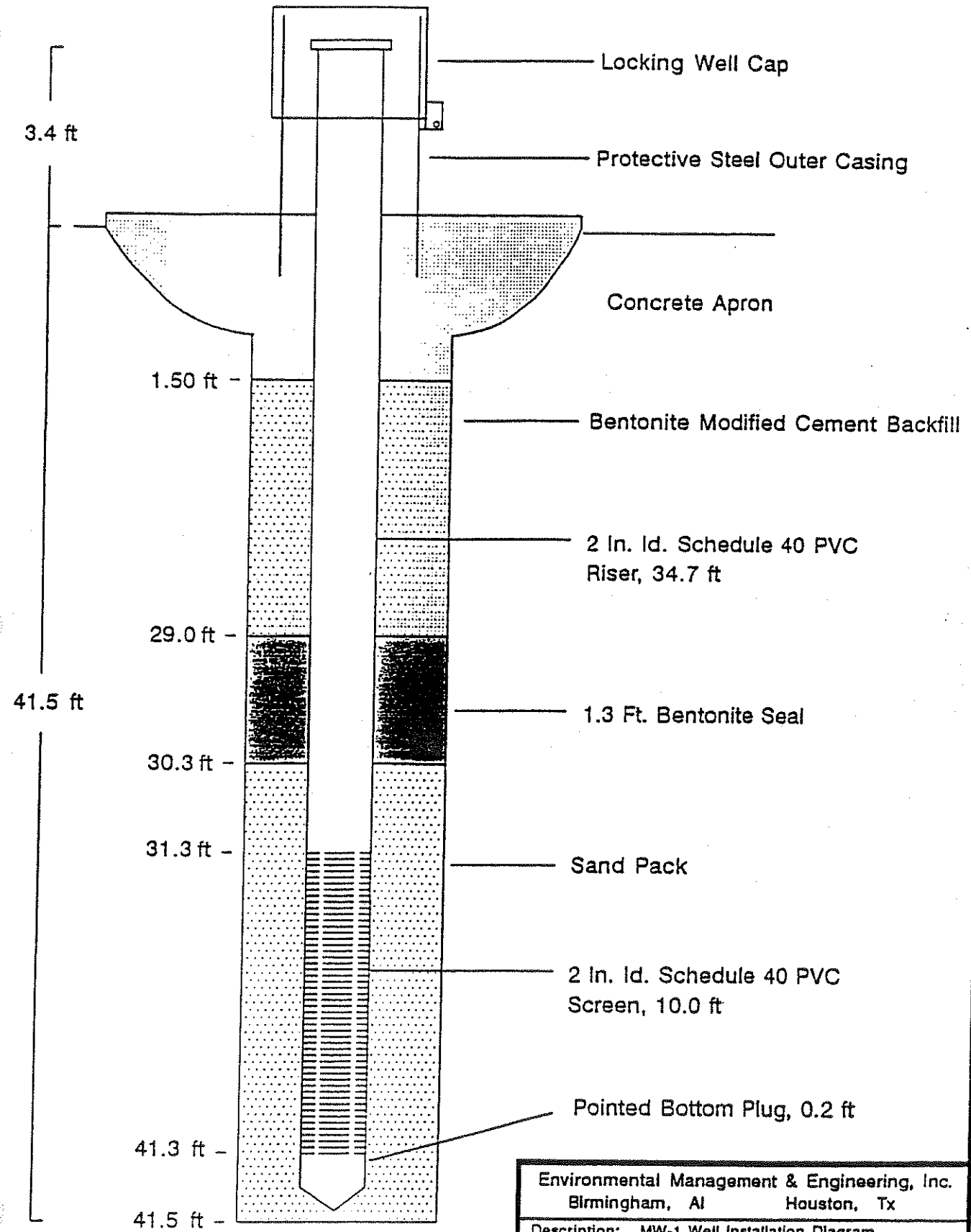
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 01-27-89

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing
Date: 01-31-89



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx		
Description: MW-1 Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant		
Date: 07-20-93	Project No. USP-86-0170	
Drawn by: JT	Scale: NTS	

SOIL BORING PROGRAM

EME Project No: USP-86-0170 Date: 1-18-89/1-23-89

Client: U. S. Pipe

Facility: Bessemer

Bore Area ID: _____ Bore No. MW2 Total Bore Depth: 42'

Bore Site Location: See Map

Note: See Bore Grid Plot Plan for Details

Boring Equipment Used: _____ Split Spoon Sampler X Auger

X Other water rotary (core barrell)

Lab Samples:	Sample No.	Depth Taken(ft)	Analysis Parameter	Results

Bore Description & Comments--Please note & describe any changes in soil color, texture, density, type & any areas of suspected contamination adjacent to the depth.

ft.		
	0	brown silty sand
12.1		gray limestone bedrock
22.3		gray limestone (highly fractured with calcite breaks)
32.3		gray limestone (highly fractured)
		F1 @ 23'; F2 @ (2" void) 25'; F3 @ (1"void) 26.5' F4 @ 26'
		F5, F6, F7 @ 29'; F8 @ 31'
42.0		gray limestone (fractured with rocks) V1 @ 40.1'; V2 @ 41.5'

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co. Project No.: USP-86-0170

Facility: Bessemer Pipe Plant Geologist: T Floyd

Well No: MW-2 Static Water Elev.: 448.80' msl

Well Location: On Map Elevation T.O.C.: 454.24' msl

Date of Drilling: 01-24-89

Bore Hole Dia.: 6.75" (0.56 ft) - 3.75" (0.31 ft)

Inner Casing and Screen

Casing Type: 34.5 ft of Scedule 40 PVC Triloc Casing

Screen Type: 10 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 42.0' Date Placed: 01-24-89

Depth Top of Screen: 31.8' Bottom Depth of Screen: 41.8'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand	Volume: .55 ft^3	Method of Placement: Gravity	Date: 01-24-89
Seal Type: Bentonite Pel.	Volume: .07 ft^3	Method of Placement: Gravity	Date: 01-24-89
Time Aged: 21 hrs.			
Back Fill Type: Bentonite	Volume: 5.1 ft^3	Method of Placement: Tremie	Date: 01-25-89

Outer Casing

Bottom Depth: 1.5'

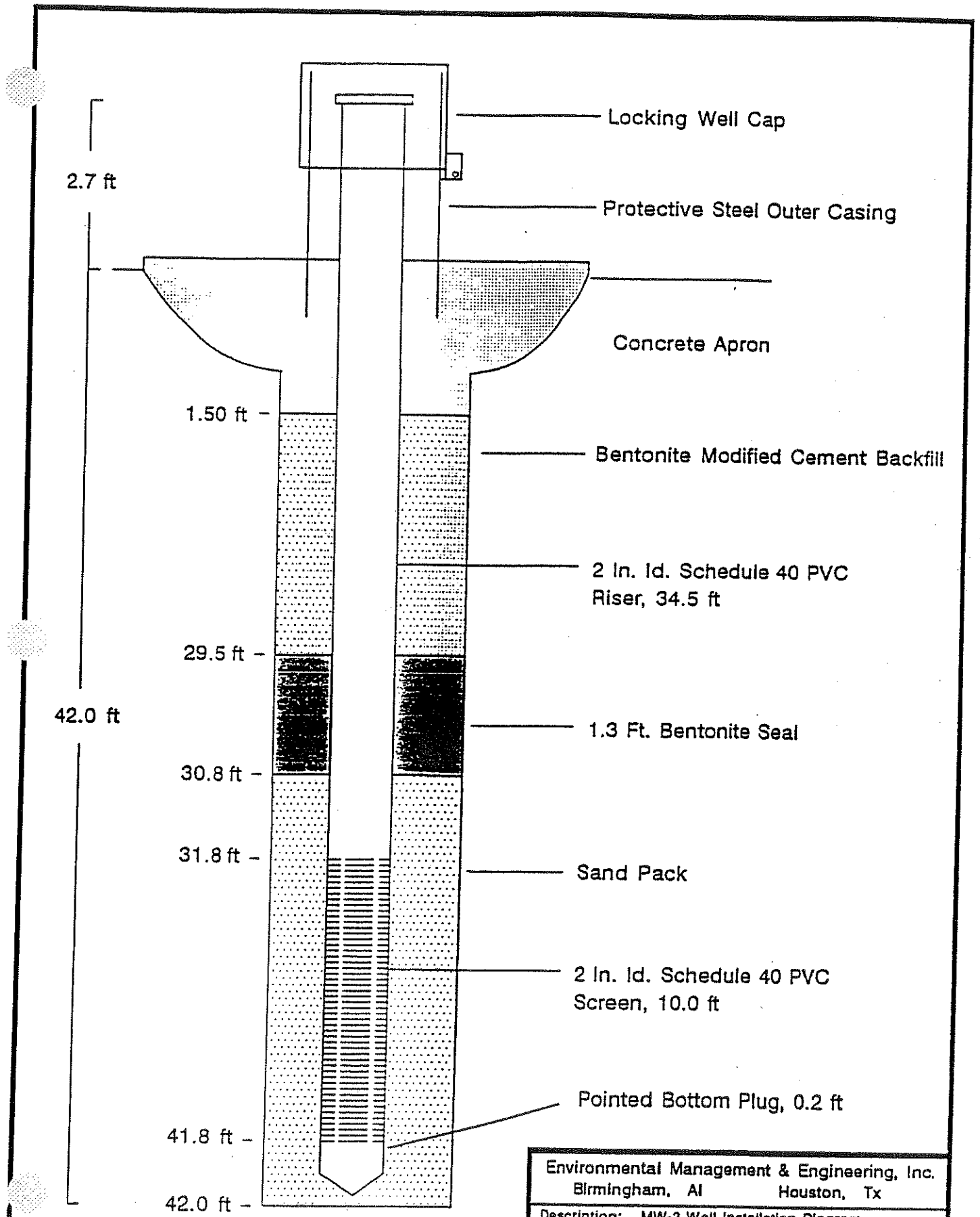
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 01-27-89

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing Date: 01-31-89



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx	
Description: MW-2 Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant	
Date: 07-20-93	Project No. USP-86-0170
Drawn by: JT	Scale: NTS

SOIL BORING PROGRAM

EME Project No: [illegible] Date: 1-19-89/1-23-89

Client: U. S. Pipe

Facility: Bessemer

Bore Area ID: _____ Bore No. MW3 Total Bore Depth: 50.7'

Bore Site Location: See Map

Note: See Bore Grid Plot Plan for Details

Boring Equipment Used: _____ Split Spoon Sampler X Auger

Y Other water rotary (core barrell)

Lab Samples: Sample No.	Depth Taken(ft)	Analysis Parameter	Results

Bore Description & Comments--Please note & describe any changes in soil color, texture, density, type & any areas of suspected contamination adjacent to the depth.

ft.	
0	gray to black silty sand
3	gray to black to tan sandy silt
16.8	gray limestone bedrock
17.5	gray limestone (highly fractured)
25.6	void
30.5	void (filled with sand and silt)
32.6	gray limestone
35.7	void (filled with silt and sand)
39.8	gray limestone
42.5	void
42.9	gray limestone
48.6	void
49.7	gray limestone
50.7	gray limestone

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co.
Project No.: USP-86-0170

Facility: Bessemer Pipe Plant
Geologist: T Floyd

Well No: MW-3
Static Water Elev.: 446.54' msl

Well Location: On Map
Elevation T.O.C.: 455.41' msl

Date of Drilling: 01-20-89

Bore Hole Dia.: 6.75" (0.56 ft) - 3.75" (0.31 ft)

Inner Casing and Screen

Casing Type: 42.6 ft of Scedule 40 PVC Triloc Casing

Screen Type: 10 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 50.2'
Date Placed: 01-20-89

Depth Top of Screen: 40.0'
Bottom Depth of Screen: 50.0'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand Volume: .55 ft^3 Method of Placement: Gravity Date: 01-20-89

Seal Type: Bentonite Pel. Volume: .07 ft^3 Method of Placement: Gravity Date: 01-20-89

Time Aged: 81 hrs.

Back Fill Type: Bentonite Volume: 5.3 ft^3 Method of Placement: Tremie Date: 01-23-89

Outer Casing

Bottom Depth: 1.5'

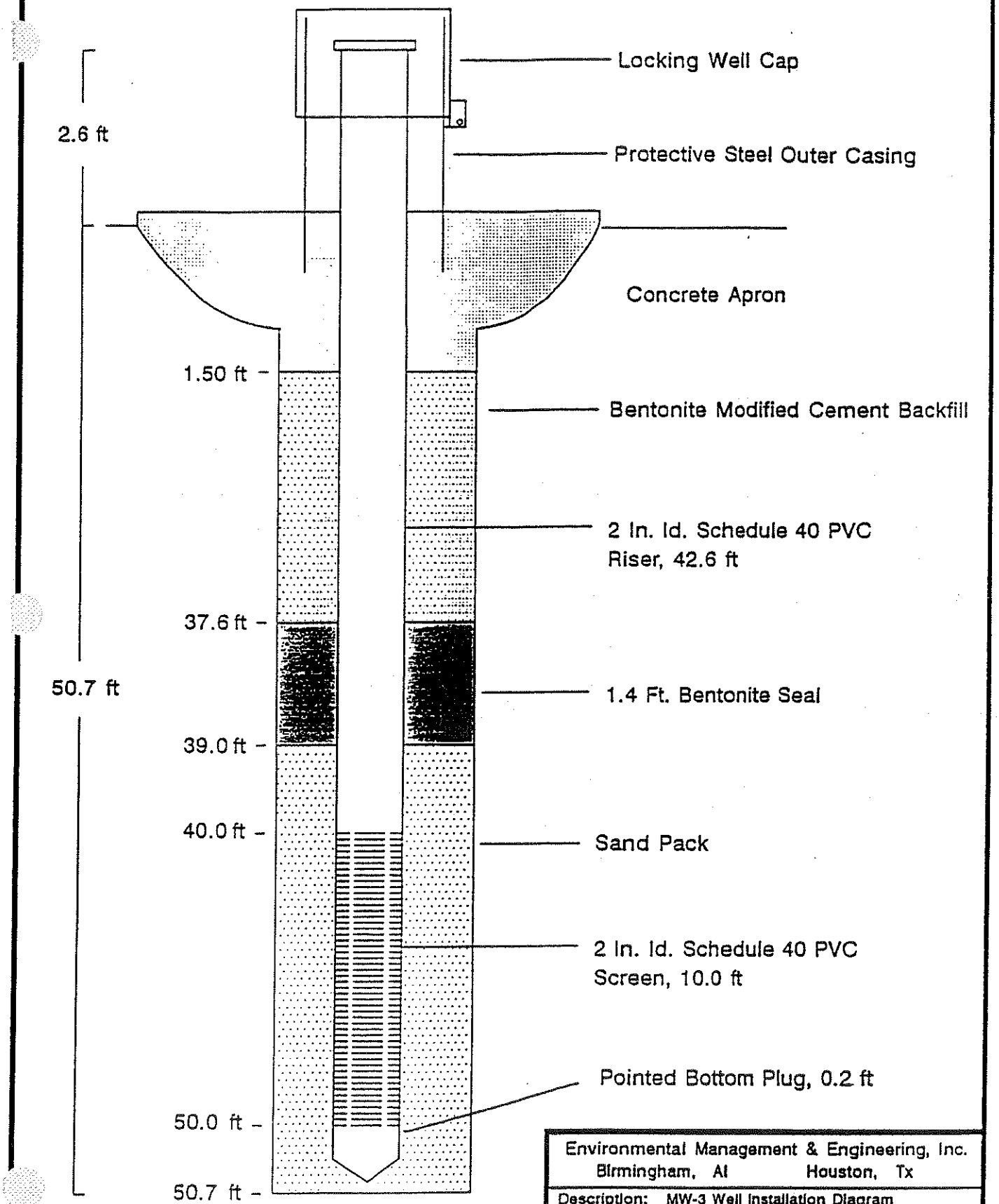
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 01-27-89

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing
Date: 01-30-89



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx	
Description: MW-3 Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant	
Date: 07-20-93	Project No. USP-86-0170
Drawn by: JT	Scale: NTS

SOIL BORING PROGRAM

EME Project No: USP-86-0170 Date: 1-10-89

Client: U. S. Pipe

Facility: Bessemer

Bore Area ID: _____ Bore No. MW4 Total Bore Depth: 53'

Bore Site Location: _____

Note: See Bore Grid Plot Plan for Details

Boring Equipment Used: _____ Split Spoon Sampler X Auger

X Other water rotary (core barrell)

Lab Samples:	Sample No.	Depth Taken(ft)	Analysis Parameter	Results

Bore Description & Comments--Please note & describe any changes in soil color, texture, density, type & any areas of suspected contamination adjacent to the depth.

ft.	
0	
12.2	orange brown clayey silt to silty clay
14.0	gray limestone (competent; minor fault approx. ±"
	offset. steeply dipping F1 @ 16'; F2 @ 19'; F3 @ 20.5'
	F4 @ 22.6'; (void) lost water @ approx. 23'
24.0	gray limestone (competent)
43.0	gray limestone (competent)
53.0	gray limestone (competent)

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co. Project No.: USP-86-0170

Facility: Bessemer Pipe Plant Geologist: T Floyd

Well No: MW-4 Static Water Elev.: 454.50' msl

Well Location: On Map Elevation T.O.C.: 471.83' msl

Date of Drilling: 01-17-89

Bore Hole Dia.: 6.75" (0.56 ft) - 3.75" (0.31 ft)

Inner Casing and Screen

Casing Type: 20.0 ft of Scedule 40 PVC Triloc Casing

Screen Type: 10 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 27.3' Date Placed: 01-17-89

Depth Top of Screen: 17.1' Bottom Depth of Screen: 27.1'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand	Volume: .55 ft^3	Method of Placement: Gravity	Date: 01-17-89
Seal Type: Bentonite Pel.	Volume: .07 ft^3	Method of Placement: Gravity	Date: 01-17-89
Time Aged: 16 hrs.			
Back Fill Type: Bentonite	Volume: 3.2 ft^3	Method of Placement: Tremie	Date: 01-18-89

Outer Casing

Bottom Depth: 1.5'

