# CAP Modification & UIC Permit Application - CP No. 51
# Cherokee Police Department
# 955 Daniel Street
# Cherokee, Colbert County, AL
# Facility ID. No. 13945-033-002051
# S&ME Project No. 20100019

PREPARED FOR:

**Cherokee Police Department**
**73 Main Street**
**Cherokee, Alabama 35616**

PREPARED BY:

**S&ME, Inc.**
**360D Quality Circle NW #450**
**Huntsville, Alabama 35806**

**September 22, 2025**

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## Appendices

# 1.0 Introduction

S&ME, Inc. (S&ME) has prepared this Corrective Action Plan Modification and engineering plan for the UIC permit application on behalf of the Cherokee Police Department. These field activities were performed according to Cost Proposal No. 51 as approved by the Alabama Department of Environmental Management (ADEM) in correspondence dated June 13, 2025. A site description including maps, injection description, hydrogeological data, and groundwater monitoring procedures is presented herein.

# 2.0 Site Description

The subject site is located at 955 Daniel Street, Cherokee, Colbert County, Alabama. Specifically, the site is located on the USGS Cherokee Alabama Quadrangle, 7.5-minute topographic map at 34° 45' 19.4" north latitude, 87° 58' 26.6" west longitude. A topographic map identifying the general location of the site and a Site Diagram may be found in **Appendix I** as **Figure 1** and **Figure 2**, respectively.

**Figure 1** Site Location Plan depicts the site and surrounding area within a 1-mile radius. Surface waters and roads are shown. **Figure 2** Well Location Plan depicts the location of the proposed injection wells, the private water supply wells in the area, as well as roads, structures and residences. There are no known public supply wells within a 1-mile radius of the site. The City of Cherokee's water is supplied from the Tennessee River. There is a private well (labeled Westfall-1) located at the residence to the southwest of the intersection of College St and Daniel St. The well has reportedly not been in service for over 20 years, and the residence has been abandoned. The well is located approximately 175 feet southwest of the nearest proposed injection well (IW-6). The location of the well and residence is shown on **Figure 2** in **Appendix I**.

# 3.0 Well Construction

The system was designed to surround an isolated area of benzene and naphthalene contamination above the Site-Specific Target Levels (SSTLs). The wells to be injected include six injection wells (IW-1 through IW-6) and one monitoring well (MW-2). The wells are Type II wells, constructed with schedule 40 PVC with 0.01-inch slotted screens. IW-1 through IW-6 are located in a circle around MW-2 as shown on **Figure 2** in **Appendix I**.

Monitoring well MW-2 is a two-inch diameter well consisting of 10 feet of screen and six and a half feet of riser to make a 16.5 foot deep well below ground surface (bgs). This well was installed on January 25, 2000. The boring log and the well construction diagram are in **Appendix II**.

IW-1 through IW-6 are four-inch diameter wells consisting of 10 feet of screen and various lengths of riser. Well depths range from 13.5 feet to 15 feet bgs. These wells were installed May 20, 2011. Boring logs and well construction diagrams are not available for these wells. S&ME will measure the depth of the wells and use a down hole camera to verify the screened interval prior to injection.

# 4.0 Injection Description

S&ME is proposing to inject Oxygen Release Compound Advanced® (ORC Advanced®) Pellets. The pellets are a proprietary technology of REGENESIS composed of a patented formulation of calcium oxyhydroxide intercalated with phosphate ions. The pellets are designed to release oxygen over time into the groundwater to promote biodegradation of petroleum contaminates. The ORC Advanced® Safety Data Sheet is included in **Appendix III**.

The ORC Advanced® Pellets are available in 2-inch and 4-inch diameter 1-foot-long filter socks. The filter socks are loaded into canisters and lowered into the injection wells. The canisters are 5 feet long, hold up to 5 filter socks and can be linked together to fill the screen interval of the injection well. The socks will typically last 8-12 months and can be replaced if additional treatment is needed. Product information for the filter socks and canisters is included in **Appendix III**.

# 5.0 Hydrogeological Data

## 5.1 Site Hydrogeology

The Geologic Survey of Alabama Special Map 220 indicates that the site is located near the contact between the Pride Mountain Formation and the Tuscumbia Limestone. Both are carbonate formations of Mississippian Age. The upper soil interval at the site consists of sandy clays (CL) and clayey sands (SC) 12-17 feet thick underlain by a thin interval of weathered sandstone and/or weathered limestone/shale. Stiff clays are present beneath the weathered rock layer to a depth of approximately 53 feet below ground surface (bgs) and competent limestone bedrock is present at depths greater than 53 feet bgs, as documented in boring B-5 at the site terminated at 70 feet bgs.

Three hydrogeologic units have been encountered at the site. The uppermost is a water bearing unit with the soil residuum to approximately 17 feet bgs. The second unit appears to be a low-flow boundary consisting of weathered shale and stiff silty clays from approximately 18 to 53 feet bgs. The third hydrogeologic unit is a water bearing unit within the limestone bedrock as encountered at a depth of approximately 60 feet bgs. The boring log for B-5 is included in **Appendix II**.

Measured hydraulic conductivities ranged from $3.0 \times 10^{-6}$ cm/sec in the upper most unit to $1.53 \times 10^{-6}$ in the deepest unit. Groundwater flow direction at the site is to the south and southwest.

### 5.2 Geologist Acknowledgement

I acknowledge under penalty of law that the proceeding hydrogeological data prepared for a UIC permit (CP No. 51) application was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiring of the person or persons who directly gathered the enclosed 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.


Mary C Lawrence

Signature

Mary Catherine Lawrence, P.G.
Alabama Geologist Registration Number 1183

*September 22, 2025*

Date

## 6.0 Baseline Groundwater Monitoring

Prior to the installation of the socks, S&ME will conduct a baseline groundwater monitoring event according to the plan detailed below.

### 6.1 Groundwater Sampling and Analysis

Prior to the groundwater monitoring event, S&ME personnel will measure and record the groundwater surface elevation in each monitoring well using a water level indicator. S&ME will make observations of the presence of free product using an oil/water interface probe. The instruments will be properly decontaminated according to the protocol described herein to avoid cross contamination between wells. Groundwater elevation maps for the event will be generated and included in the report.

Prior to sampling, the groundwater monitoring wells will be purged of three well volumes using dedicated disposable bailers according to EPA and ADEM protocols. After allowing the wells to recharge, samples will be collected in laboratory-provided vials with Teflon lids and sealed without any entrained air. The groundwater samples will be placed in a cooler with ice to maintain proper temperature.