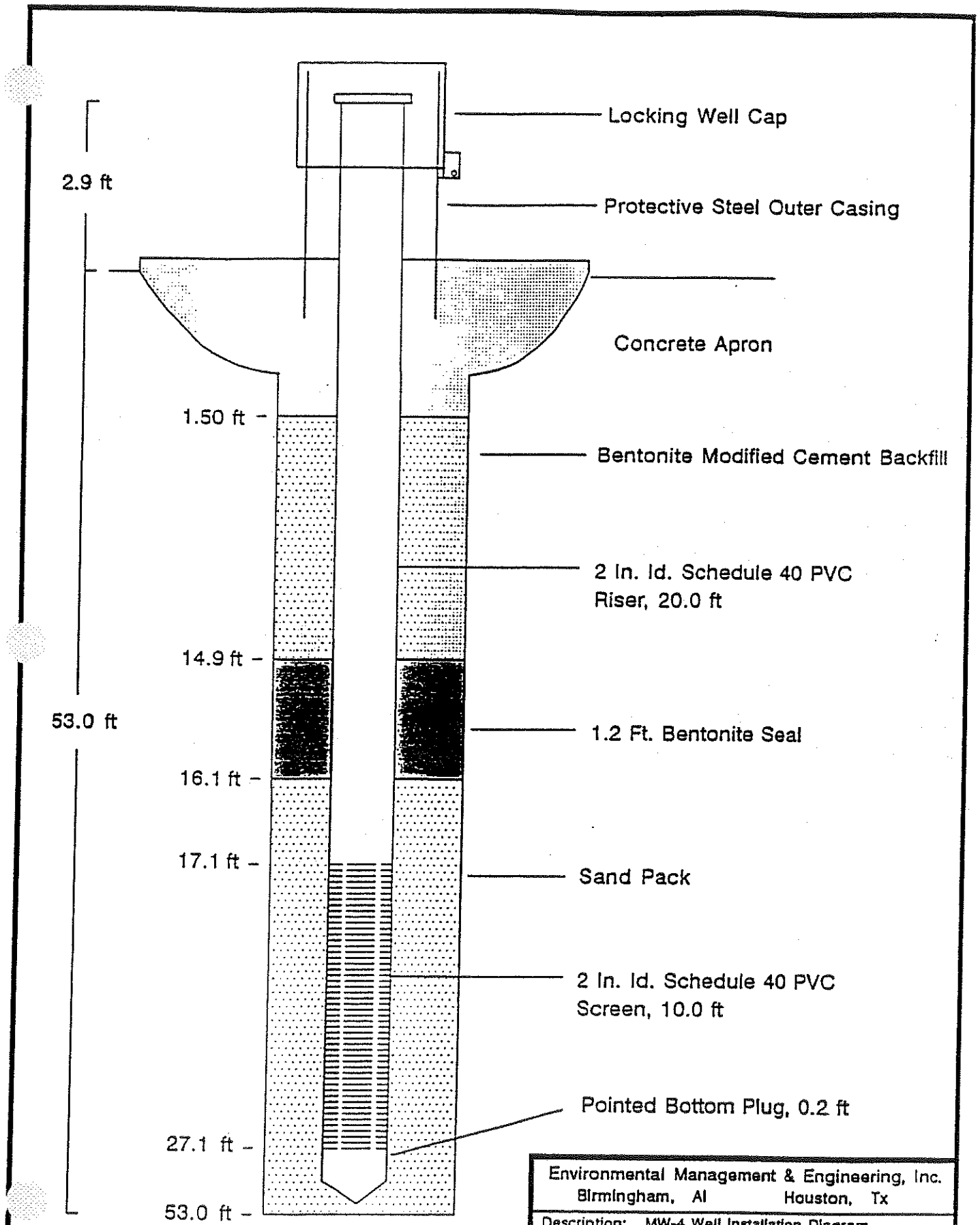
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 01-27-89

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing Date: 01-30-89



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx	
Description: MW-4 Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant	
Date: 07-20-93	Project No. USP-86-0170
Drawn by: JT	Scale: NTS

SOIL BORING PROGRAM

EME Project No: [illegible] Date: 1.10.20

Client: U. S. Pipe

Facility: Bessemer

Bore Area ID: _____ Bore No. MW5 Total Bore Depth: 40.9'

Bore Site Location: _____

Note: See Bore Grid Plot Plan for Details

Boring Equipment Used: _____ Split Spoon Sampler X Auger

X Other water rotary (core barrell)

Lab Samples:	Sample No.	Depth Taken(ft)	Analysis Parameter	Results

Bore Description & Comments--Please note & describe any changes in soil color, texture, density, type & any areas of suspected contamination adjacent to the depth.

ft.	
0	tan to brown clay and silty sand
6.1	gray limestone w/shale lenses (fractured) (F1)
20.8	gray limestone w/shale lenses
	F2 @ 17.1' iron stains F3 @ 25.6'
	rock 22.3' to 22.9' F4 @ 26.6'
40.9	gray limeston F5 @ 35.0' F6 @ 37.4'

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co.
Project No.: USP-86-0170

Facility: Bessemer Pipe Plant
Geologist: T Floyd

Well No: MW-5
Static Water Elev.: 451.41' msl

Well Location: On Map
Elevation T.O.C.: 467.82' msl

Date of Drilling: 01-16-89

Bore Hole Dia.: 6.75" (0.56 ft) - 3.75" (0.31 ft)

Inner Casing and Screen

Casing Type: 32.7 ft of Scedule 40 PVC Triloc Casing

Screen Type: 10 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 40.2'
Date Placed: 01-16-89

Depth Top of Screen: 30.0'
Bottom Depth of Screen: 40.0'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand	Volume: .55 ft^3	Method of Placement: Gravity	Date: 01-16-89
Seal Type: Bentonite Pel.	Volume: .07 ft^3	Method of Placement: Gravity	Date: 01-16-89
Time Aged: 18.5 hrs.			
Back Fill Type: Bentonite	Volume: 5.1 ft^3	Method of Placement: Tremie	Date: 01-17-89

Outer Casing

Bottom Depth: 1.5'

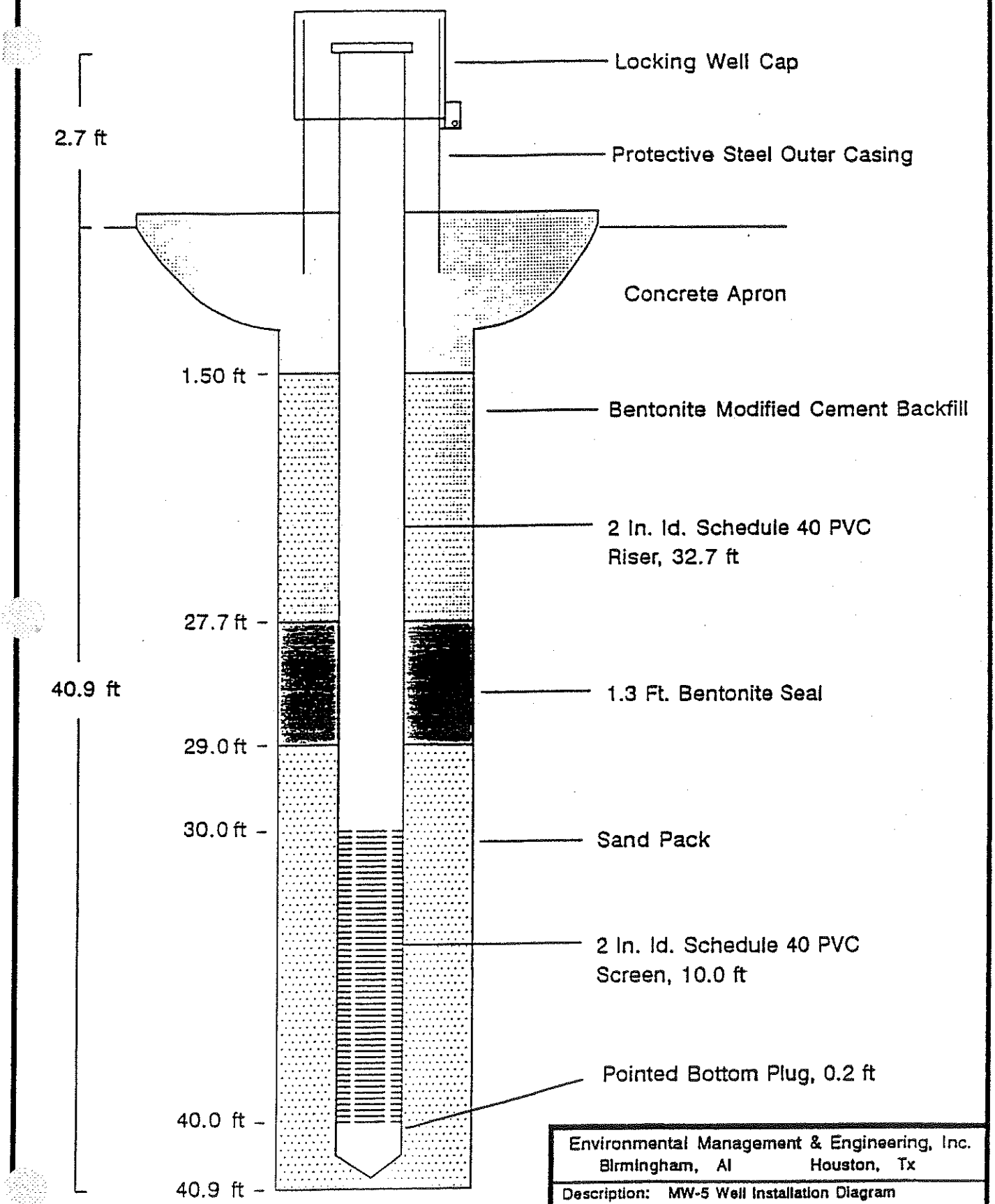
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete
Date: 01-27-89

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing
Date: 01-30-89



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx	
Description: MW-5 Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant	
Date: 07-20-93	Project No. USP-86-0170
Drawn by: JT	Scale: NTS

SUBSURFACE EXPLORATION LITHOLOGIC LOG OF

Client: U.S. Pipe
Project Number: USP-86-0170
Project Location: Bessemer Pipe Plant

Date: 10/29/91
Method of Drilling: HSA
Method of Sampling: N/A

WELL COMPLETION INFORMATION

Boring Number: MW-1A
Logged By: TS & JT
Drilled By: Geotechnical

Screen Dia: 2" Length: 5' Type: PVC
Slot size: .01 mm
Riser Dia: 2" Length: 15' Type: PVC

	DESCRIPTION	Sample Interval	Sample Number	Recovery (ft)	Blow Counts	PID (ppm)	Graphic Log	Well Completion	Water Level	OVA (ppm)
	10' from MW-1 in grassy area below landfill									
	Surface Elevation:									
5	Grass cover - loose dark brown clayey silt									
10	Stiff brown silty clay									
15	8' is water table									
20	Bedrock									
25										
30										
35										
40										
45										
50										

SAMPLER TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HSA HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co. Project No.: USP-86-0170

Facility: Bessemer Pipe Plant Geologist: T Seiler/J Thomas

Well No: MW-1A Static Water Elev.: 452.89' msl

Well Location: Landfill Elevation T.O.C.: 458.99' msl

Date of Drilling: 10-29-91

Bore Hole Dia.: 6.5" (0.54 ft)

Inner Casing and Screen

Casing Type: 13.07 ft of Scedule 40 PVC Triloc Casing

Screen Type: 5 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 15.0' Date Placed: 10-29-91

Depth Top of Screen: 9.9' Bottom Depth of Screen: 14.9'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand Volume: .55 ft^3 Method of Placement: Gravity Date: 10-29-91

Seal Type: Bentonite Pel. Volume: .14 ft^3 Method of Placement: Gravity Date: 10-29-91

Time Aged: 2 hr.

Back Fill Type: Volume: .18 ft^3 Method of Placement: Gravity Date: 10-29-91

Outer Casing

Bottom Depth: 1'

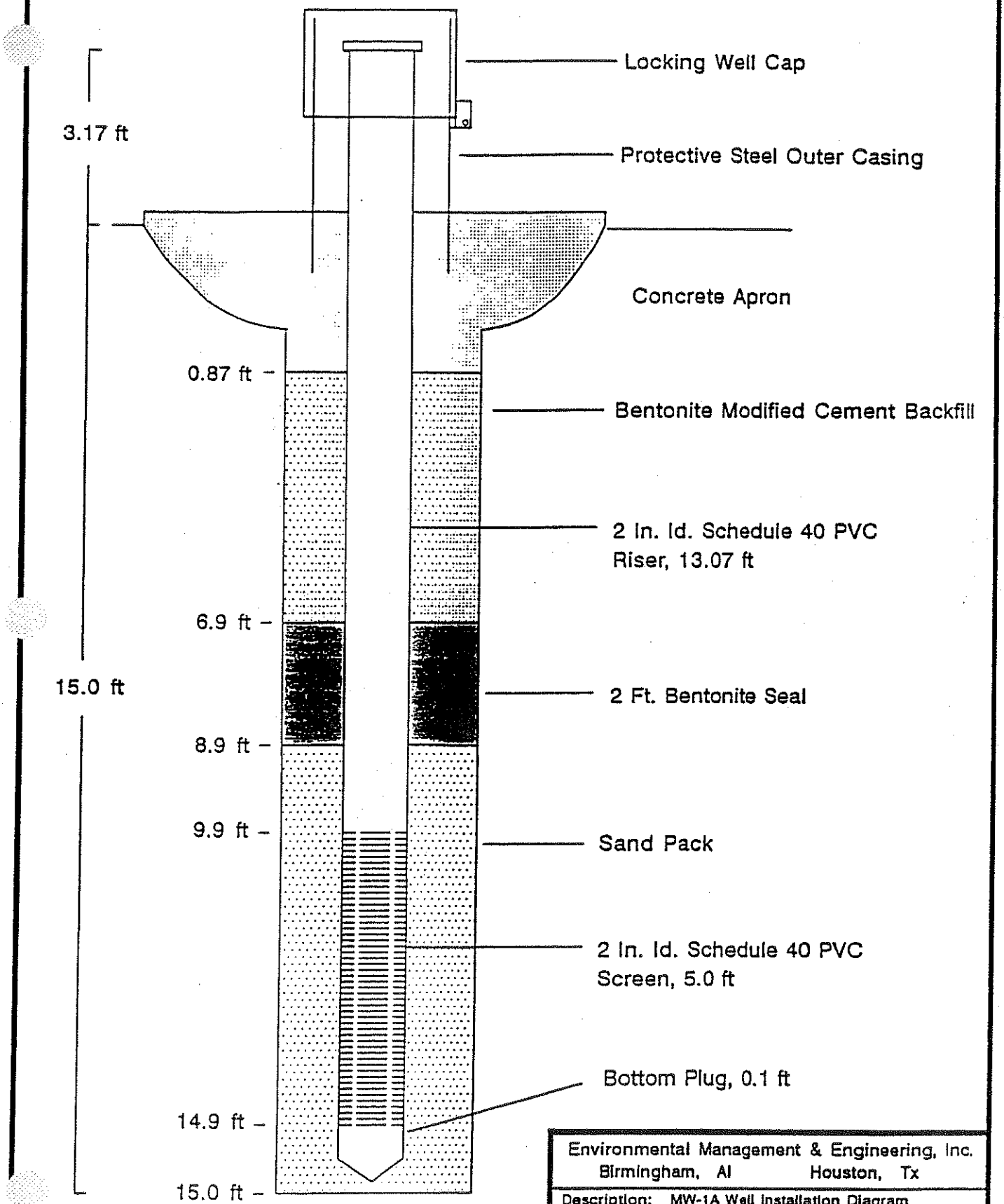
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 10-29-91

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing Date: 11-05-91



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx		
Description: MW-1A Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant		
Date: 07-20-93		Project No. USP-86-0170
Drawn by: JT		Scale: NTS

SUBSURFACE EXPLORATION LITHOLOGIC LOG OF

Client: U.S. Pipe
Project Number: USP-86-0170
Project Location: Bessemer Pipe Plant

Date: 10/28/91
Method of Drilling: HSA
Method of Sampling: N/A

WELL COMPLETION INFORMATION

Boring Number: MW-2A
Logged By: TS & JT
Drilled By: Geotechnical

Screen Dia: 2" Length: 5' Type: PVC
Slot size: .01 mm
Riser Dia: 2" Length: 10' Type: PVC

DESCRIPTION	Sample Interval	Sample Number	Recovery (Ft)	Blow Counts	PID (ppm)	Graphic Log	Well Completion	Water Level	OVA (ppm)
10' from MW-2 in grassy area below landfill Surface Elevation:									
Grass cover dark brown sandy silt with roots, very moist at 5'									
Rock fragment at about 7' Water table at 8'. Gray stiff silty clay									
12.3' is bedrock									

5 10 15 20 25 30 35 40 45 50

SAMPLER TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HSA HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co.
Project No.: USP-86-0170

Facility: Bessemer Pipe Plant
Geologist: T Seiler/J Thomas

Well No: MW-2A
Static Water Elev.: 452.66' msl

Well Location: Landfill
Elevation T.O.C.: 458.76' msl

Date of Drilling: 10-28-91

Bore Hole Dia.: 6.5" (0.54 ft)

Inner Casing and Screen

Casing Type: 10 ft of Scedule 40 PVC Triloc Casing

Screen Type: 5 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 12.3'
Date Placed: 10-28-91

Depth Top of Screen: 7.2'
Bottom Depth of Screen: 12.2'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand Volume: .28 ft^3 Method of Placement: Gravity Date: 10-28-91

Seal Type: Bentonite Pel. Volume: .14 ft^3 Method of Placement: Gravity Date: 10-28-91

Time Aged: 2 hr.

Back Fill Type: Bentonite Volume: .25 ft^3 Method of Placement: Gravity Date: 10-28-91

Outer Casing

Bottom Depth: 1'

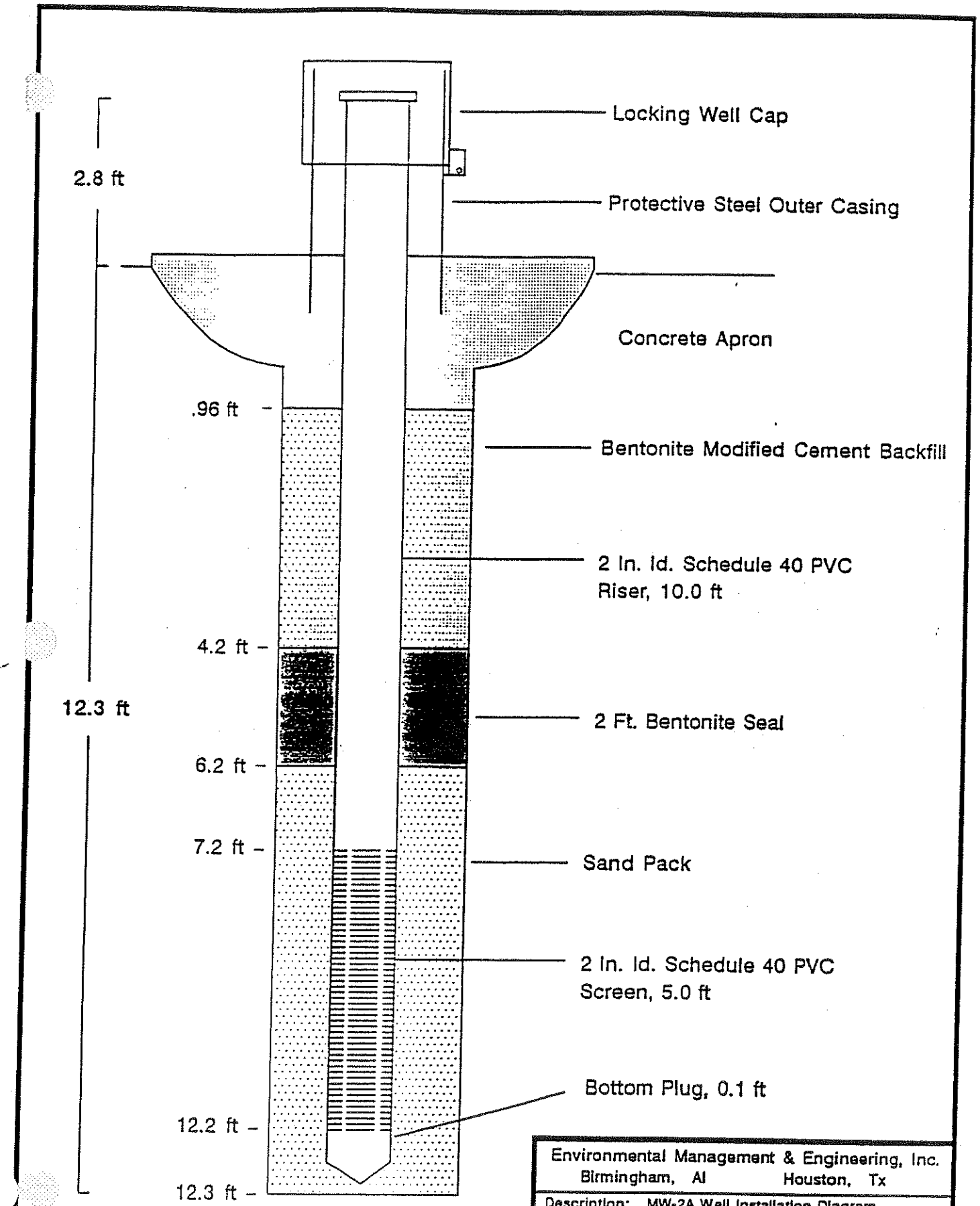
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 10-29-91

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing
Date: 11-05-91



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx		
Description: MW-2A Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant		
Date: 07-20-93		Project No. USP-86-0170
Drawn by: JT		Scale: NTS

SUBSURFACE EXPLORATION LITHOLOGIC LOG OF

Client: U.S. Pipe
Project Number: USP-86-0170
Project Location: Bessemer Pipe Plant

Date: 10/28/91
Method of Drilling: HSA
Method of Sampling: N/A

WELL COMPLETION INFORMATION

Boring Number: MW-3A
Logged By: TS & JT
Drilled By: Geotechnical

Screen Dia: 2" Length: 5' Type: PVC
Slot size: .01 mm
Riser Dia: 2" Length: 15' Type: PVC

DESCRIPTION	Sample Interval	Sample Number	Recovery (ft)	Blow Counts	PID (ppm)	Graphic Log	Well Completion	Water Level	OVA (ppm)
10' from MW-3 in grassy area below landfill Surface Elevation:									
Grass cover, wet black sandy clay silt Water 4' 8"									
Dry light brown silty..clay									
Bedrock									

5 10 15 20 25 30 35 40 45 50

SAMPLER TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HSA HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE OC DRIVEN CASING

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co.
Project No.: USP-86-0170

Facility: Bessemer Pipe Plant
Geologist: T Seiler/J Thomas

Well No: MW-3A
Static Water Elev.: 453.22' msl

Well Location: Landfill
Elevation T.O.C.: 460.62' msl

Date of Drilling: 10-28-91

Bore Hole Dia.: 6.5" (0.54 ft)

Inner Casing and Screen

Casing Type: 15 ft of Scedule 40 PVC Triloc Casing

Screen Type: 5 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 17.0'
Date Placed: 10-28-91

Depth Top of Screen: 11.9'
Bottom Depth of Screen: 16.9'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand Volume: .28 ft^3 Method of Placement: Gravity Date: 10-28-91

Seal Type: Bentonite Pel. Volume: .14 ft^3 Method of Placement: Gravity Date: 10-28-91

Time Aged: 2 hr.

Back Fill Type: Bentonite Volume: .48 ft^3 Method of Placement: Gravity Date: 10-29-91

Outer Casing

Bottom Depth: 1'

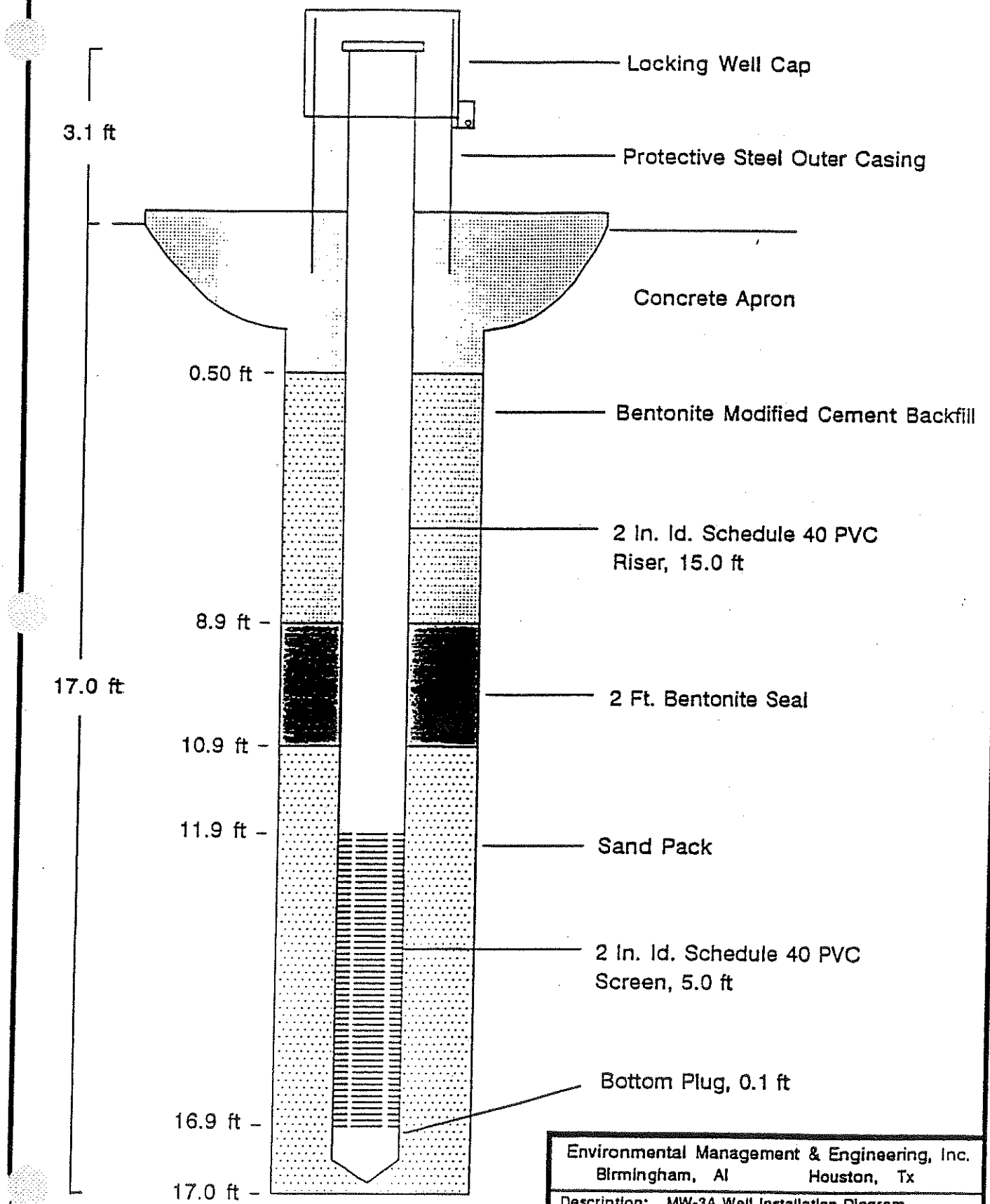
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 10-29-91

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing
Date: 11-05-91



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx		
Description: MW-3A Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant		
Date: 07-20-93	Project No. USP-86-0170	
Drawn by: JT	Scale: NTS	

SUBSURFACE EXPLORATION LITHOLOGIC LOG OF

Client: U.S. Pipe
Project Number: USP-86-0170
Project Location: Bessemer Pipe Plant

Date: 10/29/91
Method of Drilling: HSA
Method of Sampling: N/A

WELL COMPLETION INFORMATION

Boring Number: MW-5A
Logged By: TS & JT
Drilled By: Geotechnical

Screen Dia: 2" Length: 5' Type: PVC
Slot size: .01 mm
Riser Dia: 2" Length: 12' Type: PVC

	DESCRIPTION	Sample Interval	Sample Number	Recovery (ft)	Blow Counts	PID (ppm)	Graphic Log	Well Completion	Water Level	OVA (ppm)
	10' from MW-5 in the pipe yard at the southern corner of facility Surface Elevation:									
2	Gravel cover to 1'-dark black very fine sandy silt									
4	Light brown silty clay limestone rock fragments at 11'									
6										
8										
10										
12	13.5' Bedrock									

SAMPLER TYPE: SS DRIVEN SPLIT SPOON RC ROCK CORE BORING METHOD: HSA HOLLOW STEM AUGER
ST PRESSED SHELBY TUBE CT CONT. TUBE DC DRIVEN CASING

Monitoring Well Documentation
Design and Construction

Client: U.S. Pipe and Foundry Co.
Project No.: USP-86-0170

Facility: Bessemer Pipe Plant
Geologist: T Seiler/J Thomas

Well No: MW-5A
Static Water Elev.: 460.17' msl

Well Location: Landfill
Elevation T.O.C.: 472.37' msl

Date of Drilling: 10-29-91

Bore Hole Dia.: 6.5" (0.54 ft)

Inner Casing and Screen

Casing Type: 12 ft of Scedule 40 PVC Triloc Casing

Screen Type: 5 ft of Scedule 40 PVC Triloc Screen, 0.01 slot

Well Construction Description

Depth Bottom of Cup: 13.5'
Date Placed: 10-29-91

Depth Top of Screen: 8.4'
Bottom Depth of Screen: 13.4'

Filter Pack and Sealant

Filter Pack Type: 20/40 Sand Volume: .28 ft^3 Method of Placement: Gravity Date: 10-29-91

Seal Type: Bentonite Pel. Volume: .14 ft^3 Method of Placement: Gravity Date: 10-29-91

Time Aged: 2 hr.

Back Fill Type: Bentonite Volume: .32 ft^3 Method of Placement: Gravity Date: 10-29-91

Outer Casing

Bottom Depth: 1'

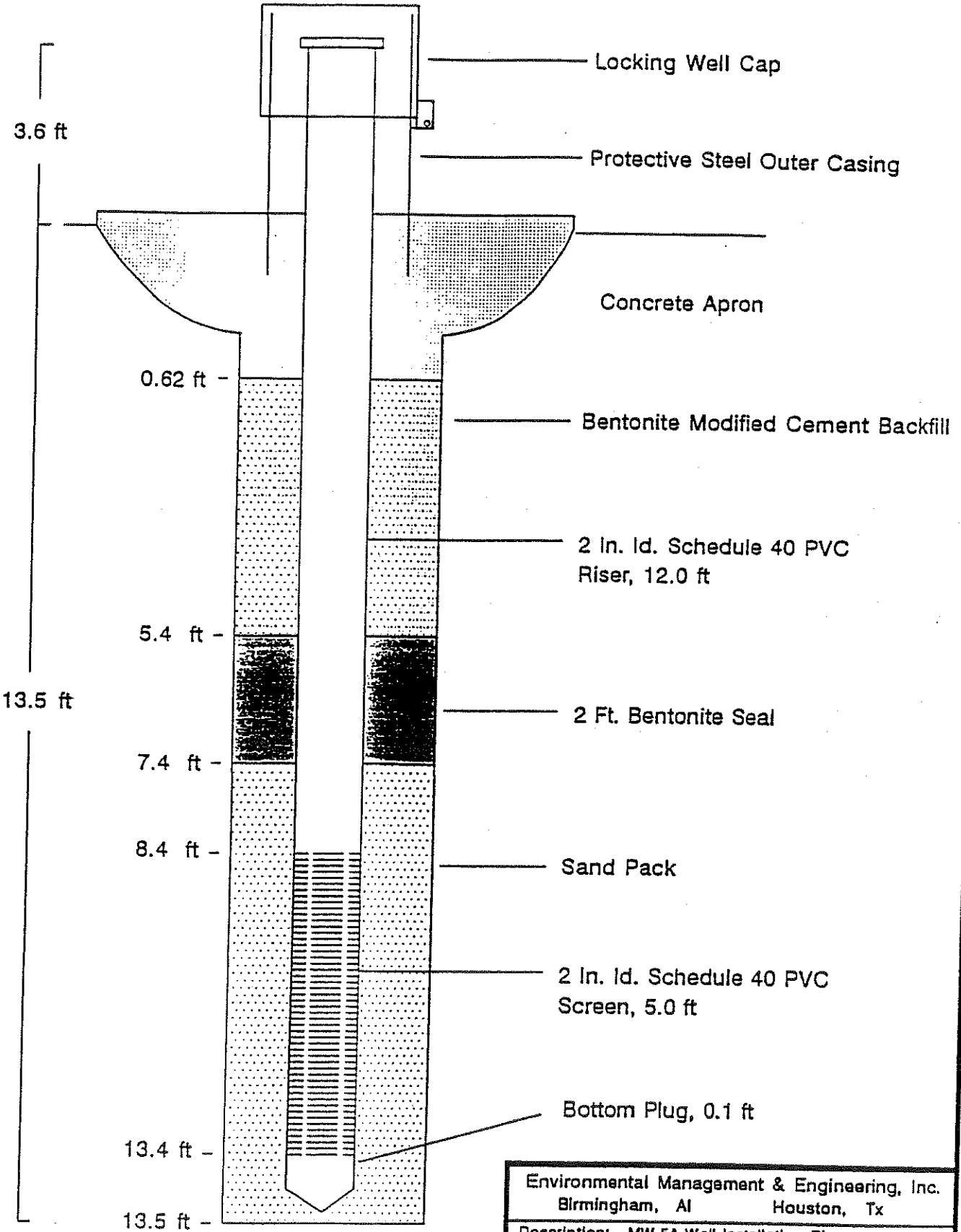
Casing Description: 6" ID

Surface Sealant and Pad Material: Conctete Date: 10-30-91

Description of Proctive Well Cap/Cover: Locking Cover with Padlock

Well Development

Method: Over Bailing
Date: 11-05-91



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx	
Description: MW-5A Well Installation Diagram U. S. Pipe & Foundry Company Bessemer Pipe Plant	
Date: 07-20-93	Project No. USP-86-0170
Drawn by: JT	Scale: NTS

APPENDIX F
SAMPLING AND ANALYSIS PLAN

TABLE OF CONTENTS

Appendix F – Sampling and Analysis Plan

OSP, LLC
Bessemer, Alabama
Facility ID No. ALD 004 017 869
Terracon Project No.: E1187198

1.0 GENERAL INFORMATION

This Sampling and Analysis Plan for the OSP Bessemer Landfill was prepared in general accordance with Alabama Environmental Investigation and Remediation Guidance (AEIRG, Revision 4.0, February 2017).

2.0 SAMPLE COLLECTION

Groundwater sample collection and analysis will be performed on a semi-annual basis for this facility. Collection of the groundwater samples will be performed in general accordance with the AEIRG. Analysis of the groundwater samples will follow the procedures and protocol recommended in the EPA document, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," 3rd Edition (EPA Office of Water and Waste Management, SW-846, 1986). Constituents to be analyzed will be dependent upon the type of monitoring being performed (i.e., Compliance Monitoring, Corrective Action Monitoring, etc.).

2.1 Measurement of Static Water Level Elevation

Prior to initiating purging and sampling, the depth to water and total well depth in each well will be determined to the nearest 0.01 foot using an electronic water level indicator. The distance from the top of the water to the survey mark, located on the top of the inner well casing will be measured and recorded. Nitrile disposable gloves will be worn while measuring the depth to water and total well depth. The probe and wetted portion of the tape of the water level indicator will be rinsed with phosphate-free laboratory grade detergent and tap water, rinsed with tap water, and final rinsed with deionized water immediately after use. At the time the well is gauged, it will also be visually inspected and the condition of the well will be noted. Once all of the monitoring wells have been measured, purging and sampling procedures will be initiated.

2.2 Well Evacuation

Purging is a process of removing stagnant water from a monitoring well prior to sampling. Purging is conducted to insure that stagnant water has been removed from the well and that groundwater samples that are representative of actual aquifer conditions will be collected. In order to determine when a well has been adequately purged, the field personnel will monitor the pH, specific conductance, and temperature of the groundwater removed during purging. In addition, a

minimum of 3 to 5 total well volumes should be removed. Prior to purging, the amount of water standing in the water column (water inside the well riser and screen) will be determined. A well volume of water will be calculated based on the information presented in Appendix C of the AEIRG.

An adequate purge is achieved when a minimum of 3 total well volumes of standing water has been removed, and when the pH, specific conductance, and temperature of groundwater have stabilized. Stabilization of the groundwater chemistry parameters occurs when pH measurements remain constant within 0.1 Standard Unit (SU), specific conductance varies no more than 10 percent, and the temperature is constant for at least three consecutive readings. Standard procedure is to collect an initial set of the groundwater chemistry parameters prior to all purging activities, with a set of parameters measured after each well volume has been removed. The conditions of all purging and sampling activities will be noted in the field log. If a well is pumped or bailed dry, this is considered an adequate purge and the well will be sampled following sufficient recovery (enough volume to allow filling of all sample containers), or within 24 hours.

The purge water will be placed into drums or totes. After completion of purging activities and receipt of the analytical results, the purge water will be properly disposed.