The groundwater samples will be shipped under chain of custody overnight to the laboratory. Each sample will be analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX), methyl tert-butyl ether (MTBE), and naphthalene by EPA Method 8260. In addition, each groundwater sample will be field analyzed for dissolved oxygen, pH, conductivity, temperature, and Oxygen-Reduction Potential (ORP) using a calibrated portable multi-meter.

## 6.2 Decontamination Procedures

S&ME proposes to use dedicated disposable bailers and nylon twine in the groundwater sampling program to minimize decontamination procedures. Also, disposable nitrile gloves will be worn and discarded between handling of each sample (soil and groundwater). Equipment that requires decontamination between sample locations will be cleaned using the following procedure:

1. Tap water rinse
2. Detergent wash with Alconox (or equivalent detergent)
3. Distilled water rinse
4. Iso-propyl alcohol wash
5. Distilled water rinse
6. Air dry

## 6.3 Sample Handling

Upon collection of each sample, the sample container will be sealed, properly handled, and immediately placed in a cooler with ice for storage pending shipment to the laboratory. A Chain of Custody (COC) form will be completed and will accompany the samples from the field location to the laboratory. The COC will be provided in the laboratory report included in the report. The samples will be shipped to the laboratory overnight in a cooler with ice to maintain the samples at proper temperature requirements.

## 6.4 QA/QC Procedures

During groundwater sampling activities, one duplicate groundwater sample will be collected and submitted for BTEX, MTBE, and naphthalene analysis. The duplicate sample will be submitted to the laboratory with a unique ID label and will not be identified as a duplicate sample. In addition, a laboratory-provided trip blank will accompany the samples during field procedures and shipping.

## 6.5 Purge Water Handling

Groundwater and free product generated during purging, sampling, and free product recovery activities will be containerized in 55-gallon steel drums. Following completion of the sampling activities, the water generated will be collected and transported to an approved disposal facility. The amount of water generated from each well will be documented in the report, along with the disposal documentation.

## 7.0 Acknowledgement

I acknowledge under penalty of law that this Engineering Plan for a UIC permit (CP No. 51) and all plans, specifications, and technical data submitted within were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiring of the person or persons who directly gathered the enclosed 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.

Deborah J. Jones

Signature

ALABAMA LICENSED NO. 24080 PROFESSIONAL ENGINEER DEBORAH JO BROMLEY JONES

Deborah Jones, P.E.
Alabama Engineer Number 24080

*September 22, 2025*

Date

## 8.0 Project Personnel

**Table 6-1 S&ME Personnel and Project Roles**

| Name of Personnel | Title |
|---|---|
| Nathanael A. Wade, P.E. | Field Technician / Staff Professional |
| Deborah Jones, P.E. | Senior Engineer / Senior Reviewer |
| Mary Lawrence, P.G. | Senior Geologist |
| Kate McDonough | Administrative Assistant |
| Nathanael A. Wade, P.E. | Draftsman / Project Manager |

## 9.0 Limitations and Qualifications

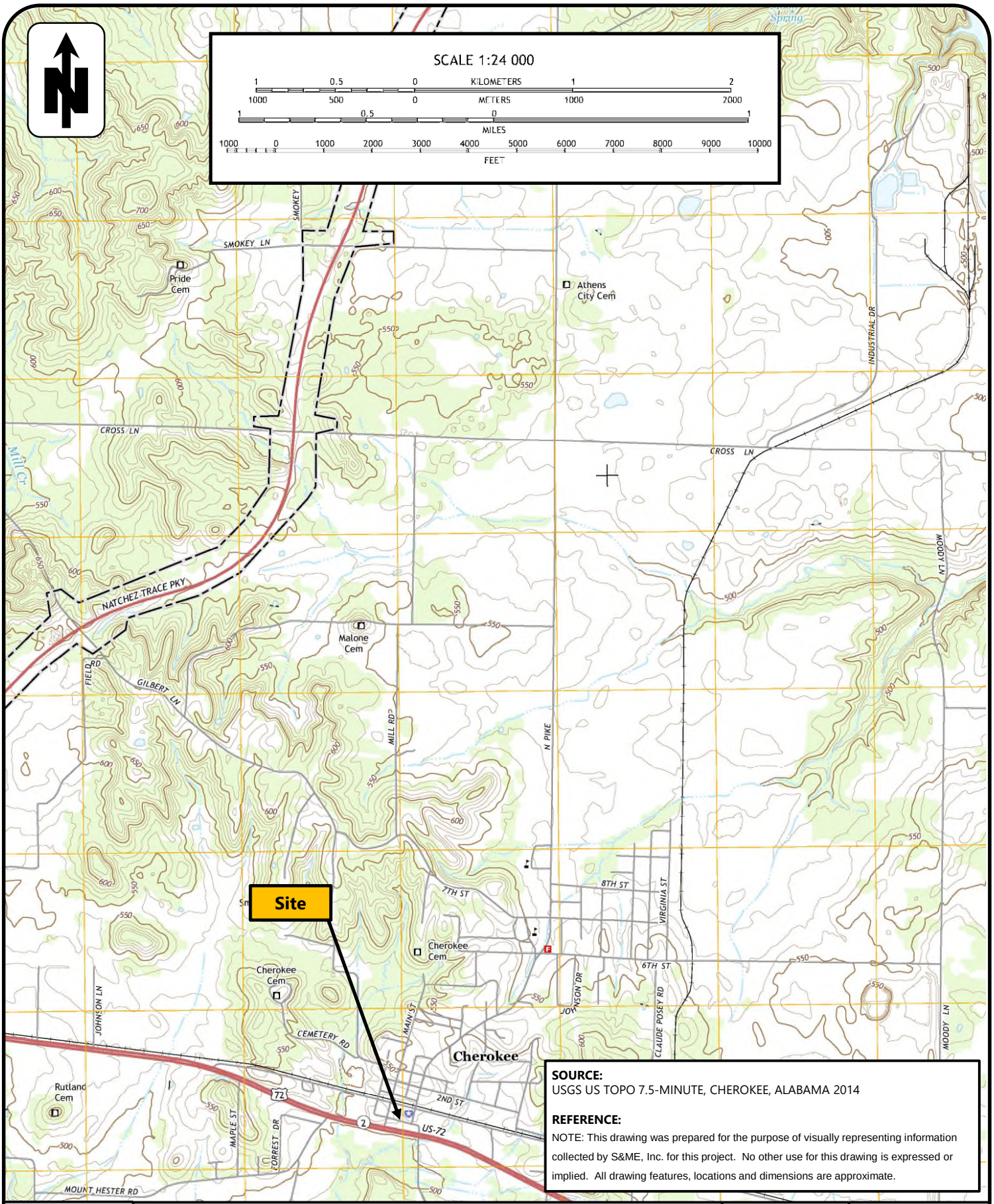
When performing this scope of services, S&ME observed the degree of care and skill generally exercised by other consultants undertaking similar studies at the same time, under similar circumstances and conditions, and in the same geographic area. Conclusions regarding the subject property are based on observations of existing conditions, available documentation, and our interpretation of the collected data.