2.3 Field Analysis

At the time of sample collection, the well water will be tested for pH; temperature; and specific conductance. The probe of the pH/conductivity meter will not be inserted into any sample bottles that are to be sent to the laboratory for analysis.

Field instruments will be calibrated each day prior to use according to the manufacturers recommendations using appropriate standards (if applicable). Prior to use and between sample locations, the field instruments will be wiped with a clean, damp cloth. The probes on these instruments (pH, conductivity, etc.) will be rinsed with analyte-free water and air-dried.

2.4 Sample Collection

Groundwater sampling is the process of obtaining, containerizing, and preserving a groundwater sample after the purging process is complete. Devices that may be used at the site to collect groundwater samples from monitoring wells are: peristaltic pump/vacuum jug assembly, stainless steel and Teflon® bladder pump, or disposable dedicated bailers. Groundwater samples will be collected in order of volatilization (highest to lowest). Groundwater samples for VOC analysis will be collected prior to all other samples. Sampling equipment including pumps, bailers, water level measurement equipment, etc., that come into contact with the water in the well will be decontaminated in accordance with the decontamination procedures described in Appendix E of the AIERG. When conducting groundwater sampling, the following evaluations must also be conducted and noted in the field logbook and in the Groundwater Sampling Data Form.

a) Determine the order in which the wells will be sampled (from least to most contaminated).
b) Note the construction and condition of the well (i.e., pad condition, ponding of water, and vertical openings between the casing and the backfill material).
c) Note any standing water inside the protective casing (casing may collapse if water freezes). Weep hole must be present at the bottom of the protective casing to prevent standing water.
d) Note if the well is locked and the condition of the lock (i.e., broken, rusted, or missing).
e) Note the condition of all well construction materials and any damage that may need to be repaired, or if the well should be abandoned and replaced.
f) Check for dangerous vapors with the proper air monitoring equipment.
g) Note the time of the sampling, the sample station location, the method of sampling, the color of sample, any odors detected, and any sediment observed.

The monitoring parameters are presented in the AHWMMA Post Closure Permit Number ALD 004 017 869. In addition to the groundwater samples, a trip blank, a rinse blank, and a duplicate sample will be collected as quality assurance samples. A trip blank will be prepared by the lab and will be transported in the cooler with the samples. A field/equipment blank will be collected from a clean dedicated disposable bottom valve polyethylene bailer. Duplicate samples will be collected at a frequency of one duplicate per ten samples collected.

3.0 SAMPLE PRESERVATION

Samples will be placed in new laboratory-provided containers containing the required preservatives appropriate for the sample to be analyzed [three 40-ml VOA vials with hydrochloric acid (HCl) for VOCs, 250-ml plastic bottles with nitric acid (HNO_3) for metals, and 1-liter amber glass bottles with no chemical preservative for semi-volatiles].

4.0 LABELING AND CHAIN-OF-CUSTODY CONTROL

4.1 Sample Labels

Samples collected for specific field analysis or measurement data will be recorded directly in bound field logbooks, sample collection forms, and/or recorded directly on the chain-of-custody (COC) record. Samples collected for laboratory analyses will include sample labels or sample tags. The following information will be written on the sample labels or tags using waterproof, non-erasable ink:

(a) Project number;
(b) Field identification or monitoring well number;
(c) Date and time of sample collection;

(d) Designation of the sample as a grab or composite;
(e) Type of sample (groundwater);
(f) The preservative used (if any); and
(g) The general types of analyses to be performed.

The labels may be partially filled out prior to sample collection. The date and time will be added to the label at the time the sample is collected.

4.2 Field Sample Log

At the time of collection the following information will be recorded in the bound field notebook or on a Field Sample Log:

(a) Project number;
(b) Field identification or monitoring well number;
(c) Date and time of sample collection;
(d) Designation of the sample as a grab or composite;
(e) The signature of either the sampler(s) or the designated sampling team leader and the field sample custodian;
(f) Whether the sample was preserved or unpreserved, and if preserved, identify the preservative used;
(g) The types of analyses to be performed;
(h) Field measurements collected during the purging of monitoring wells (pH, Specific Conductivity, and Temperature);
(i) Water levels and total well depths measured during the sampling event; and,
(j) Any relevant comments (such as readily detectable or identifiable odor, color, turbidity, or known toxic properties).

4.3 Chain of Custody Record/Analysis Request

All information on the COC forms should be recorded in a legible manner. COC forms will originate in the field immediately upon sampling groundwater. The COC forms will stay with the samples at all times until properly relinquished to the laboratory for analysis. Information which should be present on chain-of-custody forms include the following:

1. Site name and location;
2. Date and time of sampling of each sample;
3. Sample identification numbers;
4. Name of sampler(s);
5. Analytical laboratory to be utilized;
6. Analytical methods to be used;
7. Type of sample (*i.e.,* composite, grab, etc.);
8. Matrix sampled (groundwater);

9. Number of sample containers;
10. Remarks regarding sampling, if applicable;
11. Preservatives used for each sample (also indicate if placed on ice);
12. Personnel relinquishing samples; times and dates; and
13. Personnel receiving samples; times and dates.

5.0 ANALYTICAL PROCEDURES

An EPA National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory will analyze the groundwater samples. The laboratory will employ methods specified in the following U. S. EPA Documents:

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", 3rd Edition.

"Methods for Chemical Analysis of Water and Wastes", Revised March 1983.

6.0 LABORATORY QUALITY ASSURANCE\QUALITY CONTROL

6.1 Quality Control

The analytical laboratory will follow an active quality control program during the analysis of samples, including the aspects listed below:

Sample containers will be prepared in accordance with EPA protocols. Preservatives will be included in the proper bottles for client convenience and immediate stabilization of samples.

Internal quality controls will include routine analysis of quality control check samples, duplicates, and spiked samples. Techniques used for specific tests may include one or more of these approaches, as appropriate. Calibration samples and standard samples will be both prepared in-house and obtained from the EPA. The results of quality control tests will be evaluated to determine the acceptability of analytical results and permanently recorded on tables and on control charts.

The laboratory will also participate in NELAP external quality control programs administered by the EPA. These programs are separate and additional to internal programs.

Detailed instructions for quality control procedures, sample handling, and EPA-approved test procedures are included in appropriate sections of laboratory manuals.

6.2 Quality Assurance

The important components of the laboratory's Quality Assurance Program will include adequately trained analysts, use of approved procedures, routine control of precision and accuracy, outside confirmation of internal control and records, and documentation of activities suitable for display to the public.

APPENDIX G
FINANCIAL ASSURANCE

POST-CLOSURE CARE PC-1

Facility Name: OSP, LLC

SUMMARY WORKSHEET

	Activity	Worksheet Number	Cost
1.	Monitoring of Cesium Vaults	PC-A	$79,500.00
2.	Site Security	PC-3	$39,980.00
3.	Maintenance of Vegetative Cover	PC_4	$810,000.00
4.	Maintenance and Inspection	PC-5	$72,000.00
5.	Groundwater Monitoring	PC-6	$795,000.00
6.	Deed Notation	PC-7	N/A
7.	Maintenance and Inspection of Asphalt Cover	PC-8	N/A
8.	Subtotal of Post-Closure Costs (Add lines 1 through 7)		$1,796,480.00
9.	Engineering Expenses (Engineering Expenses are typically 10% of post closure costs, excluding certification of post-closure.)		$179,648.00
10.	Certification of Post-Closure	PC-9	N/A
11.	Subtotal (Add engineering expenses and cost of certification of post-closure to post-closure costs [Add lines 8, 9, and 10])		$1,976,128.00
12.	Contingency Allowance (Contingency Allowances are typically 20% of post-closure care costs, engineering expenses, and cost of certification of post-closure.)		$395,225.60
TOTAL COST OF POST-CLOSURE CARE (add lines 11 and 12)			$2,371,353.60

POST-CLOSURE CARE

PC-A

Facility Name: OSP, LLC

CORRECTIVE ACTION

O&M on Hydraulic Control System				
1.	Semi-Annual Inspections (including Report)	2 trip	$1,100.00/event	$2,200.00
2.	Minor Maintenance (trimming grass)	1 hrs/month	6 hrs/year @ $75.00/hr	$450.00
YEARLY TOTAL				$2,650.00
TOTAL 30 YEAR COST OF CESIUM VAULT MONITORING (Total entered on PC-1, Line 1)				$79,500.00

POST-CLOSURE CARE PC-3

Facility Name: OSP, LLC

SITE SECURITY

1. FENCING			
1.A	Length of Fencing (ft.)	2345	
1.B	Labor, Materials, and Equipment to install per ft.	$16.00	
1.C	**Fencing Subtotal**		$37,520.00
2. Gates			
2.A	Number of Gates	4	
2.B	Labr, Material, and Equipment Cost per Gate	$300.00	
2.C	**Gate Subtotal**		$1,200.00
Reflection Signs			
3.A	Number of Signs Required	4	
3.B	Labr, Material, and Equipment Cost per Sign	$65.00	
3.C	**Sign Subtotal**		$260.00
TOTAL COST OF SITE SECURITY (Add Lines 1.C, 2.C, and 3.C)			$38,980.00

Notes: * Assume 30 years of post-closure care

POST-CLOSURE CARE PC-4

Facility Name: OSP, LLC

MAINTENANCE OF VEGETATIVE COVER

1. MOWING			
1.A	Area of Cover to be mowed (Enter from worksheet LF-1, line 1.D)	ft2	
1.B	Covert the area in ft2 to MSF (thousand square feet)(Divide line 1A by 1,000)	MSF	
1.C	Labor and equipment cost per MSF	$_/MSF	
1.D	Cost of 1 mowing event (Multiply 1.B by line 1.C)	$3000_/event	
1.E	Number of mowing events per year	9 events/year	
1.F	Number of years in post-closure care period*	30 years	
1.G	Number of mowing events during the post-closure care period (Multiply line 1.E by line 1.F)	270 events	
1.H	**Cost to mow for Post-Closure Care Period (Multiply line 1.D by line 1.G)**		$810,000
2. FERTILIZING			
2.A	Area of Cover to be fertilized (Enter from line 1.B)	MSF	
2.B	Labor and equipment cost per MSF	$_/MSF	
2.C	Cost of 1 fertilizing event (Multiply 1.B by line 1.C)	$_/event	
2.D	Number of fertilizing events per year	events/year	
2.E	Number of years in post-closure care period*	years	
2.F	Number of fertilizing events during the post-closure care period (Multiply line 1.E by line 1.F)	events	
2.G	**Cost to fertilize for Post-Closure Care Period (Multiply line 1.D by line 1.G)**		Included in Mowing Costs
3. Watering and Other Maintenance, Per Year = $5000			
3.A	Area of Cover to be fertilized (Enter from line 1.B)	MSF	
3.B	Labor and equipment cost per MSF	$_/MSF	
3.C	Cost of 1 watering event (Multiply 1.B by line 1.C)	$_/event	
3.D	Number of watering events per year	events/year	
3.E	Number of years in post-closure care period*	years	
3.F	Number of watering events during the post-closure care period (Multiply line 1.E by line 1.F)	events	
3.G	**Cost to water for Post-Closure Care Period (Multiply line 1.D by line 1.G)**		Included in Mowing Costs
TOTAL COST OF MAINTENANCE OF VEGETATIVE COVER (Add Lines 1.H, 2.G, and 3.G)			$810,000.00

Notes: * Assume 30 years of post-closure care

POST-CLOSURE CARE PC-5

Facility Name: OSP, LLC

MAINTENANCE AND INSPECTION

If maintenance Costs are not specifically indicated, the cost of maintaining and repairing the final cover can be estimated based on a percentage of constructing the final cover (such as 20 percent). If the unit is closed and construction costs for the final cover are not available, use lanfill worksheets LF-3 through LF-6, found in chapter 7 to estimate cost.

1. MAINTENANCE AND RERAIR OF FINAL COVER			
1.A	Cost of installing clay layer	ft2	
1.B	Cost of installing geomembrane	MSF	
1.C	Costs of installing drainage layer	$_/MSF	
1.D	Cost of installing topsoil	$_/event	
1.E	Total cost of final cover	events/year	
1.F	**Cost to Maintain and Repair Final Cover**		$ N/A
2. POST-CLOSURE CARE INSPECTION			
2.A	Cost of Conducting one inspection	$200.00**/inspection	
2.B	Number of inspections per year	12 inspections per year	
2.C	Cost of Cconducting post-closure care inspections per year (Multiply line 2.A by line 2.B)	$2,400.00/year	
2.D	Number of years in post-closure care.*	30 years	
2.E	**Costs to Conduct Post-Closure Care Inspections Over the Post-Closure Care Period (Multiply line 2.C by line 2.D**		$72,000.00
TOTAL COST OF MAINTENANCE AND INSPECTION (Add lines 1.F and 2.E) (Enter total on Workshett PC-1, line 4)			$72,000.00

Notes: * Assume 30 years of post-closure care
** Based on 2 hours time per inspection @ $75.00/hour

POST-CLOSURE CARE PC-6

Facility Name: OSP, LLC

GROUNDWATER MONITORING

1. MAINTENANCE AND RERAIR OF FINAL COVER			
1	Number of years of groundwater monitoring during the post-closure period.	30	
2	Cost of groundwater monitoring per year	$26,500.00	
TOTAL COST OF GROUNDWATER MONITORING (Multiply line 1 by line 2) (Enter on PC-1 worksheet, line 5)			$795,000.00

SAMPLING AND ANALYSIS SA-8

Facility Name: OSP, LLC

MAINTENANCE AND INSPECTION

Use this worksheet to estimate the cost of sampling and analysis of groundwater monitoring wells.

1. COLLECTION OF GROUNDWATER SAMPLE FOR POST-CLOSURE CARE			
1.A	Sampling Cost per Year (2 events)	$6,500.00	
1.B	Annual Report Cost	$8,000.00	
1.C	**ANNUAL SAMPLING AND REPORTING COSTS**		$14,500.00
2. ANALYSIS OF GROUNDWATER SAMPLE FOR POST-CLOSURE CARE			
2.A	Cost to analyze groundwater wells for one sampling event (Enter from line 1.E	$6,000.00	
2.B	Enter the number of analysis events per year	2 event/year	
2.C	**Costs to Analyze Groundwater Samples Annually for Post-Closure Care**		$12,000.00
TOTAL COST OF SAMPLING AND ANALYSIS OF GROUNDWATER ANNUALLY FOR POST-CLOSURE CARE			$26,500.00

Notes: Includes cost of collection and handling of samples, vehicle rental, and decontamination of sampling team and equipment.

APPENDIX H
FINANCIAL ASSURANCE MECHANISM

Bank of America

BANK OF AMERICA - CONFIDENTIAL PAGE: 1

DATE: FEBRUARY 25, 2013

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: 68069275

ISSUING BANK
BANK OF AMERICA, N.A.
ONE FLEET WAY
PA6-580-02-30
SCRANTON, PA 18507-1999

BENEFICIARY
ALABAMA DEPT OF ENVIRONMENTAL MGMT
1400 COLISEUM BLVD 36110-2400
MONTGOMERY, ALABAMA 36130-1463

APPLICANT
OSP, LLC
1200 ABERNATHY RD
SUITE 1200
ATLANTA, GA 30328

AMOUNT
USD 2,447,559.00
TWO MILLION FOUR HUNDRED FORTY SEVEN THOUSAND FIVE HUNDRED FIFTY NINE AND 00/100'S US DOLLARS

EXPIRATION
FEBRUARY 25, 2014 AT OUR COUNTERS

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO. 68069275 IN YOUR FAVOR, AT THE REQUEST AND FOR THE ACCOUNT OF OSP, LLC, 1200 ABERNATHY ROAD, NE, SUITE 1200, ATLANTA, GA 30328 UP TO THE AGGREGATE AMOUNT OF TWO MILLION FOUR HUNDRED FOURTY SEVEN THOUSAND FIVE HUNDRED FIFTY NINE AND 00/100 UNITED STATES DOLLARS (USD 2,447,559.00).

AVAILABLE UPON PRESENTATION OF:

(1) YOUR SIGHT DRAFT, BEARING REFERENCE TO THIS LETTER OF CREDIT NO. 68069275, 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 FEBRUARY 25, 2013 AND SHALL EXPIRE ON FEBRUARY 25, 2014, BUT SUCH EXPIRATION DATE SHALL BE AUTOMATICALLY EXTENDED FOR A PERIOD OF ONE YEAR ON FEBRUARY 25, 2014 AND ON EACH SUCCESSIVE EXPIRATION DATE, UNLESS, AT LEAST 120 DAYS BEFORE THE CURRENT EXPIRATION DATE, WE NOTIFY BOTH YOU AND OSP, LLC 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 OSP, LLC, AS SHOWN ON THE SIGNED RETURN

ORIGINAL

THIS IS AN INTEGRAL PART OF LETTER OF CREDIT NUMBER: 68069275

RECEIPTS.

WHENEVER THIS LETTER OF CREDIT IS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS CREDIT, WE SHALL DULY HONOR SUCH DRAFT UPON PRESENTATION TO US AT BANK OF AMERICA, N.A., ONE FLEET WAY, PA6-580-02-30, SCRANTON, PA 18507-1999, AND WE SHALL DEPOSIT THE AMOUNT OF THE DRAFT DIRECTLY INTO THE STANDBY TRUST FUND OF OSP, 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 ABOVE.

THIS LETTER OF CREDIT IS SUBJECT TO THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS (2007 REVISION) INTERNATIONAL CHAMBER OF COMMERCE PUBLICATION UPC 600.

IF YOU REQUIRE ANY ASSISTANCE OR HAVE ANY QUESTIONS REGARDING THIS TRANSACTION, PLEASE CALL 800-370-7519 OPT 1 .

AUTHORIZED SIGNATURE

THIS DOCUMENT CONSISTS OF 2 PAGE(S).

ORIGINAL

Bank of America

BANK OF AMERICA - CONFIDENTIAL PAGE: 1

STATEMENT OF FEES AND CHARGES

SCRANTON STANDBY
TRADE OPERATIONS PA6-580-02-30
1 FLEET WAY
SCRANTON PA 18507

LETTER OF CREDIT # 68069275
CUSTOMER NUMBER B0121405
STATEMENT DATE 02/25/13

BANKAMERICA BUSINESS CREDIT CHICAGO
DISBURSEMENTS
CT2-545-01-03 200 GLASTONBURY BLVD.
GLASTONBURY, CT 06033

US DOLLARS

YOUR REFERENCE:
APPLICANT: OSP, LLC
BENEFICIARY: ALABAMA DEPT OF ENVIRONMENTAL MGMT

SUMMARY OF FEES

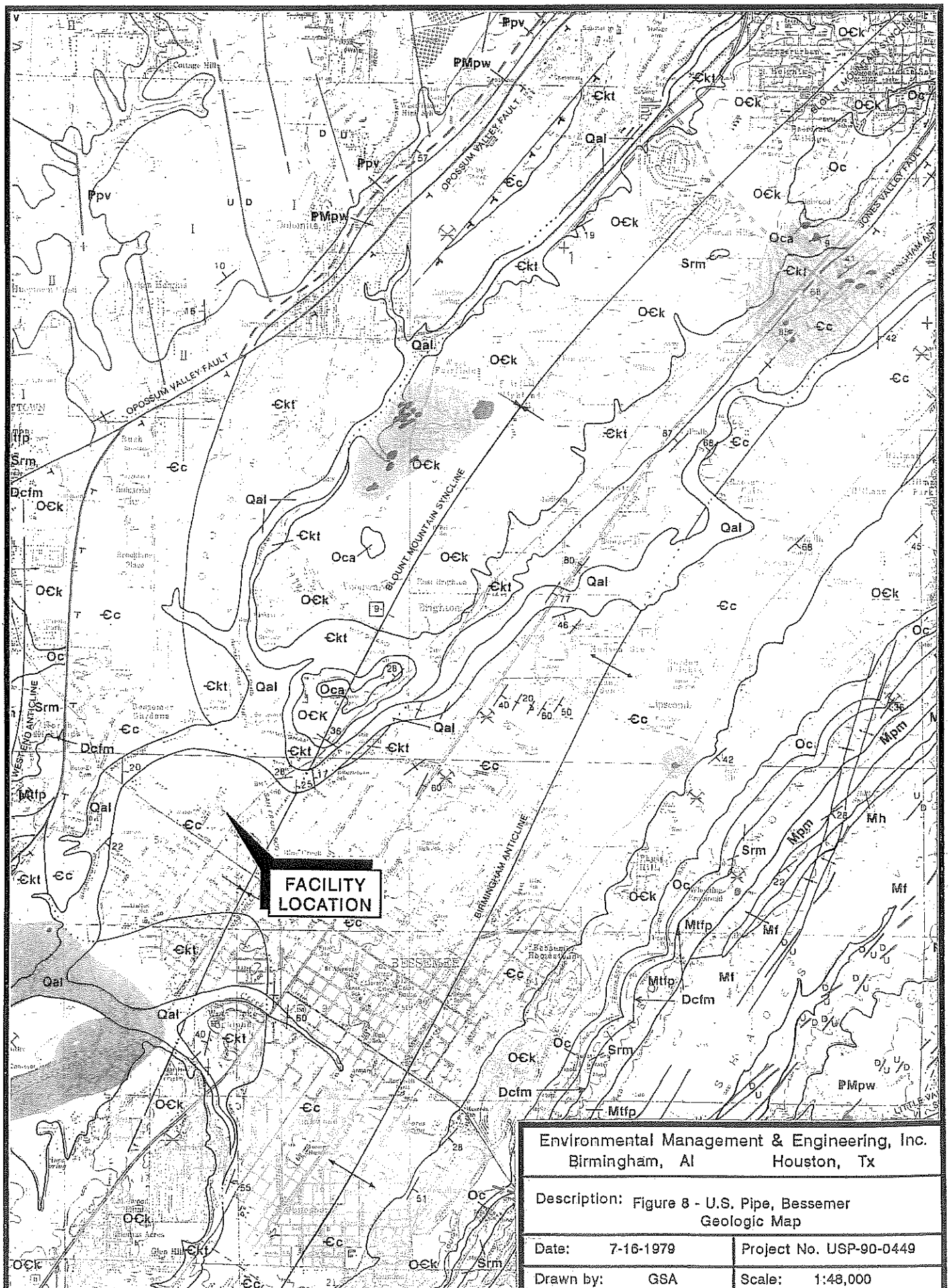
DATE INCURRED	FEE/CHARGE DESCRIPTION		FEE/AMOUNT AMOUNT
02/25/13	ISSUANCE FEE STBY PART	USD	250.00
02/25/13	COURIER FEE	USD	30.00
	TOTAL FEES DUE	USD	280.00
	TOTAL COMMISSIONS AND FEES DUE	USD	280.00

WE CHARGED YOUR ACCOUNT # **********3025 TODAY.

FOR QUESTIONS REGARDING THIS TRANSACTION, PLEASE CALL 800-370-7519 OR FAX 800-755-8743.

ORIGINAL

APPENDIX I
GEOLOGICAL MAP



Environmental Management & Engineering, Inc. Birmingham, Al Houston, Tx	
Description: Figure 8 - U.S. Pipe, Bessemer Geologic Map	
Date: 7-16-1979	Project No. USP-90-0449
Drawn by: GSA	Scale: 1:48,000

EXPLANATION TO FIGURE 8

Alluvium and low terrace deposits

Pottsville Formation

Parkwood Formation

Floyd Shale

Bangor Limestone

Hartselle Sandstone

Pride Mountain Formation

Tuscumbia Limestone, Fort Payne Chert and Maury Formation

Chattanooga Shale and Frog Mountain Formation

Red Mountain Formation

Chickamauga Limestone

Attalla Chert Conglomerate Member, Chickamauga Limestone

Knox Group undifferentiated

Ketona Dolomite

Conasauga Formation

Contact, dotted where concealed

Anticline, axial trace, dotted where concealed

Syncline, axial trace, dashed where inferred, dotted where concealed

Fault, direction and amount of displacement unknown, dashed where inferred

U/D — Normal fault: U, upthrown side; D, downthrown side, dashed where inferred

Thrust fault: T on upper plate, dashed where inferred

45 — Strike and dip of beds

45 — Strike and dip of overturned beds

Strike of vertical beds

Sandy loam

Silty loam

Silty loam with shale fragments

} Soils associated with Pottsville Formation

Mine-waste dump

Sinkhole

Areas most susceptible to subsidence by sinkhole collapse

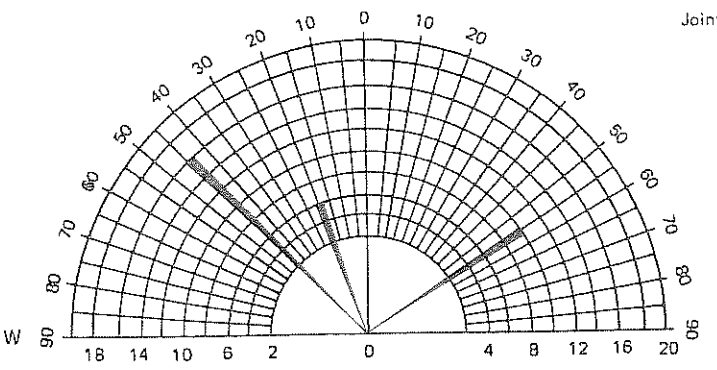
Quarries

Active

Inactive

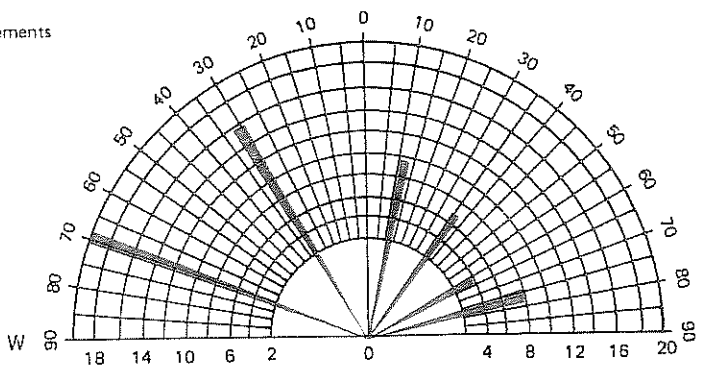
1 — Joint-measurement site (see below)

Joint Measurements



Number of fractures/10 ft.

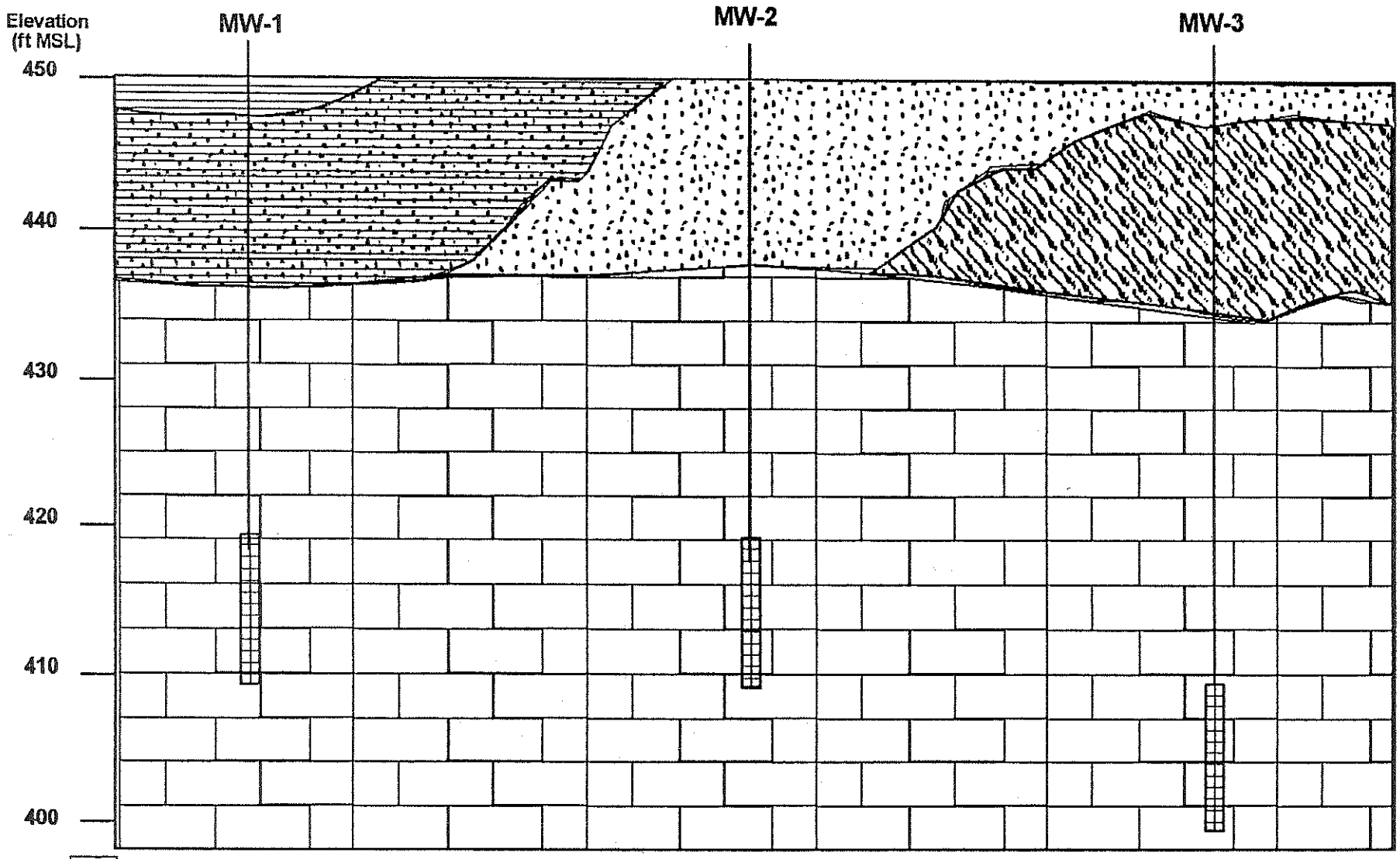
Site: 1
Location: SE¼SE¼ Sec. 15, T. 18 S., R. 4 W.
Geologic Unit: Ketona Dolomite
Strike: N55°E
Dip: 19°SE



Number of fractures/10 ft

Site: 2
Location: SW¼NW¼ Sec. 19, T. 18 S., R. 3 W.
Geologic Unit: Conasauga Formation
Strike: N36°E
Dip: 45°SE

APPENDIX J
GEOLOGIC CROSS-SECTION



Environmental Management & Engineering, Inc. Birmingham, AL Houston, TX	
Description: Figure 9 - Geologic Cross Section, U.S. Pipe and Foundry Co., Bessemer, AL	
Date: 5-30-95	Project No: USP-90-0449
Drawn By: LM	Scale: As Specified

APPENDIX K
GROUNDWATER ANALYTICAL DATA

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

January 2009 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Barium (mg/l)	0.0304	0.0391	0.114	0.0622	0.0398	0.198	0.0529	0.0467
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	nd	nd	nd	nd	nd	nd	0.0492	nd
Cyanide, Total (mg/l)	nd	nd	0.015	0.229	0.065	0.012	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Beta (pCi/l)	nd	18.7	13.3	19.3	nd	36.7	3.46	3.85

January 2009 Sample ID	MW-1 (REP#1)	MW-1A (REP#1)	MW-2 (REP#1)	MW-2A (REP#1)	MW-3 (REP#1)	MW-3A (REP#1)	MW-5 (REP#1)	MW-5A (REP#1)
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Barium (mg/l)	0.0309	0.0519	0.116	0.0625	0.0412	0.201	0.0540	0.0494
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Cyanide, Total (mg/l)	nd	nd	0.024	0.221	0.040	nd	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	3.30	nd	nd
Gross Beta (pCi/l)	5.36	17.5	11.6	16.5	nd	42.0	10.8	7.37

nd = not detected

Revised 5/10/2019

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

January 2009 Sample ID	MW-1 (REP#2)	MW-1A (REP#2)	MW-2 (REP#2)	MW-2A (REP#2)	MW-3 (REP#2)	MW-3A (REP#2)	MW-5 (REP#2)	MW-5A (REP#2)
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Barium (mg/l)	0.0309	0.0590	0.147	0.0657	0.0436	0.203	0.0539	0.0474
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Cyanide, Total (mg/l)	nd	nd	0.030	0.211	0.041	nd	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Beta (pCi/l)	nd	20.2	12.5	15.9	nd	35.2	nd	nd

January 2009 Sample ID	MW-1 (REP#3)	MW-1A (REP#3)	MW-2 (REP#3)	MW-2A (REP#3)	MW-3 (REP#3)	MW-3A (REP#3)	MW-5 (REP#3)	MW-5A (REP#3)
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Barium (mg/l)	0.0311	0.0615	0.166	0.0682	0.0420	0.197	0.0541	0.0456
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	0.0727	nd	nd	0.0266	nd	0.318	nd	nd
Cyanide, Total (mg/l)	nd	nd	0.016	0.160	0.040	0.017	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	4.42	nd	nd
Gross Beta (pCi/l)	4.63	17.0	5.55	17.5	nd	35.1	5.12	nd

nd = not detected

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2009 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Acenaphthene	nd	nd	nd	nd	nd	nd	nd	nd
Anthracene	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)anthracene	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(a)pyrene	nd	nd	nd	nd	nd	nd	nd	nd
4-Chloroaniline	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene	nd	nd	nd	nd	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd	nd	nd
Phenanthrene	nd	nd	nd	nd	nd	nd	nd	nd
Benzylbutyl phthalate	nd	nd	nd	nd	nd	nd	nd	nd
Bis(2-ethylhexyl)phthalate	nd	nd	nd	nd	nd	nd	nd	nd
Di-n-butyl phthalate	nd	nd	nd	nd	nd	nd	nd	nd
Pyrene	nd	nd	nd	nd	nd	nd	nd	nd
4-Chloro-3-methylphenol	nd	nd	nd	nd	nd	nd	nd	nd
Phenol	nd	nd	nd	nd	nd	nd	nd	nd
Arsenic (mg/l)	nd	nd	nd	nd	nd	0.0516	nd	nd
Barium (mg/l)	0.0326	0.0552	0.162	0.0660	0.0298	0.152	0.0539	0.0437
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	nd	0.178	0.241	0.0986	nd	nd	0.0442	nd
Cyanide, Total (mg/l)	nd	nd	0.020	0.214	0.052	0.014	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Beta (pCi/l)	nd	16.3	7.43	18.8	19.1	38.8	4.53	nd

nd = not detected

Revised 5/10/2019

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2009 Sample ID	MW -1 #1	MW -1A #1	MW -2 #1	MW -2A #1	MW -3 #1	MW -3A #1	MW -5 #1	MW -5A #1
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Barium (mg/l)	0.0331	0.0592	0.161	0.0678	0.0281	0.158	0.0540	0.0450
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	0.127	nd	0.555	nd	nd	nd	nd	nd
Cyanide, Total (mg/l)	nd	nd	0.019	0.216	0.058	0.018	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Beta (pCi/l)	nd	13.7	7.98	20.1	20.8	33.8	nd	5.21

July 2009 Sample ID	MW -1 #2	MW -1A #2	MW -2 #2	MW -2A #2	MW -3 #2	MW -3A #2	MW -5 #2	MW -5A #2
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Barium (mg/l)	0.0328	0.0684	0.161	0.0681	0.0281	0.165	0.0541	0.0450
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	0.0368	0.539	0.135	nd	nd	0.0890	0.0520	nd
Cyanide, Total (mg/l)	nd	nd	0.022	0.210	0.060	0.019	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Beta (pCi/l)	nd	11.0	9.59	20.9	10.3	38.6	nd	nd

nd = not detected

Revised 5/10/2019

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2009 Sample ID	MW-1 #3	MW-1A #3	MW-2 #3	MW-2A #3	MW-3 #3	MW-3A #3	MW-5 #3	MW-5A #3
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Barium (mg/l)	0.0331	0.0678	0.162	0.0730	0.0290	0.164	0.0531	0.0435
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Zinc (mg/l)	0.0243	0.149	nd	nd	0.0682	0.336	nd	0.0351
Cyanide, Total (mg/l)	nd	nd	0.018	0.206	0.060	0.021	nd	nd
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	nd	nd	3.81
Gross Beta (pCi/l)	nd	16.6	9.40	15.9	11.0	35.2	3.54	nd

nd = not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter

Revised 5/10/2019

Table 6.
Average Groundwater Constituent Concentrations, January 2009 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.05**
Barium (mg/l)	0.031	0.053	0.136	0.065	0.042	0.200	0.054	0.047	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.73**
Zinc (mg/l)	0.073	nd	nd	0.027	nd	0.318	0.049	nd	**5.0**
Cyanide, Total (mg/l)	nd	nd	0.02	0.21	0.05	0.01	nd	nd	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	3.860	nd	nd	**15.0**
Gross Beta (pCi/l)	5.00	18.35	10.74	17.30	nd	37.25	6.46	5.61	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations highlighted exceed the GWPS