S&ME cannot state that the site contains no hazardous or toxic materials, or other latent conditions, beyond those noted by its personnel during the performance of assessment activities. Subsequent changes in land use or other activities on or near the site could invalidate those findings. If additional or corrected information becomes available, we request the opportunity to review and modify our opinions, if warranted.

The findings and conclusions of S&ME must be considered not as scientific certainties, but as probabilities based on our professional judgment concerning the significance of the data gathered during the course of the site evaluation. S&ME does not and cannot represent beyond that observed by S&ME during this site study. No warranty is expressed or implied.

# Appendices

# Appendix I– Figures



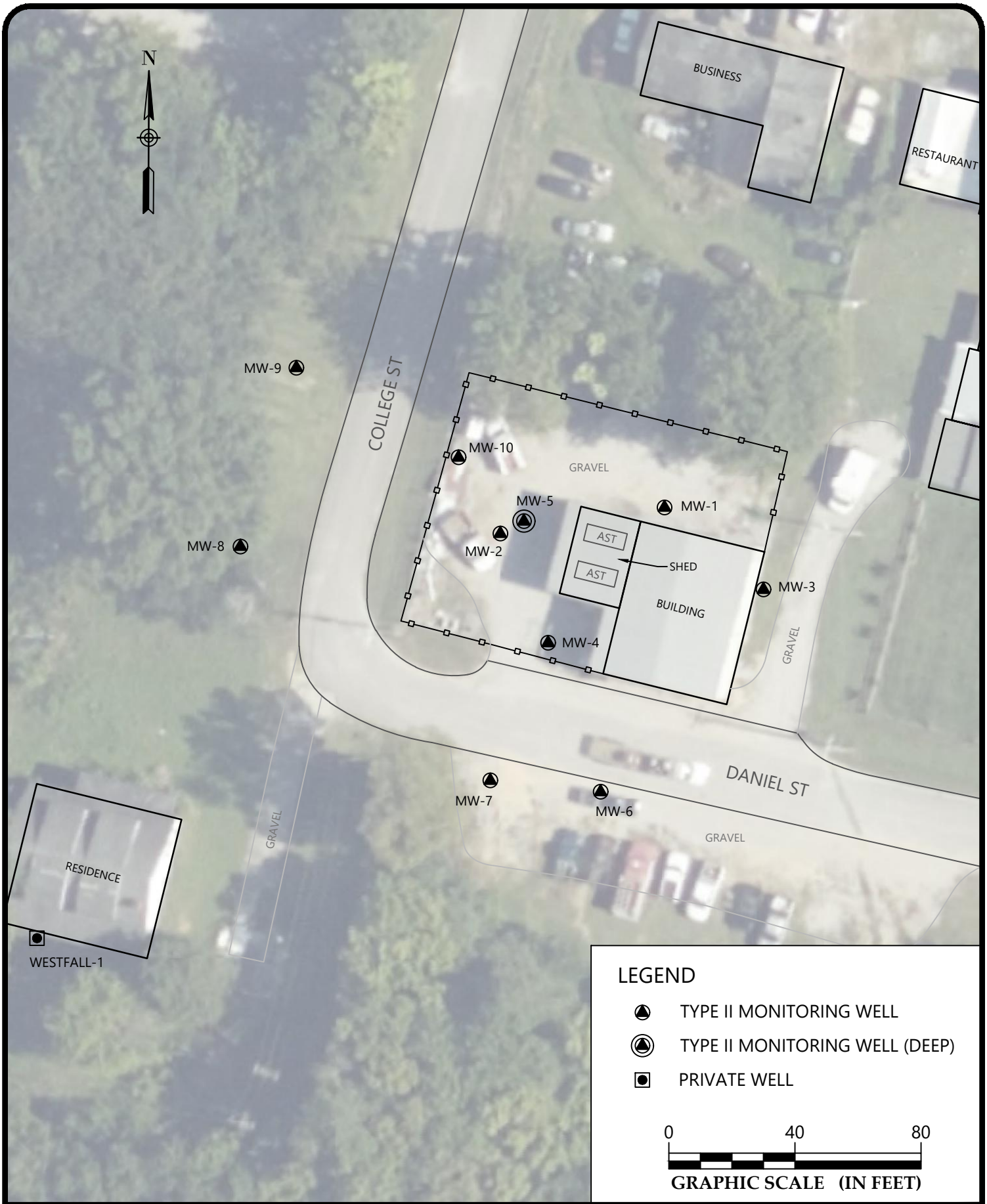

**SOURCE:**
USGS US TOPO 7.5-MINUTE, CHEROKEE, ALABAMA 2014

**REFERENCE:**
NOTE: This drawing was prepared for the purpose of visually representing information collected by S&ME, Inc. for this project. No other use for this drawing is expressed or implied. All drawing features, locations and dimensions are approximate.