Revised 5/10/2019

Table 7.
Average Groundwater Constituent Concentrations, July 2009 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	nd	nd	nd	0.05	nd	nd	**0.05**
Barium (mg/l)	0.033	0.063	0.162	0.069	0.029	0.160	0.054	0.044	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.73**
Zinc (mg/l)	0.063	0.289	0.310	0.099	0.068	0.213	0.048	0.035	**5.0**
Cyanide, Total (mg/l)	nd	nd	0.02	0.21	0.06	0.02	nd	nd	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	nd	nd	nd	nd	nd	nd	nd	3.8	**15.0**
Gross Beta (pCi/l)	nd	14.4	8.6	18.9	15.3	36.6	4.0	5.2	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations highlighted exceed the GWPS

Revised 5/10/2019

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

January 2010 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0395**	<0.0100	**0.0630**	<0.0100	<0.0100
Barium (mg/l)	**0.0334**	**0.0480**	**0.153**	**0.0620**	**0.0457**	**0.253**	**0.0466**	**0.0403**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	**0.00960**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cyanide, Total (mg/l)	**0.0114**	<0.00500	**0.0252**	**0.157**	**0.0436**	<0.00500	<0.00500	<0.00500
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	<3.0	**0.9**	**1.21**	**0.38**	**0.6**	**2.9**	**0.7**	**2.2**
Gross Beta (pCi/l)	**2.8**	**14.8**	**9.7**	**22.1**	**6.7**	**47.2**	**2.4**	**3.4**

January 2010 Sample ID	MW-1 (REP 1)	MW-1A (REP 1)	MW-2 (REP 1)	MW-2A (REP 1)	MW-3 (REP 1)	MW-3A (REP 1)	MW-5 (REP 1)	MW-5A (REP 1)
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0143**	<0.0100	**0.0504**	<0.0100	<0.0100
Barium (mg/l)	**0.0350**	**0.0811**	**0.203**	**0.0757**	**0.0418**	**0.228**	**0.0426**	**0.0406**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	**0.00960**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	**0.0531**
Cyanide, Total (mg/l)	**0.00810**	<0.00500	**0.0217**	**0.0742**	**0.0369**	**0.00890**	<0.00500	<0.00500
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**0.6**	**0.94**	**2.3**	**1.6**	**0.19**	**0.5**	**1**	**1.9**
Gross Beta (pCi/l)	**5.2**	**10.9**	**7.8**	**15.2**	**4.9**	**35.6**	**2.2**	**0.6**

Revised 5/10/2019

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

January 2010 Sample ID	MW-1 (REP 2)	MW-1A (REP 2)	MW-2 (REP 2)	MW-2A (REP 2)	MW-3 (REP 2)	MW-3A (REP 2)	MW-5 (REP 2)	MW-5A (REP 2)
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0123**	<0.0100	**0.0381**	<0.0100	<0.0100
Barium (mg/l)	**0.0354**	**0.0770**	**0.205**	**0.0764**	**0.0428**	**0.203**	**0.0426**	**0.0396**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	**0.00700**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cyanide, Total (mg/l)	**0.00570**	<0.00500	**0.00820**	**0.0460**	**0.0306**	**0.0162**	<0.00500	<0.00500
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd
Gross Alpha (pCi/l)	**0.08**	**0.32**	**0.90**	**0.34**	**1**	**1.3**	**1.5**	**0.6**
Gross Beta (pCi/l)	**5.4**	**8.6**	**5.8**	**14.7**	**4.8**	**36.4**	**1.4**	**4.5**

January 2010 Sample ID	MW-1 (REP 3)	MW-1A (REP 3)	MW-2 (REP 3)	MW-2A (REP 3)	MW-3 (REP 3)	MW-3A (REP 3)	MW-5 (REP 3)	MW-5A (REP 3)
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	**0.0356**	<0.0100	<0.0100
Barium (mg/l)	**0.0353**	**0.0787**	**0.206**	**0.0753**	**0.0421**	**0.195**	**0.0423**	**0.0406**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	**0.00700**	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.318	<0.0500	<0.0500
Cyanide, Total (mg/l)	**0.00710**	**0.00600**	**0.0152**	**0.0492**	**0.0312**	**0.0164**	<0.00500	<0.00500
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**1.1**	**2.3**	**1.7**	**0.6**	**1.1**	**3.5**	**1.9**	**2.4**
Gross Beta (pCi/l)	**5.2**	**5.3**	**6.3**	**14.7**	**3.0**	**30.7**	**2.2**	**4.2**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2010 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Acenaphthene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Anthracene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Benzo(a)anthracene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Benzo(b)fluoranthene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Benzo(a)pyrene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
4-Chloroaniline (ug/l)	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43
Chrysene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Fluoranthene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Naphthalene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Phenanthrene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
Benzylbutyl phthalate (ug/l)	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43
Bis(2-ethylhexyl)phthalate (ug/l)	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43
Di-n-butyl phthalate (ug/l)	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43
Pyrene (ug/l)	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89	<1.89
4-Chloro-3-methylphenol (ug/l)	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43
Phenol (ug/l)	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43	<9.43
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0250**	<0.0100	**0.0468**	<0.0100	<0.0100
Barium (mg/l)	**0.0339**	**0.0454**	**0.123**	**0.0703**	**0.0407**	**0.151**	**0.0464**	**0.0375**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cyanide, Total (mg/l)	**0.00780**	<0.00500	<0.00500	**0.00760**	<0.0100	<0.0100	**0.0346**	<0.0100
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**2.42**	**2.96**	**2.21**	**2.38**	**2.18**	**2.43**	**2.62**	**2.69**
Gross Beta (pCi/l)	**6.80**	**15.2**	**11.7**	**22.5**	**6.49**	**37.9**	**3.19**	**6.19**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2010 Sample ID	MW -1 #1	MW -1A #1	MW -2 #1	MW -2A #1	MW -3 #1	MW -3A #1	MW -5 #1	MW -5A #1
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0175**	<0.0100	**0.0437**	<0.0100	<0.0100
Barium (mg/l)	**0.0378**	**0.0723**	**0.124**	**0.0731**	**0.0417**	**0.159**	**0.0436**	**0.0377**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	**0.0615**	**0.0773**	<0.0500
Cyanide, Total (mg/l)	<0.00500	<0.00500	<0.00500	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**1.61**	**1.26**	**8.68**	**1.21**	**2.91**	**2.21**	**2.33**	**2.49**
Gross Beta (pCi/l)	**3.35**	**17.9**	**12.8**	**19.0**	**4.98**	**42.7**	**4.02**	**3.53**

July 2010 Sample ID	MW -1 #2	MW -1A #2	MW -2 #2	MW -2A #2	MW -3 #2	MW -3A #2	MW -5 #2	MW -5A #2
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0147**	<0.0100	**0.0426**	<0.0100	<0.0100
Barium (mg/l)	**0.0356**	**0.0783**	**0.129**	**0.0769**	**0.0408**	**0.161**	**0.0405**	**0.0398**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	**0.0539**	<0.0500
Cyanide, Total (mg/l)	<0.00500	<0.00500	<0.00500	<0.0100	<0.0100	<0.0100	**0.0162**	<0.0100
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**2.42**	**2.36**	**1.63**	**1.63**	**2.16**	**2.09**	**2.10**	**2.21**
Gross Beta (pCi/l)	**4.51**	**18.9**	**11.3**	**19.0**	**6.57**	**39.4**	**5.17**	**4.38**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2010 Sample ID	MW -1 #3	MW -1A #3	MW -2 #3	MW -2A #3	MW -3 #3	MW -3A #3	MW -5 #3	MW -5A #3
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0118**	<0.0100	**0.0436**	<0.0100	<0.0100
Barium (mg/l)	**0.0348**	**0.0774**	**0.159**	**0.0762**	**0.0400**	**0.164**	**0.0450**	**0.0374**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cyanide, Total (mg/l)	<0.00500	<0.00500	<0.00500	<0.0100	<0.0100	**0.0184**	<0.0100	<0.0100
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**2.00**	**1.97**	**1.38**	**1.38**	**2.02**	**1.95**	**2.05**	**2.09**
Gross Beta (pCi/l)	**3.90**	**18.8**	**10.1**	**20.9**	**5.34**	**40.0**	**5.81**	**4.00**

ug/l - micrograms per liter
mg/l = milligrams per liter
pCi/l = picoCuries per liter

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Table 6.
Average Groundwater Constituent Concentrations, January 2010 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	nd	0.022	nd	0.047	nd	nd	**0.05**
Barium (mg/l)	0.035	0.071	0.192	0.072	0.043	0.220	0.044	0.040	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	0.008	nd	nd	nd	nd	nd	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.73**
Zinc (mg/l)	nd	nd	nd	nd	nd	0.318	nd	0.053	**5.0**
Cyanide, Total (mg/l)	0.008	0.006	0.018	0.082	0.036	0.014	nd	nd	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	0.593	1.115	1.528	0.730	0.723	2.050	1.275	1.775	**15.0**
Gross Beta (pCi/l)	4.65	9.90	7.40	16.68	4.85	37.48	2.05	3.18	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations highlighted exceed the GWPS

Table 7.
Average Groundwater Constituent Concentrations, July 2010 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	nd	0.017	nd	0.044	nd	nd	**0.05**
Barium (mg/l)	0.036	0.068	0.134	0.074	0.041	0.159	0.044	0.038	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.73**
Zinc (mg/l)	nd	nd	nd	nd	nd	0.062	0.066	nd	**5.0**
Cyanide, Total (mg/l)	0.008	nd	nd	0.008	nd	0.018	0.025	nd	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	2.11	2.14	3.48	1.65	2.32	2.17	2.28	2.37	**15.0**
Gross Beta (pCi/l)	4.64	17.70	11.48	20.35	5.85	40.00	4.55	4.53	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations highlighted exceed the GWPS

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Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

January 2011 Sample ID	MW -1 #2	MW -1A #2	MW -2 #2	MW -2A #2	MW -3 #2	MW -3A #2	MW -5 #2	MW -5A #2
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0154**	<0.0100	**0.0381**	<0.0100	<0.0100
Barium (mg/l)	**0.0314**	**0.0882**	**0.123**	**0.0778**	**0.0409**	**0.203**	**0.0473**	**0.0453**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	**0.0840**	**0.161**	**0.0672**	<0.0500	<0.0500	<0.0500	**0.168**	**0.155**
Cyanide, Total (mg/l)	**0.0122**	<0.00500	**0.0237**	**0.0971**	**0.0436**	**0.0160**	<0.00500	**0.00600**
Sulfide, Total (mg/l)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Gross Alpha (pCi/l)	**0.5**	**0.9**	**0.3**	**-0.42**	**0.32**	**1.3**	**0.3**	**-0.4**
Gross Beta (pCi/l)	**2.85**	**12.4**	**7.3**	**17.3**	**3.38**	**35.9**	**2.36**	**2.37**

January 2011 Sample ID	MW -1 #3	MW -1A #3	MW -2 #3	MW -2A #3	MW -3 #3	MW -3A #3	MW -5 #3	MW -5A #3
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0137**	<0.0100	**0.0348**	<0.0100	<0.0100
Barium (mg/l)	**0.0304**	**0.0918**	**0.139**	**0.0817**	**0.0431**	**0.192**	**0.0451**	**0.0430**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.318	**0.0847**	<0.0500
Cyanide, Total (mg/l)	**0.00880**	<0.00500	**0.0412**	**0.103**	**0.0361**	**0.0139**	<0.00500	<0.00500
Sulfide, Total (mg/l)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
Gross Alpha (pCi/l)	**-0.2**	**1.4**	**0.80**	**0.2**	**-0.08**	**1.6**	**0.3**	**0.5**
Gross Beta (pCi/l)	**2.15**	**17.2**	**7.4**	**17.4**	**3.74**	**34.30**	**2.45**	**2.02**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2011 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Acenaphthene (ug/l)	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	**37**
Anthracene (ug/l)	<0.189	<0.189	<0.189	<0.189	<0.189	<0.189	<0.189	<0.189	**180**
Benzo(a)anthracene (ug/l)	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	**0.092**
Benzo(b)fluoranthene (ug/l)	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	**0.092**
Benzo(a)pyrene (ug/l)	<0.566	<0.566	<0.566	<0.566	<0.566	<0.566	<0.566	<0.566	**0.2**
Bis(2-ethylhexyl)phthalate (ug/l)	<3.02	<3.02	<3.02	<3.02	<3.02	<3.02	<3.02	<3.02	**6**
Benzylbutyl phthalate (ug/l)	<3.49	<3.49	<3.49	<3.49	<3.49	<3.49	<3.49	<3.49	**730**
4-Chloroaniline (ug/l)	<4.53	<4.53	<4.53	<4.53	<4.53	<4.53	<4.53	<4.53	**15**
p-Chloro-m-cresol (ug/l)	<2.64	<2.64	<2.64	<2.64	<2.64	<2.64	<2.64	<2.64	**14.1**
Chrysene (ug/l))	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	**9.2**
Di-n-butyl phthalate (ug/l)	<3.02	<3.02	<3.02	<3.02	<3.02	<3.02	<3.02	<3.02	**360**
Fluoranthene (ug/l)	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	**150**
Naphthalene (ug/l)	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	<0.472	**0.62**
Phenanthrene (ug/l)	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	<0.660	**46.9**
Phenol (ug/l)	<1.60	<1.60	<1.60	<1.60	<1.60	<1.60	<1.60	<1.60	**1100**
Pyrene (ug/l)	<0.566	<0.566	<0.566	<0.566	<0.566	<0.566	<0.566	<0.566	**18**
Arsenic (mg/l)	<0.002	<0.002	**0.00596**	**0.0229**	**0.00284**	**0.0410**	<0.002	<0.002	
Barium (mg/l)	**0.0333**	**0.0736**	**0.116**	**0.0790**	**0.0377**	**0.163**	**0.0673**	**0.0426**	
Beryllium (mg/l)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Cadmium (mg/l)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Chromium (mg/l)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Copper (mg/l)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Lead (mg/l)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Nickel (mg/l)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Zinc (mg/l)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cyanide, Total (mg/l)	**0.00940**	<0.00500	**0.0184**	**0.202**	**0.0583**	**0.0146**	<0.00500	<0.00500	
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Gross Alpha (pCi/l)	**1.25**	**1.38**	**1.64**	**2.16**	**1.74**	**1.03**	**2.67**	**1.98**	
Gross Beta (pCi/l)	**6.54**	**1.61**	**1.30**	**2.4**	**5.55**	**35.7**	**6.37**	**4.45**	

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2011 Sample ID	MW -1 #1	MW -1A #1	MW -2 #1	MW -2A #1	MW -3 #1	MW -3A #1	MW -5 #1	MW -5A #1
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0145**	<0.0100	**0.0391**	<0.0100	<0.0100
Barium (mg/l)	**0.0312**	**0.0887**	**0.160**	**0.0803**	**0.0333**	**0.161**	**0.0508**	**0.0397**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cyanide, Total (mg/l)	**0.0239**	**0.00820**	<0.00500	**0.0622**	**0.0232**	**0.0163**	<0.00500	<0.00500
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**1.37**	**2.08**	**2.51**	**1.45**	**1.19**	**1.79**	**1.84**	**1.75**
Gross Beta (pCi/l)	**5.01**	**2.29**	**9.10**	**2.01**	**6.05**	**36.3**	**3.71**	**4.05**

July 2011 Sample ID	MW -1 #2	MW -1A #2	MW -2 #2	MW -2A #2	MW -3 #2	MW -3A #2	MW -5 #2	MW -5A #2
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0142**	<0.0100	**0.0416**	<0.0100	<0.0100
Barium (mg/l)	**0.0316**	**0.0912**	**0.169**	**0.0800**	**0.0364**	**0.171**	**0.0515**	**0.0387**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cyanide, Total (mg/l)	**0.00780**	<0.00500	**0.0166**	**0.0149**	**0.0266**	<0.0100	<0.00500	<0.00500
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**2.26**	**1.97**	**1.70**	**1.71**	**1.12**	**1.30**	**1.31**	**1.13**
Gross Beta (pCi/l)	**5.37**	**2.09**	**9.94**	**1.7**	**6.27**	**38.8**	**3.92**	**5.24**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2011 Sample ID	MW -1 #3	MW -1A #3	MW -2 #3	MW -2A #3	MW -3 #3	MW -3A #3	MW -5 #3	MW -5A #3
Arsenic (mg/l)	<0.0100	<0.0100	<0.0100	**0.0124**	<0.0100	**0.0358**	<0.0100	<0.0100
Barium (mg/l)	**0.0308**	**0.0820**	**0.180**	**0.0787**	**0.0377**	**0.173**	**0.0480**	**0.0396**
Cadmium (mg/l)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Chromium (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Lead (mg/l)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Nickel (mg/l)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Zinc (mg/l)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cyanide, Total (mg/l)	**0.00760**	**0.0166**	**0.0156**	**0.0393**	**0.0292**	**0.0199**	0.0130	<0.00500
Sulfide, Total (mg/l)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Gross Alpha (pCi/l)	**1.92**	**2.01**	**1.39**	**1.35**	**1.76**	**1.88**	**1.77**	**2.15**
Gross Beta (pCi/l)	**4.86**	**2.02**	**9.01**	**1.93**	**7.86**	**38.4**	**5.27**	**4.16**

ug/l - micrograms per liter
mg/l = milligrams per liter
pCi/l = picoCuries per liter

Table 6. Average Groundwater Constituent Concentrations, January 2011 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	nd	**0.017**	nd	**0.042**	nd	nd	**0.01**
Barium (mg/l)	0.031	0.081	0.118	0.079	0.042	0.206	0.046	0.043	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	nd	nd	nd	nd	0.005	nd	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.10**
Zinc (mg/l)	0.067	0.198	0.067	0.353	nd	0.318	0.126	0.126	**1.1**
Cyanide, Total (mg/l)	0.011	0.006	0.026	0.154	0.039	0.013	nd	0.007	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	0.10	1.55	0.62	0.22	0.44	1.53	0.90	0.50	**15.0**
Gross Beta (pCi/l)	2.68	14.00	8.38	17.30	3.64	35.03	2.61	2.41	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations bold and highlighted exceed the GWPS

Table 7. Average Groundwater Constituent Concentrations, July 2011 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	0.006	**0.016**	0.003	**0.039**	nd	nd	**0.01**
Barium (mg/l)	0.032	0.084	0.156	0.080	0.036	0.167	0.054	0.040	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.10**
Zinc (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**1.1**
Cyanide, Total (mg/l)	0.012	0.012	0.017	0.080	0.034	0.017	0.013	nd	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	1.70	1.86	1.81	1.67	1.45	1.50	1.90	1.75	**15.0**
Gross Beta (pCi/l)	5.45	2.00	7.34	2.03	6.43	37.30	4.82	4.48	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations bold and highlighted exceed the GWPS