# TOPOGRAPHIC MAP

CHEROKEE POLICE DEPARTMENT
FACILITY ID # 13945-033-002051
UST INCIDENT # UST99-09-31

| SCALE: | FIGURE NO. |
|---|---|
| AS SHOWN | 1 |
| DATE: 07-27-21 | |
| PROJECT NUMBER 20100019 | |

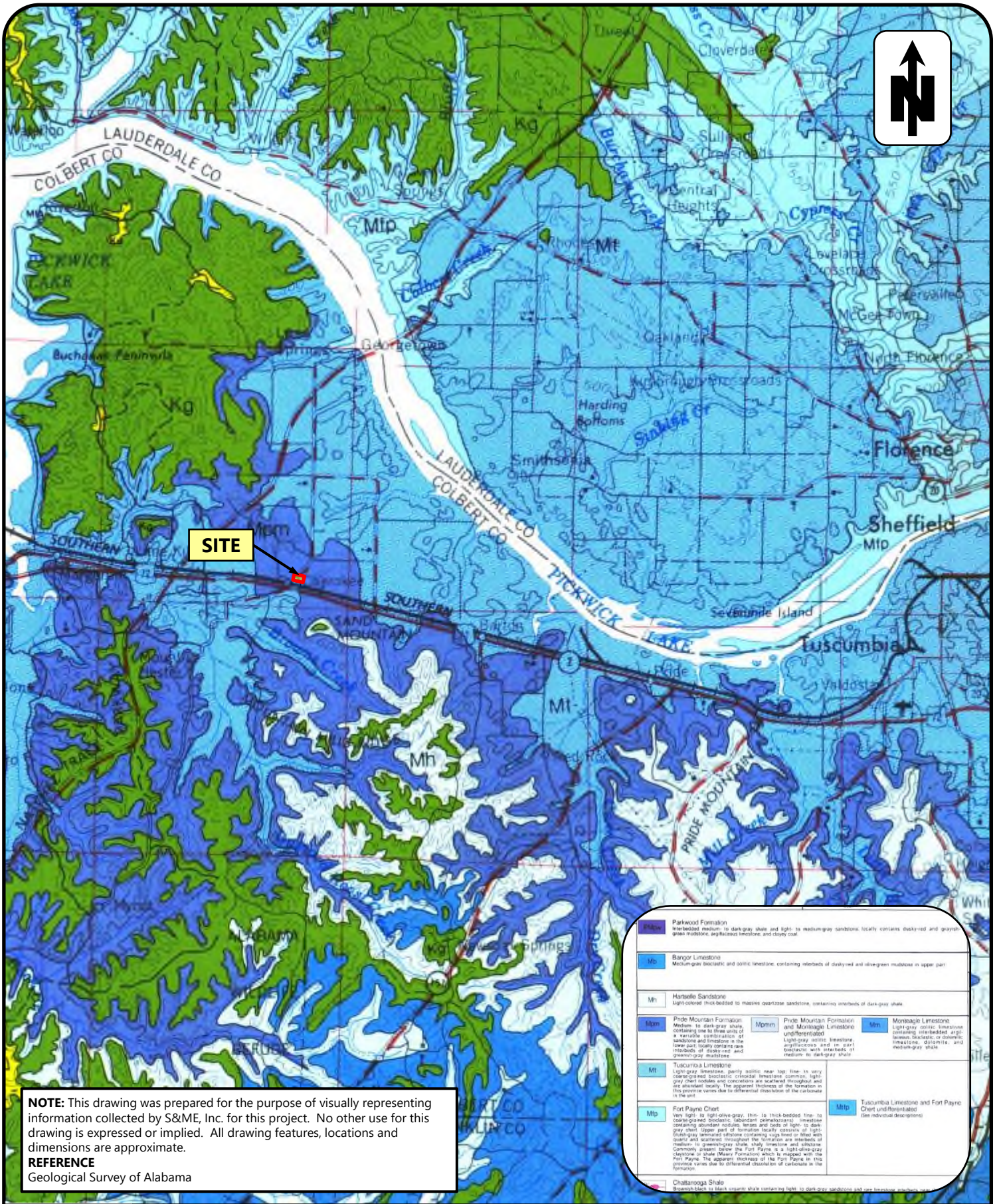



Drawing Path: \\EgnyteDrive\Ops\Huntsville-1820\Projects\2010\20100019 Cherokee Police Department\CAD\Cherokee Police Dept - SITE DIAGRAM.dwg

# SITE DIAGRAM

CHEROKEE POLICE DEPARTMENT
F.I.D. #13945-033-002051
UST INCIDENT #UST99-09-31

| SCALE: | FIGURE NO. |
|---|---|
| 1" = 40' | 2 |
| DATE: | |
| 5/10/2024 | |
| PROJECT NUMBER | |
| 20100019 | |




**NOTE:** This drawing was prepared for the purpose of visually representing information collected by S&ME, Inc. for this project. No other use for this drawing is expressed or implied. All drawing features, locations and dimensions are approximate.

**REFERENCE**
Geological Survey of Alabama

# SITE GEOLOGY MAP

CHEROKEE POLICE DEPARTMENT
FACILITY ID # 13945-033-002051
UST INCIDENT # UST99-09-31

SCALE: NOT TO SCALE

DATE: 9/19/2025

PROJECT NUMBER: 20100019

FIGURE NO. 3

# Appendix II– Boring Logs and Well Construction Diagrams

JOB NO. 7444 JOB NAME City of Cherokee BORING NO. B-2

DATE 1/25/00 LOCATION Cherokee, Alabama TOP ELEV. 528.61'

GEOLOGIST NW DRILLED BY Southeastern Drilling PAGE 1 OF 1

| DEPTH FT. | SYM | SOIL-ROCK DESCRIPTION | SAMPLE TYPE | SAMPLE DEPTH FT. | SAMPLE REC. IN. | STANDARD PENETRATION BLOWS/6 IN. | OVA (PPM) | TIME Sampled | Samp ID |
|---|---|---|---|---|---|---|---|---|---|
| | | SANDY CLAY, low plasticity, gray to brown, moist, stiff, petroleum odor. CL | | | | | | | |
| 5 | | | SS | 5.00 | 12 | Push | 0 | 12:20 | |
| 10 | | As above, slight petroleum odor. | SS | 10.00 | 22 | Push | 0 | 12:30 | |
| 12.0 | | | | | | | | | |
| 15 | | Black weathered sandstone. SANDSTONE | SS | 15.00 | 3 | 50/2 | 0 | 12:40 | |
| 16.5 | | Refusal at 16.5 feet, set 16.5 foot 2-inch casing, 10 foot screen, 12 foot sand filter pack, bentonite plug to surface. | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |