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Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

January 2012 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Arsenic (mg/l)	<0.020	<0.020	<0.020	**0.022**	<0.020	**0.045**	<0.020	<0.020
Barium (mg/l)	**0.026**	**0.068**	**0.1**	**0.081**	**0.038**	**0.21**	**0.057**	**0.042**
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.006**	**0.0082**	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.030	**0.045**	<0.030	<0.030	<0.030	<0.030	<0.030	**0.05**
Cyanide, Total (mg/l)	**0.0093**	<0.0050	**0.022**	**0.15**	**0.042**	**0.011**	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Gross Alpha (pCi/l)	**2.3**	**1.8**	<2.3	**1.70**	<1.9	**2.4**	<1.3	**2.1**
Gross Beta (pCi/l)	**4.40**	**42.0**	**11.0**	**19**	**2.5**	**29**	**1.90**	**9.60**

January 2012 Sample ID	MW-1 REP 1	MW-1A #1	MW-2 #1	MW-2A #1	MW-3 #1	MW-3A #1	MW-5 #1	MW-5A #1
Arsenic (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	**0.053**	<0.020	<0.020
Barium (mg/l)	**0.026**	**0.082**	**0.14**	**0.081**	**0.038**	**0.2**	**0.058**	**0.041**
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	**0.0086**	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.030	**0.042**	<0.030	<0.030	<0.030	<0.030	<0.030	**0.049**
Cyanide, Total (mg/l)	**0.0091**	**0.0051**	**0.022**	**0.12**	**0.038**	**0.01**	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Gross Alpha (pCi/l)	<2.5	<1.4	**2.0**	<1.6	<1.6	**2.7**	<1.2	<2.8
Gross Beta (pCi/l)	<2.6	**17.0**	**8.9**	**16.0**	**3.40**	**31.0**	<2.1	**39.00**

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Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

January 2012 Sample ID	MW -1 REP 2	MW -1A #2	MW -2 #2	MW -2A #2	MW -3 #2	MW -3A #2	MW -5 #2	MW -5A #2
Arsenic (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	**0.053**	<0.020	<0.020
Barium (mg/l)	**0.026**	**0.082**	**0.17**	**0.083**	**0.037**	**0.2**	**0.052**	**0.042**
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.030	**0.041**	<0.030	<0.030	<0.030	<0.030	**0.05**	**0.048**
Cyanide, Total (mg/l)	**0.0086**	<0.0050	**0.0062**	**0.074**	**0.038**	**0.0097**	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Gross Alpha (pCi/l)	<2.1	**1.4**	**1.6**	<2.5	<2.2	**2.9**	<2.9	<1.8
Gross Beta (pCi/l)	**3.1**	**21**	**6.6**	**14**	**4.4**	**29**	<2.4	<2.0

January 2012 Sample ID	MW -1 REP 3	MW -1A #3	MW -2 #3	MW -2A #3	MW -3 #3	MW -3A #3	MW -5 #3	MW -5A #3
Arsenic (mg/l)	<0.020	<0.020	<0.020	**0.021**	<0.020	**0.051**	<0.020	<0.020
Barium (mg/l)	**0.026**	**0.083**	**0.18**	**0.085**	**0.04**	**0.19**	**0.049**	**0.042**
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	**0.0057**	<0.0050	<0.0050	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.030	**0.051**	<0.030	<0.030	<0.030	<0.030	**0.048**	**0.05**
Cyanide, Total (mg/l)	**0.0089**	**0.0065**	**0.022**	**0.083**	**0.035**	**0.013**	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Gross Alpha (pCi/l)	**3.1**	<2.0	**3.2**	<2.7	<1.8	<2.2	<2.6	<2.3
Gross Beta (pCi/l)	**14**	**19**	**6.5**	**17**	**5.5**	**24**	<2.7	**3.2**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2012 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Acenaphthene (ug/l)	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032
Anthracene (ug/l)	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029	<0.00029
Benzo(a)anthracene (ug/l)	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032	<0.00032
Benzo(b)fluoranthene (ug/l)	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027
Benzo(a)pyrene (ug/l)	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034	<0.00034
Bis(2-ethylhexyl)phthalate (ug/l)	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
Benzylbutyl phthalate (ug/l)	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028
4-Chloroaniline (ug/l)	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038
p-Chloro-m-cresol (ug/l)	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026
Chrysene (ug/l))	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033
Di-n-butyl phthalate (ug/l)	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027
Fluoranthene (ug/l)	<0.00031	<0.00031	<0.00031	<0.00031	<0.00031	<0.00031	<0.00031	<0.00031
Naphthalene (ug/l)	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037
Phenanthrene (ug/l)	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037	<0.00037
Phenol (ug/l)	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033
Pyrene (ug/l)	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033
Arsenic (mg/l)	<0.0010	<0.0010	**0.0069**	**0.0160**	**0.004**	**0.0420**	<0.0010	<0.0010
Barium (mg/l)	**0.032**	**0.083**	**0.18**	**0.18**	**0.091**	**0.16**	**0.050**	**0.041**
Beryllium (mg/l)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Copper (mg/l)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide, Total (mg/l)	**0.0066**	**0.0053**	**0.02**	**0.150**	**0.032**	**0.012**	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Gross Alpha (pCi/l)	<0.84	<0.81	**18**	<2.3	<2.8	**4.5**	**4.0**	**1.7**
Gross Beta (pCi/l)	<1.1	**22**	**26**	**18**	**10**	**30**	**4.9**	**6.6**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2012 Sample ID	MW-1 #1	MW-1A #1	MW-2 #1	MW-2A #1	MW-3 #1	MW-3A #1	MW-5 #1	MW-5A #1
Arsenic (mg/l)	<0.0010	<0.0010	<0.0010	**0.029**	<0.0010	**0.042**	<0.0010	<0.0010
Barium (mg/l)	**0.034**	**0.10**	**0.19**	**0.093**	**0.037**	**0.017**	**0.051**	**0.043**
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide, Total (mg/l)	**0.012**	**0.0057**	**0.023**	**0.084**	**0.031**	**0.02**	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Gross Alpha (pCi/l)	**0.95**	**0.88**	<2.5	<2.3	**3.0**	<2.9	**1.9**	**2.9**
Gross Beta (pCi/l)	<1.1	**18**	**4.7**	**14**	**13**	**28**	<2.4	**4.5**

July 2012 Sample ID	MW-1 #2	MW-1A #2	MW-2 #2	MW-2A #2	MW-3 #2	MW-3A #2	MW-5 #2	MW-5A #2
Arsenic (mg/l)	<0.0010	<0.0010	<0.0010	**0.023**	<0.0010	**0.046**	<0.0010	<0.0010
Barium (mg/l)	**0.0440**	**0.1**	**0.19**	**0.093**	**0.038**	**0.18**	**0.050**	**0.041**
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide, Total (mg/l)	**0.0086**	**0.0056**	**0.023**	**0.076**	**0.031**	0.021	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Gross Alpha (pCi/l)	<0.74	<0.88	<2.5	<2.3	<2.0	**3.3**	**2.3**	**1.9**
Gross Beta (pCi/l)	**4.3**	**20**	**5.9**	**27**	**4.5**	**27**	<2.2	**3.6**

Table 5. Summary of Groundwater Analytical Data
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

July 2012 Sample ID	MW -1 #3	MW -1A #3	MW -2 #3	MW -2A #3	MW -3 #3	MW -3A #3	MW -5 #3	MW -5A #3
Arsenic (mg/l)	<0.0010	<0.0010	<0.0010	**0.025**	<0.0010	**0.046**	<0.0010	<0.0010
Barium (mg/l)	**0.034**	**0.11**	**0.20**	**0.092**	**0.039**	**0.17**	**0.049**	**0.041**
Cadmium (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nickel (mg/l)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Zinc (mg/l)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cyanide, Total (mg/l)	<0.0050	**0.0061**	**0.022**	**0.063**	**0.036**	**0.021**	<0.0050	<0.0050
Sulfide, Total (mg/l)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Gross Alpha (pCi/l)	<0.78	<1.2	**24**	**3.9**	**3.1**	<2.5	**1.2**	**3.0**
Gross Beta (pCi/l)	**2.1**	**19**	**26**	**15**	**5.0**	**26**	**3.0**	**5.3**

ug/l - micrograms per liter
mg/l = milligrams per liter
pCi/l = picoCuries per liter

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Table 6. Average Groundwater Constituent Concentrations, January 2012 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	nd	**0.022**	nd	**0.051**	nd	nd	**0.01**
Barium (mg/l)	0.026	0.079	0.148	0.083	0.038	0.200	0.054	0.042	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	nd	nd	nd	0.006	0.006	0.008	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.10**
Zinc (mg/l)	nd	0.045	nd	nd	nd	nd	0.049	0.049	**1.1**
Cyanide, Total (mg/l)	0.009	0.006	0.018	0.107	0.038	0.011	nd	nd	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	2.70	1.60	2.27	1.70	#DIV/0!	2.67	#DIV/0!	2.10	**15.0**
Gross Beta (pCi/l)	7.17	24.75	8.25	16.50	3.95	28.25	1.90	17.27	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations bold and highlighted exceed the GWPS

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Table 7. Average Groundwater Constituent Concentrations, July 2012 Event
U.S. Pipe and Foundry Company
Bessemer Pipe Plant

Well Number	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Arsenic (mg/l)	nd	nd	0.007	**0.023**	0.004	**0.044**	nd	nd	**0.01**
Barium (mg/l)	0.036	0.098	0.190	0.115	0.051	0.132	0.050	0.042	**2.0**
Cadmium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.005**
Chromium (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.1**
Lead (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.015**
Nickel (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**0.10**
Zinc (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**1.1**
Cyanide, Total (mg/l)	0.009	0.006	0.022	0.093	0.033	0.019	#DIV/0!	nd	**0.2**
Sulfide, Total (mg/l)	nd	nd	nd	nd	nd	nd	nd	nd	**MDL**
Gross Alpha (pCi/l)	0.95	0.88	10.50	3.90	3.05	3.90	2.35	2.38	**15.0**
Gross Beta (pCi/l)	3.20	19.75	15.65	18.50	8.13	27.75	3.95	5.00	**50.0**

nd =not detected
mg/l = milligrams per liter
pCi/l = picoCuries per liter
GWPS =Groundwater Protection Standard
MDL = Method Detection Limit
Concentrations bold and highlighted exceed the GWPS

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Table 2: Groundwater Analytical Results - January 24, 2013

OSP, LLC
OSP, LLC Hazardous Waste Landfill
Bessemer, Jefferson County, Alabama

Sample ID				MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Collect Date				1/24/2013	1/24/2013	1/24/2013	1/24/2013	1/24/2013	1/24/2013	1/24/2013	1/24/2013
Method	Parameter	Units	GWPS	Value	Value	Value	Value	Value	Value	Value	Value
6010B	Total Arsenic	mg/l	0.01	<0.0065	<0.0065	<0.0065	**0.027**	<0.0065	**0.042**	<0.0065	<0.0065
6010B	Total Barium	mg/l	2.00	**0.032**	**0.032**	**0.21**	**0.10**	**0.044**	**0.19**	**0.066**	**0.043**
6010B	Total Cadmium	mg/l	0.005	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070
6010B	Total Chromium	mg/l	0.1	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014
6010B	Total Lead	mg/l	0.015	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019
6010B	Total Nickel	mg/l	0.1	**0.0072 J**	**0.0075 J**	<0.0049	<0.0049	**0.0090 J**	**0.0050 J**	**0.0089 J**	**0.0071 J**
6010B	Total Zinc	mg/l	1.10	**0.0099 J**	**0.014 J**	**0.0066 J**	**0.0084 J**	**0.0065 J**	**0.0076 J**	**0.016 J**	**0.011 J**
9012B	Cyanide	mg/l	0.2	**0.0058**	**0.0052**	**0.016**	**0.22**	**0.029**	**0.015**	<0.0020	<0.0020
4500S2	Sulfide	mg/l	MDL	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019
900.0	Gross Alpha	pCi/l	15	<0.82	<0.97	<0.96	<0.90	<0.90	<0.93	<1.1	<0.91
900.0	Gross Beta	pCi/l	50	**2.1**	**11**	**7.6**	**23**	**2.4**	**27**	**2.9**	**3.2**

Yellow/Bold - indicates detected concentration exceeds Groundwater Protection Standard (GWPS)
Shaded/Bold - indicates detected concentration
mg/l - milligrams per liter
pCi/l = picoCurie per liter
GWPS - Groundwater Protection Standard
J - indicates concentration above Minimum Detection Limit (MDL) but below Reported Detection Limit (RDL)

Table 3: Groundwater Analytical Results - July 16, 2013

OSP, LLC
OSP, LLC Hazardous Waste Landfill
Bessemer, Jefferson County, Alabama

Sample ID				MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A
Collect Date				7/16/2013	7/16/2013	7/16/2013	7/16/2013	7/16/2013	7/16/2013	7/16/2013	7/16/2013
Method	Parameter	Units	GWPS	Value	Value	Value	Value	Value	Value	Value	Value
6020	Total Arsenic	mg/l	0.01	**0.0016**	**0.00078 J**	**0.0089**	**0.035**	**0.0040**	**0.036**	**0.00035 J**	**0.00029 J**
6010B	Total Barium	mg/l	2.0	**0.036**	**0.010**	**0.16**	**0.084**	**0.045**	**0.16**	**0.067**	**0.040**
6010B	Total Beryllium	mg/l	0.004	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070
6010B	Total Cadmium	mg/l	0.005	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070
6010B	Total Chromium	mg/l	0.1	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014
6010B	Total Copper	mg/l	1.30	<0.0053	<0.0053	<0.0053	<0.0053	<0.0053	<0.0053	<0.0053	<0.0053
6010B	Total Lead	mg/l	0.015	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019
6010B	Total Nickel	mg/l	0.1	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049
6010B	Total Zinc	mg/l	1.10	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059
9012B	Cyanide	mg/l	0.2	**0.010**	**0.0080**	**0.016**	**0.39**	**0.030**	**0.015**	<0.0020	<0.0020
4500S2	Sulfide	mg/l	MDL	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019
900.0	Gross Alpha	pCi/l	15	**2.2**	<1.7	**2.6**	**2.9**	**2.6**	**2.5**	**6.8**	<1.9
900.0	Gross Beta	pCi/l	50	**4.9**	**8.6**	**13**	**37**	**5.1**	**33**	**6.3**	**4.7**
8270C-SIM	Acenapthene	mg/l	0.037	<0.0000082	<0.0000082	**0.00034**	**0.0016**	<0.0000082	**0.00053**	<0.0000082	<0.0000082
8270C-SIM	Anthracene	mg/l	0.180	<0.0000076	<0.0000076	<0.0000076	**0.000053**	<0.0000076	**0.00012**	<0.0000076	<0.0000076
8270C-SIM	Benzo(a)anthracene	mg/l	0.000092	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012
8270C-SIM	Benzo(b)fluoranthene	mg/l	0.000092	<0.000014	<0.000014	<0.000014	<0.000014	<0.000014	<0.000014	<0.000014	<0.000014
8270C-SIM	Benzo(a)pyrene	mg/l	0.0002	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012	<0.000012
8270C	Bis(2-ethylhexyl)phthalate	mg/l	0.006	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071	<0.00071
8270C	Butyl benzyl phthalate	mg/l	0.730	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028	<0.00028
8270C	p-Chloroaniline	mg/l	0.015	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038
8270C	p-Chloro-m-cresol	mg/l	0.0141	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026
8270C-SIM	Chrysene	mg/l	0.0092	<0.000011	<0.000011	<0.000011	<0.000011	<0.000011	<0.000011	<0.000011	<0.000011
8270C	Di-n-butyl phthalate	mg/l	0.36	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027	<0.00027
8270C-SIM	Fluoranthene	mg/l	0.15	<0.000016	<0.000016	<0.000016	**0.00034**	<0.000016	**0.000075**	<0.000016	<0.000016
8270C-SIM	Naphthalene	mg/l	0.00062	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
8270C-SIM	Phenanthrene	mg/l	0.0469	<0.0000082	<0.0000082	<0.0000082	**0.00030**	<0.0000082	**0.00012**	<0.0000082	<0.0000082
8270C	Phenol	mg/l	1.10	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033
8270C-SIM	Pyrene	mg/l	0.018	<0.000012	<0.000012	**0.00011**	**0.00030**	**0.00014**	**0.00047**	<0.000012	<0.000012

Yellow/Bold - indicates detected concentration exceeds Groundwater Protection Standard (GWPS)
Shaded/Bold - indicates detected concentration
mg/l - milligrams per liter
pCi/l = picocuries per liter
GWPS - Groundwater Protection Standard
J - indicates concentration above Minimum Detection Limit (MDL) but below Reported Detection Limit (RDL)

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Table 4. Summary of Groundwater Analytical Data

OSP, LLC - Bessemer, Alabama

Bessemer Pipe Plant

January 2014 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Arsenic (mg/L)	<0.0065	<0.0065	0.0071	**0.013**	<0.0065	**0.039**	<0.0065	<0.0065	0.010
Barium (mg/L)	**0.030**	**0.079**	**0.22**	**0.093**	**0.047**	**0.20**	**0.050**	**0.044**	2.0
Cadmium (mg/L)	<0.00070	<0.00070	<0.0081	<0.00070	<0.00070	<0.00090	<0.00090	<0.00090	0.005
Chromium (mg/L)	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	0.10
Lead (mg/L)	<0.0019	<0.00440	<0.0028	<0.0019	<0.0019	<0.0019	<0.0030	<0.0027	0.015
Nickel (mg/L)	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	0.10
Zinc (mg/L)	<0.0059	<0.011	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	1.10
Cyanide, Total (mg/L)	<0.0018	<0.0018	<0.0050	**0.067**	**0.016**	<0.0018	<0.0018	<0.0018	0.20
Sulfide, Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.0065	<0.0065	<0.0065	<0.0065	MDL
Gross Alpha (pCi/L)	**2.4**	**2.2**	**2.1**	<1.3	<1.7	**1.7**	<1.3	<1.2	15
Gross Beta (pCi/L)	**3.7**	**23**	**6.7**	**21**	**5.2**	**27**	**2.7**	**4.0**	50

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Table 4. Summary of Groundwater Analytical Data

OSP, LLC - Bessemer, Alabama

Bessemer Pipe Plant

July 2014 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Acenaphthene (mg/L)	<0.000050	<0.000050	**0.00017**	**0.0019**	<0.000050	**0.00044**	<0.000050	<0.000050	0.037
Anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.18
Benzo(a)anthracene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000092
Benzo(b)fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000092
Benzo(a)pyrene (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0002
Bis(2-ethylhexyl)phthalate	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.006
Benzylbutyl phthalate (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.73
4-Chloroaniline (mg/L)	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	<0.00038	0.015
p-Chloro-m-cresol (mg/L)	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	<0.00026	0.0141
Chrysene (mg/L))	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.0092
Di-n-butyl phthalate (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.36
Fluoranthene (mg/L)	<0.000050	<0.000050	<0.000050	**0.00015**	<0.000050	<0.000050	<0.000050	<0.000050	0.15
Naphthalene (mg/L)	**0.00026**	**0.00026**	**0.00080**	**0.0019**	<0.00025	<0.00025	**0.00035**	<0.00025	0.00062
Phenanthrene (mg/L)	<0.000050	<0.000050	<0.000050	**0.00029**	<0.000050	**0.0001**	**0.000057**	<0.000050	0.0469
Phenol (mg/L)	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	<0.00033	1.1
Pyrene (mg/L)	<0.000050	<0.000050	<0.000050	**0.00011**	**0.00011**	**0.00032**	<0.000050	<0.000050	0.018
Arsenic (mg/L)	**0.002**	0.0013	**0.010**	**0.028**	**0.0052**	**0.034**	<0.0010	<0.0010	0.010
Barium (mg/L)	**0.032**	**0.10**	**0.18**	**0.085**	**0.048**	**0.19**	**0.075**	**0.044**	2.0
Beryllium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.004
Cadmium (mg/L)	**0.00054**	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	**0.0056**	0.005
Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.10
Copper (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	1.30
Lead (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.015
Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.10
Zinc (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	1.10
Cyanide, Total (mg/L)	**0.0064**	<0.0050	**0.015**	**0.18**	**0.024**	**0.012**	<0.0050	<0.0050	0.20
Sulfide, Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	MDL
Gross Alpha (pCi/L)	<5.0	**5.4**	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	15
Gross Beta (pCi/L)	<5.0	**25**	**11**	**29**	<5.0	**32**	<5.0	**7.4**	50

Concentrations highlighted in the modified Appendix IX list exceed the GWPS

Revised 5/10/2019

Table 4. Summary of Groundwater Analytical Data

OSP, LLC - Bessemer, Alabama

Bessemer Pipe Plant

January 2015 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Arsenic (mg/L)	<0.0065	<0.0065	<0.0065	**0.014 J**	<0.0065	**0.034**	<0.0065	<0.0065	0.010
Barium (mg/L)	**0.044**	**0.065**	**0.26**	**0.10**	**0.051**	**0.19**	**0.054**	**0.045**	2.0
Cadmium (mg/L)	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	<0.00070	0.005
Chromium (mg/L)	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	<0.0014	0.10
Lead (mg/L)	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.015
Nickel (mg/L)	**0.010 J**	**0.010 J**	**0.0095 J**	**0.014 J**	**0.011 J**	**0.012 J**	**0.012 J**	**0.013 J**	0.10
Zinc (mg/L)	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	<0.0059	1.10
Cyanide, Total (mg/L)	**0.0053**	0.0022 J	<0.0018	**0.064**	**0.018**	0.0028 J	<0.0018	<0.0018	0.20
Sulfide, Total (mg/L)	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	<0.0065	MDL
Gross Alpha (pCi/L)	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	15
Gross Beta (pCi/L)	**4.43**	**28.4**	**9.34**	**29.2**	**6.51**	**36.6**	**5.35**	**5.03**	50

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Table 4. Summary of Groundwater Analytical Data
OSP, LLC - Bessemer, Alabama
Bessemer Pipe Plant

July 2015 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Acenaphthene (mg/L)	**0.000130**	<0.0000500	**0.000109**	**0.00381**	<0.0000500	**0.000408**	<0.0000500	<0.0000500	0.037
Anthracene (mg/L)	<0.0000500	<0.0000500	<0.0000500	**0.0000598**	<0.0000500	**0.0000673**	<0.0000500	<0.0000500	0.18
Benzo(a)anthracene (mg/L)	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.000092
Benzo(b)fluoranthene (mg/L)	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.000092
Benzo(a)pyrene (mg/L)	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.0002
Bis(2-ethylhexyl)phthalate	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	0.006
Benzylbutyl phthalate (mg/L)	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	0.73
4-Chloroaniline (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.015
p-Chloro-m-cresol (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0141
Chrysene (mg/L))	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.0092
Di-n-butyl phthalate (mg/L)	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300	0.36
Fluoranthene (mg/L)	<0.0000500	<0.0000500	<0.0000500	**0.000169**	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.15
Naphthalene (mg/L)	**0.00191**	**0.000359**	**0.000307**	**0.00274**	<0.000250	<0.000250	<0.000250	<0.000250	0.00062
Phenanthrene (mg/L)	**0.0000945**	<0.0000500	<0.0000500	**0.000426**	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.0469
Phenol (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	1.1
Pyrene (mg/L)	<0.0000500	<0.0000500	0.0000974	**0.000163**	**0.0000898**	**0.000346**	<0.0000500	<0.0000500	0.018
Arsenic (mg/L)	<0.00200	<0.00200	**0.0107**	**0.0345**	**0.00363**	**0.0367**	<0.00200	<0.00200	0.010
Barium (mg/L)	**0.0420**	**0.0682**	**0.213**	**0.035**	**0.0517**	**0.196**	**0.0594**	**0.0507**	2.0
Beryllium (mg/L)	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	0.004
Cadmium (mg/L)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	0.005
Chromium (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.10
Copper (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	1.30
Lead (mg/L)	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.015
Nickel (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.10
Zinc (mg/L)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	1.10
Cyanide, Total (mg/L)	<0.00500	**0.00600**	**0.0175**	**0.181**	**0.0115**	**0.00880**	<0.00500	<0.00500	0.20
Sulfide, Total (mg/L)	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	MDL
Gross Alpha (pCi/L)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	15
Gross Beta (pCi/L)	<5.0	**27.4**	**8.77**	**33.3**	**5.03**	**32.7**	**7.15**	<5.0	50

Concentrations highlighted in the modified Appendix IX list exceed the GWPS

J = Estimated values

Revised 5/10/2019

Table 4. Summary of Groundwater Analytical Data
OSP, LLC - Bessemer, Alabama
Bessemer Pipe Plant

January 2016 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Arsenic (mg/L)	<0.01	<0.01	**0.0125**	**0.0273**	<0.01	**0.0398**	<0.01	<0.01	0.010
Barium (mg/L)	**0.0406**	**0.0579**	**0.23**	**0.0913**	**0.0521**	**0.193**	**0.0727**	**0.0466**	2.0
Cadmium (mg/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005
Chromium (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Lead (mg/L)	<0.005	0.00195 J	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.015
Nickel (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Zinc (mg/L)	<0.05	<0.05	<0.05	<0.05	0.00768 J	<0.05	<0.05	<0.05	1.10
Cyanide, Total (mg/L)	**0.02**	**0.008**	**0.028**	**0.166**	**0.037**	**0.025**	<0.005	<0.005	0.20
Sulfide, Total (mg/L)	0.018 J	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	MDL
Gross Alpha (pCi/L)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	15
Gross Beta (pCi/L)	**7.14**	**23.5**	**14.0**	**24.4**	**6.80**	**29.5**	**3.44**	**2.73**	50

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Table 4. Summary of Groundwater Analytical Data
OSP, LLC - Bessemer, Alabama
Bessemer Pipe Plant

July 2016 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Acenaphthene (mg/L)	<0.00005	<0.00005	**0.000406**	**0.00329**	<0.00005	**0.000475**	<0.00005	<0.00005	0.037
Anthracene (mg/L)	<0.00005	<0.00005	<0.00005	**0.0000961**	<0.00005	**0.0000628**	<0.00005	<0.00005	0.18
Benzo(a)anthracene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000092
Benzo(b)fluoranthene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000092
Benzo(a)pyrene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0002
Bis(2-ethylhexyl)phthalate	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006
Benzylbutyl phthalate (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.73
4-Chloroaniline (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015
p-Chloro-m-cresol (mg/L)	<0.01	<0.01	<0.01	<0.01	**0.0148**	<0.01	<0.01	<0.01	0.0141
Chrysene (mg/L))	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0092
Di-n-butyl phthalate (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.36
Fluoranthene (mg/L)	<0.00005	**0.0000798**	<0.00005	**0.000289**	**0.0000558**	<0.00005	**0.0000731**	<0.00005	0.15
Naphthalene (mg/L)	<0.00025	<0.00025	<0.00025	**0.00176**	<0.00025	<0.00025	<0.00025	<0.00025	0.00062
Phenanthrene (mg/L)	<0.00005	<0.00005	<0.00005	**0.000662**	<0.00005	<0.00005	**0.0000527**	<0.00005	0.0469
Phenol (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.1
Pyrene (mg/L)	<0.00005	**0.0000601**	**0.000189**	**0.000256**	**0.00017**	**0.000328**	**0.0000533**	<0.00005	0.018
Arsenic (mg/L)	<0.002	<0.002	**0.00717**	**0.0243**	**0.00309**	**0.0383**	<0.002	<0.002	0.010
Barium (mg/L)	**0.0406**	**0.0813**	**0.259**	**0.0914**	**0.0603**	**0.196**	**0.0488**	**0.0431**	2.0
Beryllium (mg/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004
Cadmium (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005
Chromium (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Copper (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.30
Lead (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.015
Nickel (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Zinc (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.10
Cyanide, Total (mg/L)	**0.02**	**0.007**	**0.028**	**0.304**	**0.039**	**0.03**	<0.005	<0.005	0.20
Sulfide, Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	MDL
Gross Alpha (pCi/L)	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	15
Gross Beta (pCi/L)	<5.00	**29.8**	**9.47**	**28.3**	**7.18**	**32.5**	**3.88**	**5.35**	50

Concentrations highlighted exceed the GWPS

J = Estimated values

Revised 5/10/2019

Table 4. Summary of Groundwater Analytical Data
OSP, LLC - Bessemer, Alabama
Bessemer Pipe Plant

January 2017 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Arsenic (mg/L)	<0.01	<0.01	<0.01	**0.0184**	<0.01	**0.0403**	<0.01	<0.01	0.010
Barium (mg/L)	**0.0355**	**0.0542**	**0.233**	**0.0954**	**0.0589**	**0.194**	**0.0564**	**0.0420**	2.0
Cadmium (mg/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005
Chromium (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Lead (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.015
Nickel (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Zinc (mg/L)	<0.05	<0.05	<0.05	<0.05	0.00768 J	<0.05	<0.05	<0.05	1.10
Cyanide, Total (mg/L)	**0.00678**	<0.005	**0.0147**	**0.118**	**0.0213**	**0.0186**	<0.005	**0.00515**	0.20
Sulfide, Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	MDL
Gross Alpha (pCi/L)	<1.90	<2.29	<1.76	<1.46	<1.56	<2.15	**1.47**	**1.55**	15
Gross Beta (pCi/L)	**2.18**	**22.6**	**10.2**	**23.3**	**7.35**	**28.4**	**2.38**	**3.31**	50

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Table 4. Summary of Groundwater Analytical Data
OSP, LLC - Bessemer, Alabama
Bessemer Pipe Plant

July 2017 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GWPS
Acenaphthene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.037
Anthracene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.18
Benzo(a)anthracene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000092
Benzo(b)fluoranthene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000092
Benzo(a)pyrene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0002
Bis(2-ethylhexyl)phthalate	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.006
Benzylbutyl phthalate (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.73
4-Chloroaniline (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.015
p-Chloro-m-cresol (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0141
Chrysene (mg/L))	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0092
Di-n-butyl phthalate (mg/L)	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.36
Fluoranthene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.15
Naphthalene (mg/L)	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	<0.00025	0.00062
Phenanthrene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0469
Phenol (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.1
Pyrene (mg/L)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.018
Arsenic (mg/L)	<0.002	**0.00238**	**0.00564**	**0.0217**	**0.00426**	**0.0375**	<0.002	<0.002	0.010
Barium (mg/L)	**0.0403**	**0.111**	**0.205**	**0.114**	**0.0556**	**0.205**	**0.0659**	**0.0459**	2.0
Beryllium (mg/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004
Cadmium (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005
Chromium (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Copper (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.30
Lead (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.015
Nickel (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10
Zinc (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.10
Cyanide, Total (mg/L)	**0.00531**	<0.005	**0.0148**	**0.227**	**0.0233**	**0.0181**	<0.005	<0.005	0.20
Sulfide, Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	MDL
Gross Alpha (pCi/L)	**2.50**	**2.91**	**2.60**	**3.27**	<1.94	**2.84**	<1.95	**3.19**	15
Gross Beta (pCi/L)	**2.47**	**24.1**	**11.6**	**24.4**	**5.06**	**24.9**	**6.71**	**4.38**	50

Concentrations highlighted exceed the GWPS

J = Estimated values

Revised 5/10/2019

Table 4. Summary of Groundwater Analytical Data
OSP, LLC - Bessemer, Alabama
Bessemer Pipe Plant

January 2018 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Arsenic (mg/L)	<0.00200	**0.00431**	**0.00579**	**0.0269**	**0.00307**	**0.0360**	<0.00200	<0.00200	0.010
Barium (mg/L)	**0.0304**	**0.0741**	**0.138**	**0.0989**	**0.0482**	**0.166**	**0.0587**	**0.0395**	2.0
Cadmium (mg/L)	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	0.005
Chromium (mg/L)	<0.00200	**0.0160**	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	0.10
Lead (mg/L)	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	0.015
Nickel (mg/L)	<0.00200	**0.195**	<0.00200	<0.00200	**0.00269**	<0.00200	<0.00200	<0.00200	0.10
Zinc (mg/L)	<0.0250	<0.0250	<0.0250	<0.0250	<0.0250	<0.0250	<0.0250	<0.0250	1.10
Cyanide, Total (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sulfide, Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	MDL
Gross Alpha (pCi/L)	**2.19**	**-0.339**	**2.36**	**0.609**	**0.851**	**1.13**	**1.13**	**1.22**	15
Gross Beta (pCi/L)	**3.36**	**2.44**	**9.1**	**22.2**	**3.61**	**28.3**	**0.286**	**5.64**	50

Concentrations highlighted exceed the GWPS

Revised 5/10/2019

Table 4. Summary of Groundwater Analytical Data

OSP, LLC - Bessemer, Alabama

Bessemer Pipe Plant

July 2018 Sample ID	MW-1	MW-1A	MW-2	MW-2A	MW-3	MW-3A	MW-5	MW-5A	GW PS
Arsenic (mg/L)	<0.0100	<0.0100	.00722 j	**0.0154**	0.00661 j	**0.0399**	<0.0100	<0.0100	0.010
Barium (mg/L)	**0.0396**	**0.0939**	**0.191**	**0.126**	**0.0639**	**0.215**	**0.0675**	**0.0459**	2.0
Beryllium (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.004
Cadmium (mg/L)	.000903 j	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	0.005
Chromium (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	0.00226 j	<0.0100	<0.0100	<0.0100	0.10
Copper (mg/L)	.000903 j	.00184 j	.000781 j	<0.00500	0.00476 j	0.000595 j	0.000817 j	<0.00500	1.30
Mercury (mg/l)	<0.000200	.0000535 j	<0.000200	<0.000200	0.000160 j	<0.000200	<0.000200	<0.000200	
Lead (mg/L)	<0.00500	.00224 j	<0.00500	<0.00500	0.00211 j	<0.00500	<0.00500	<0.00500	0.015
Nickel (mg/L)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.10
Selenium (mg/L)	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	0.000429 j	0.000580 j	
Zinc (mg/L)	0.00378 j	.00482 j	.00520 j	<0.0250	0.00774 j	<0.0250	<0.0250	<0.0250	1.10
Cyanide, Total (mg/L)	0.00412 j	.00222 j	**0.0178**	**0.171**	**0.00844**	**0.0160**	**0.0109**	<0.00500	0.20
Sulfide, Total (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	MDL
Gross Alpha (pCi/L)	**-0.473**	**3.24**	**4.36**	**0.279**	**1.49**	**1.29**	**0.611**	**1.44**	15
Gross Beta (pCi/L)	**-1.66**	**23.1**	**13.8**	**22.2**	**5.76**	**30.3**	**3.31**	**2.00**	50

Concentrations highlighted exceed the GWPS

J = Estimated values

Revised 5/10/2019

APPENDIX L
TABLE III.2 OF THE CURRENT PART B
POST CLOSURE CARE PERMIT

TABLE III.2

GROUNDWATER QUALITY MONITORING CONSTITUENTS

[illegible]
Arsenic
Barium
Cadmium
Chromium
Cyanide
Lead
Nickel
Sulfide
Zinc
Gross Alpha
Gross Beta

Monitoring is required on a semi-annual basis for the constituents listed herein which is a subset of the Groundwater Protection Standard listed in Table III.3 for which monitoring is required on an annual basis.

APPENDIX M
TABLE III.3 OF THE CURRENT PART B
POST CLOSURE CARE PERMIT

TABLE III.3

GROUNDWATER PROTECTION STANDARD

HAZARDOUS CONSTITUENT	CONCENTRATION LIMIT (mg/L)
Acenapthene	3.70E-2
Anthracene	1.80E-1
Arsenic	1.00E-2
Barium	2.00
Benzo(a)anthracene; Benzathracene	9.20E-5
Benzo(b)fluoranthene	9.20E-5
Benzo(a)pyrene	2.00E-4
Beryllium	4.00E-3
Bis(2-ethylhexyl)phthalate	6.00E-3
Butyl benzyl phthalate; Benzyl butyl phthalate	7.30E-1
Cadmium	5.00E-3
p-Chloroaniline	1.50E-2
p-Chloro-m-cresol	1.41E-2
Chromium	1.00E-1
Chrysene	9.20E-3
Copper	1.30
Cyanide	2.00E-1
Di-n-butyl phthalate	3.60E-1
Fluoranthene	1.50E-1
Lead	1.50E-2
Naphthalene	6.20E-4
Nickel	1.00E-1
Phenanthrene	4.69E-2
Phenol	1.10
Pyrene	1.80E-2
Sulfide	MDL
Zinc	1.10
Gross Alpha	15 pCi/L
Gross Beta	50 pCi/L

Monitoring is required on an annual basis for the constituents listed herein.