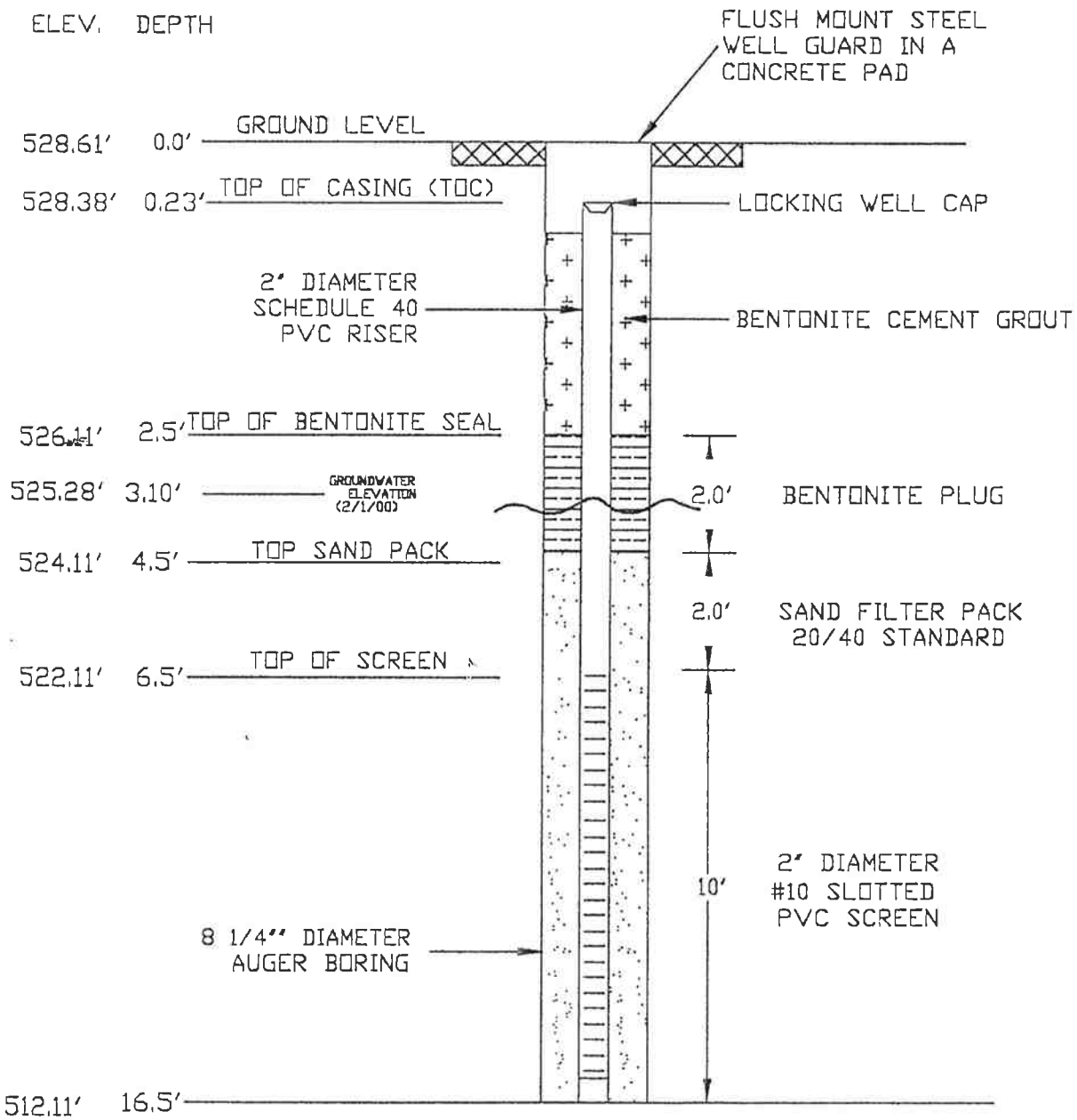
SEE LEGEND SHEET FOR SYMBOLS AND NOTES

SOIL BORING RECORD

# QORE PROPERTY SCIENCES

4814 COMMERCIAL DRIVE HUNTSVILLE, ALABAMA 35816

CHEROKEE POLICE DEPARTMENT
7444
MONITOR WELL NO. MW-2
1/25/00




7444

NTS

JOB NO. 7444CP2 JOB NAME CITY OF CHEROKEE BORING NO. B-5

DATE 6/14/01 LOCATION CHEROKEE, ALABAMA TOP ELEV. 528.35'

GEOLOGIST Chris Gillentine (Summit, Inc.) DRILLED BY Southeastern Drilling PAGE 1 OF 3

| DEPTH FT. | SYM | SOIL-ROCK DESCRIPTION | SAMPLE TYPE | SAMPLE DEPTH FT. | SAMPLE REC. IN. | STANDARD PENETRATION BLOWS/6 IN. | OVA (PPM) | TIME Sampled | Sample ID |
|---|---|---|---|---|---|---|---|---|---|
| | | SANDY CLAY, brown with grey mottles, moist, stiff, slight petroleum odor (CL) | | | | | | | |
| 5 | | | SS | 5.00 | | PUSH | | 13:20 | B5-5 |
| 10 | | | SS | 10.00 | | PUSH | | 13:30 | B5-10 |
| 12.0 | | BLACK WEATHERED SANDSTONE (SANDSTONE) | | | | | | | |
| 15 | | | | | | | | | |
| 16.5 | | LIMESTONE (LIMESTONE) | | | | | | | |
| 18.0 | | CLAY, blue to grey, stiff (CL) | | | | | | | |
| 20 | | | | | | | | | |
| 25 | | | | | | | | | |
| 30 | | | | | | | | | |

SEE LEGEND SHEET FOR SYMBOLS AND NOTES

SOIL BORING RECORD

QORE™ PROPERTY SCIENCES

JOB NO. 7444CP2 JOB NAME CITY OF CHEROKEE BORING NO. B-5

DATE 6/14/01 LOCATION CHEROKEE, ALABAMA TOP ELEV. 528.35'

GEOLOGIST Chris Gillentine (Summit, Inc.) DRILLED BY Southeastern Drilling PAGE 2 OF 3

| DEPTH FT. | SYM | SOIL-ROCK DESCRIPTION | SAMPLE TYPE | SAMPLE DEPTH FT. | SAMPLE REC. IN. | STANDARD PENETRATION BLOWS/6 IN. | OVA (PPM) | TIME Sampled | Sample ID |
|---|---|---|---|---|---|---|---|---|---|
| 35 | | | | | | | | | |
| 40 | | | | | | | | | |
| 45 | | | | | | | | | |
| 50 | | | | | | | | | |
| 53.5 | | LIMESTONE (LIMESTONE) | | | | | | | |
| 55 | | Refusal at 53.5 feet, set 5 inch diameter PVC casing at 55.5 feet and tremi-grouted outside of casing. | | | | | | | |
| ▽ 60 | | water at 60 feet | | | | | | | |

SEE LEGEND SHEET FOR SYMBOLS AND NOTES

SOIL BORING RECORD

QORE™ PROPERTY SCIENCES

JOB NO. 7444CP2 JOB NAME CITY OF CHEROKEE BORING NO. B-5

DATE 6/14/01 LOCATION CHEROKEE, ALABAMA TOP ELEV. 528.35'

GEOLOGIST Chris Gillentine (Summit, Inc.) DRILLED BY Southeastern Drilling PAGE 3 OF 3

| DEPTH FT. | SYM | SOIL-ROCK DESCRIPTION | SAMPLE TYPE | SAMPLE DEPTH FT. | SAMPLE REC. IN. | STANDARD PENETRATION BLOWS/6 IN. | OVA (PPM) | TIME Sampled | Sample ID |
|---|---|---|---|---|---|---|---|---|---|
| 65 | | | | | | | | | |
| 70.0 | | | | | | | | | |
| | | Terminated drilling at 70 feet.<br>Hole collapsed at approximately 60.7 feet.<br>Set 2 inch diameter PVC well at 60.7 feet with a 10 foot screen, 12 feet of filter sand and 2 feet of bentonite. | | | | | | | |
| 75 | | | | | | | | | |
| 80 | | | | | | | | | |
| 85 | | | | | | | | | |
| 90 | | | | | | | | | |

SEE LEGEND SHEET FOR SYMBOLS AND NOTES

SOIL BORING RECORD

QORE™ PROPERTY SCIENCES

# Appendix III– ORC Specifications

# SAFETY DATA SHEET

## 1. Identification

| | |
|---|---|
| **Product identifier** | **Oxygen Release Compound Advanced (ORC Advanced®)** |
| **Other means of identification** | None. |
| **Recommended use** | Soil and Groundwater Remediation. |
| **Recommended restrictions** | None known. |

**Manufacturer/Importer/Supplier/Distributor information**

| | |
|---|---|
| **Company Name** | REGENESIS |
| **Address** | 1011 Calle Sombra<br>San Clemente, CA 92673 USA |
| **General information** | 949-366-8000 |
| **E-mail** | CustomerService@regenesis.com |

| | |
|---|---|
| **Emergency phone number** | For Dangerous Goods Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at: |
| **USA, Canada** | 1-800-424-9300 |
| **International** | +1 703-741-5970 |

## 2. Hazard(s) identification

| | | |
|---|---|---|
| **Physical hazards** | Oxidizing solids | Category 2 |
| **Health hazards** | Skin corrosion/irritation | Category 1 |
| | Serious eye damage/eye irritation | Category 1 |
| | Specific target organ toxicity, single exposure | Category 3 respiratory tract irritation |

**OSHA defined hazards** Not classified.

**Label elements**

| | |
|---|---|
| **Signal word** | Danger |
| **Hazard statement** | May intensify fire; oxidizer. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation. |

**Precautionary statement**

| | |
|---|---|
| **Prevention** | Keep away from heat. Keep/Store away from clothing/combustible materials. Take any precaution to avoid mixing with combustibles. Do not breathe dust. Avoid breathing vapors. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. |
| **Response** | If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Wash contaminated clothing before reuse. In case of fire: Use appropriate media to extinguish. |
| **Storage** | Store in a well-ventilated place. Keep container tightly closed. Store locked up. |
| **Disposal** | Dispose of contents/container in accordance with local/regional/national/international regulations. |

| | |
|---|---|
| **Hazard(s) not otherwise classified (HNOC)** | None known. |
| **Supplemental information** | None. |

## 3. Composition/information on ingredients

**Mixtures**

| Chemical name | CAS number | % |
|---|---|---|
| Calcium peroxide | 1305-79-9 | ≥ 75 |
| Calcium hydroxide | 1305-62-0 | ≤ 25 |
| Dipotassium Phosphate | 7758-11-4 | < 5 |
| Monopotassium Phosphate | 7778-77-0 | < 5 |

**Composition comments** All concentrations are in percent by weight unless otherwise indicated.

## 4. First-aid measures

**Inhalation** Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.

**Skin contact** If on clothing: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

**Eye contact** Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

**Ingestion** Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

**Most important symptoms/effects, acute and delayed** Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

**Indication of immediate medical attention and special treatment needed** Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

**General information** Take off all contaminated clothing immediately. Contact with combustible material may cause fire. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

## 5. Fire-fighting measures

**Suitable extinguishing media** Water spray, fog (flooding amounts). Foam. Dry chemical powder. Carbon dioxide (CO2).

**Unsuitable extinguishing media** Do not use water jet as an extinguisher, as this will spread the fire.

**Specific hazards arising from the chemical** Greatly increases the burning rate of combustible materials. Containers may explode when heated. During fire, gases hazardous to health may be formed. Combustion products may include: metal oxides.

**Special protective equipment and precautions for firefighters** Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire fighting equipment/instructions** In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.

**Specific methods** Cool containers exposed to flames with water until well after the fire is out.

**General fire hazards** May intensify fire; oxidizer. Contact with combustible material may cause fire.

## 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures** Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep away from clothing and other combustible materials. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of dust. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for containment and cleaning up**

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Ventilate the contaminated area. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Minimize dust generation and accumulation. Collect dust using a vacuum cleaner equipped with HEPA filter. Wear appropriate protective equipment and clothing during clean-up. Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

**Environmental precautions**

Avoid discharge into drains, water courses or onto the ground.

## 7. Handling and storage

**Precautions for safe handling**

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Keep away from heat. Provide appropriate exhaust ventilation at places where dust is formed. Take any precaution to avoid mixing with combustibles. Keep away from clothing and other combustible materials. Do not get this material in contact with eyes. Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. Avoid contact with water and moisture.

**Conditions for safe storage, including any incompatibilities**

Store locked up. Keep away from heat. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Do not store near combustible materials. Store away from incompatible materials (see Section 10 of the SDS).

## 8. Exposure controls/personal protection

**Occupational exposure limits**

**US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)**

| Components | Type | Value | Form |
|---|---|---|---|
| Calcium hydroxide (CAS 1305-62-0) | PEL | 5 mg/m3 | Respirable fraction. |
| | | 15 mg/m3 | Total dust. |

**US. ACGIH Threshold Limit Values**

| Components | Type | Value |
|---|---|---|
| Calcium hydroxide (CAS 1305-62-0) | TWA | 5 mg/m3 |

**US. NIOSH: Pocket Guide to Chemical Hazards**

| Components | Type | Value |
|---|---|---|
| Calcium hydroxide (CAS 1305-62-0) | TWA | 5 mg/m3 |

**Biological limit values**

No biological exposure limits noted for the ingredient(s).

**Appropriate engineering controls**

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Provide eyewash station and safety shower.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection**

Use dust-tight, unvented chemical safety goggles when there is potential for eye contact.

**Skin protection**

**Hand protection**

Recommended gloves include rubber, neoprene, nitrile or viton. Frequent change is advisable.

**Other**

Wear appropriate chemical resistant clothing.

| | |
|---|---|
| **Respiratory protection** | If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Recommended use: Wear respirator with dust filter. |
| **Thermal hazards** | Wear appropriate thermal protective clothing, when necessary. |
| **General hygiene considerations** | Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. |

## 9. Physical and chemical properties

| | |
|---|---|
| **Appearance** | |
| **Physical state** | Solid. |
| **Form** | Powder. |
| **Color** | White to pale yellow. |
| **Odor** | Odorless. |
| **Odor threshold** | Not available. |
| **pH** | 12.5 (3% suspension/water) |
| **Melting point/freezing point** | Not applicable, material is a solid. |
| **Initial boiling point and boiling range** | Not applicable, material is a solid. |
| **Flash point** | Property has not been measured. |
| **Evaporation rate** | Not available. |
| **Flammability (solid, gas)** | Oxidizer. |
| **Upper/lower flammability or explosive limits** | |
| **Explosive limit - lower (%)** | Not available. |
| **Explosive limit - upper (%)** | Not available. |
| **Vapor pressure** | Not applicable, material is a solid. |
| **Vapor density** | Not applicable, material is a solid. |
| **Relative density** | Property has not been measured. |
| **Solubility(ies)** | |
| **Solubility (water)** | Slightly soluble |
| **Partition coefficient (n-octanol/water)** | Not applicable, product is a mixture.<br>Not applicable, product is a mixture. |
| **Auto-ignition temperature** | Property has not been measured. |
| **Decomposition temperature** | 527 °F (275 °C) |
| **Viscosity** | Not applicable, material is a solid. |
| **Other information** | |
| **Bulk density** | 0.5 - 0.9 g/ml |
| **Density** | Property has not been measured. |
| **Explosive limit** | Non-explosive. |
| **Explosive properties** | Not explosive. |
| **Kinematic viscosity** | Not applicable, material is a solid. |
| **Oxidizing properties** | May intensify fire; oxidizer. |

## 10. Stability and reactivity

| | |
|---|---|
| **Reactivity** | Greatly increases the burning rate of combustible materials. |
| **Chemical stability** | Decomposes on heating. Product may be unstable at temperatures above: 275°C/527°F. |
| **Possibility of hazardous reactions** | Reacts slowly with water. |
| **Conditions to avoid** | Moisture. Heat. Avoid temperatures exceeding the decomposition temperature. Contact with incompatible materials. |
| **Incompatible materials** | Acids. Bases. Combustible material. Reducing agents. Salts of heavy metals. |

**Hazardous decomposition products** Oxygen. Hydrogen peroxide (H2O2). Steam. Heat.

## 11. Toxicological information

**Information on likely routes of exposure**

**Inhalation** Dust may irritate respiratory system.

**Skin contact** Causes severe skin burns.

**Eye contact** Causes serious eye damage.

**Ingestion** Causes digestive tract burns.

**Symptoms related to the physical, chemical and toxicological characteristics** Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes.

**Information on toxicological effects**

**Acute toxicity** Not known.

| Components | Species | Test Results |
|---|---|---|
| Calcium hydroxide (CAS 1305-62-0) | | |
| **Acute** | | |
| **Dermal** | | |
| LD50 | Rabbit | > 2500 mg/kg, 24 Hours |
| **Inhalation** | | |
| LC50 | Rat | 6.04 mg/l, 4 hours |
| **Oral** | | |
| LD50 | Rat | > 2000 mg/kg |

**Skin corrosion/irritation** Causes severe skin burns and eye damage.

**Serious eye damage/eye irritation** Causes serious eye damage.

**Respiratory or skin sensitization**

**Respiratory sensitization** Not a respiratory sensitizer.

**Skin sensitization** This product is not expected to cause skin sensitization.

**Germ cell mutagenicity** No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

**Carcinogenicity** Not classifiable as to carcinogenicity to humans.

**IARC Monographs. Overall Evaluation of Carcinogenicity**

Not listed.

**NTP Report on Carcinogens**

Not listed.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)**

Not listed.

**Reproductive toxicity** This product is not expected to cause reproductive or developmental effects.

**Specific target organ toxicity - single exposure** May cause respiratory irritation.

**Specific target organ toxicity - repeated exposure** Not classified.

**Aspiration hazard** Not an aspiration hazard.

## 12. Ecological information

**Ecotoxicity** The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

| Components | | Species | Test Results |
|---|---|---|---|
| Calcium hydroxide (CAS 1305-62-0) | | | |
| **Aquatic** | | | |
| Algae | EC50 | Algae | 184.57 mg/l, 72 hours |

| | |
|---|---|
| **Persistence and degradability** | Decomposes in the presence of water. The product contains inorganic compounds which are not biodegradable. |
| **Bioaccumulative potential** | The product does not contain any substances expected to be bioaccumulating. |
| **Mobility in soil** | This product has very low solubility in water and low mobility in the environment. |
| **Other adverse effects** | None known. |

## 13. Disposal considerations

| | |
|---|---|
| **Disposal instructions** | Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations. |
| **Local disposal regulations** | Dispose in accordance with all applicable regulations. |
| **Hazardous waste code** | The waste code should be assigned in discussion between the user, the producer and the waste disposal company. |
| **Waste from residues / unused products** | Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner. |
| **Contaminated packaging** | Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied. |

## 14. Transport information

**DOT**

| | |
|---|---|
| **UN number** | UN1457 |
| **UN proper shipping name** | Calcium peroxide |
| **Transport hazard class(es)** | |
| **Class** | 5.1 |
| **Subsidiary risk** | - |
| **Label(s)** | 5.1 |
| **Packing group** | II |
| **Environmental hazards** | |
| **Marine pollutant** | No. |
| **Special precautions for user** | Read safety instructions, SDS and emergency procedures before handling. |
| **Special provisions** | IB6, IP2, T3, TP33, W100 |
| **Packaging exceptions** | 152 |
| **Packaging non bulk** | 212 |
| **Packaging bulk** | 242 |

**IATA**

| | |
|---|---|
| **UN number** | UN1457 |
| **UN proper shipping name** | Calcium peroxide |
| **Transport hazard class(es)** | |
| **Class** | 5.1 |
| **Subsidiary risk** | - |
| **Packing group** | II |
| **Environmental hazards** | No. |
| **ERG Code** | 5L |
| **Special precautions for user** | Read safety instructions, SDS and emergency procedures before handling. |

**IMDG**

| | |
|---|---|
| **UN number** | UN1457 |
| **UN proper shipping name** | CALCIUM PEROXIDE |
| **Transport hazard class(es)** | |
| **Class** | 5.1 |
| **Subsidiary risk** | - |
| **Packing group** | II |
| **Environmental hazards** | |
| **Marine pollutant** | No. |
| **EmS** | F-G, S-Q |
| **Special precautions for user** | Read safety instructions, SDS and emergency procedures before handling. |

| | |
|---|---|
| **Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** | Not applicable. |

## 15. Regulatory information

**US federal regulations** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

**CERCLA Hazardous Substance List (40 CFR 302.4)**

Not listed.

**SARA 304 Emergency release notification**

Not regulated.

**OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)**

Not listed.

**Toxic Substances Control Act (TSCA)** All components of the mixture on the TSCA 8(b) inventory are designated “active”.

**Superfund Amendments and Reauthorization Act of 1986 (SARA)**

**SARA 302 Extremely hazardous substance**

Not listed.

**SARA 311/312 Hazardous chemical** Yes

**Classified hazard categories**
Oxidizer (liquid, solid, or gas)
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

**SARA 313 (TRI reporting)**

Not regulated.

**Other federal regulations**

**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Not regulated.

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**US state regulations**

**US. Massachusetts RTK - Substance List**

Calcium hydroxide (CAS 1305-62-0)

**US. New Jersey Worker and Community Right-to-Know Act**

Calcium hydroxide (CAS 1305-62-0)
Calcium peroxide (CAS 1305-79-9)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Calcium hydroxide (CAS 1305-62-0)

**US. Rhode Island RTK**

Calcium hydroxide (CAS 1305-62-0)

**California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

**International Inventories**

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|---|---|---|
| Australia | Australian Inventory of Industrial Chemicals (AICIS) | Yes |
| Canada | Domestic Substances List (DSL) | Yes |
| Canada | Non-Domestic Substances List (NDSL) | No |
| China | Inventory of Existing Chemical Substances in China (IECSC) | Yes |
| Europe | European Inventory of Existing Commercial Chemical Substances (EINECS) | Yes |
| Europe | European List of Notified Chemical Substances (ELINCS) | No |
| Japan | Inventory of Existing and New Chemical Substances (ENCS) | Yes |

| Country(s) or region | Inventory name | On inventory (yes/no)* |
|---|---|---|
| Korea | Existing Chemicals List (ECL) | Yes |
| New Zealand | New Zealand Inventory | Yes |
| Philippines | Philippine Inventory of Chemicals and Chemical Substances (PICCS) | Yes |
| Taiwan | Taiwan Chemical Substance Inventory (TCSI) | Yes |
| United States & Puerto Rico | Toxic Substances Control Act (TSCA) Inventory | Yes |

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

## 16. Other information, including date of preparation or last revision

**Issue date** 14-February-2020

**Revision date** 15-July-2022

**Version #** 02

**HMIS® ratings**
Health: 3
Flammability: 0
Physical hazard: 2

**NFPA ratings**


**Disclaimer** Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

# ORC Advanced® Pellets Technical Specification

ORC Advanced Pellets are a dust-minimizing, dry application, pelletized form of the widely-used ORC Advanced controlled-release oxygen compound.

They are designed specifically for the treatment of dissolved-phase petroleum hydrocarbons through direct application into excavations, petroleum storage tank pits, trenches and backfill.

Oxygen is released from ORC Advanced for a period of 9 to 12 months *in situ*.

Example of ORC Advanced Pellets

$$CaO(OH)_2 + H_2O \rightarrow \tfrac{1}{2}O_2 + Ca(OH)_2 + H_2O$$

ORC Advanced is a formulation of calcium oxyhydroxide which, upon hydration, releases oxygen and forms simple calcium hydroxide and water.

For a list of treatable contaminants with the use of ORC Advanced, view the Range of Treatable Contaminants Guide.

## Chemical Composition

- Calcium Oxyhydroxide
- Calcium Hydroxide
- Monopotassium Phosphate
- Ammonium Phosphate Dibasic

## Properties

- Pellet size: 3-10 mm
- Contains micro-nutrients such as nitrogen, phosphorous, and potassium (N,P,K) which can be beneficial to aerobic biodegradation processes

OXYGEN RELEASE COMPOUND

# ORC Advanced® Pellets Technical Specification

## Storage and Handling Guidelines

| Storage |
| --- |
| Store in a cool, dry place out of direct sunlight |
| Store in original tightly closed container |
| Store in a well-ventilated place |
| Do not store near combustible materials |
| Store away from incompatible materials |
| Provide appropriate exhaust ventilation in places where dust is formed |

| Handling |
| --- |
| Minimize dust generation and accumulation |
| Keep away from heat |
| Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces |
| Observe good industrial hygiene practices |
| Take precaution to avoid mixing with combustibles |
| Keep away from clothing and other combustible materials |
| Avoid contact with water and moisture |
| Avoid contact with eyes, skin, and clothing |
| Avoid prolonged exposure |
| Wear appropriate personal protective equipment |

## Applications

- *In situ* or *ex situ* out of the bag
- Direct application into open excavations, petroleum storage tank pits and trenches
- Direct application to contaminated backfill or contaminated soils
- *Ex situ* biopile applications (requires a source of hydration)

## Health and Safety

Wash thoroughly after handling. Wear protective gloves, eye protection, and face protection.
Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: ORC Advanced SDS.

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REGENESIS®

MENU

# Application Made-Easy Filter Sock Canisters

## Product

Canisters are constructed of durable, slotted, polyvinyl chloride (PVC) and are designed to contain and deliver ORC or ORC Advanced Filter Socks (filter socks) quickly and easily into treatment wells.

Figure 1.
Application-Made-Easy Canisters being prepped for installation

Figure 2.
The simple process of loading Filter Socks into Canisters

Figure 3.
Canister filled with ORC Filter Socks being lowered into treatment well

## Purpose

Typically ORC or ORC Advanced filter socks are installed using a basic but proven, rope-lacing method, however some may find this approach time consuming and challenging. In response, Regenesis now offers new Application-Time-Saver Canisters.

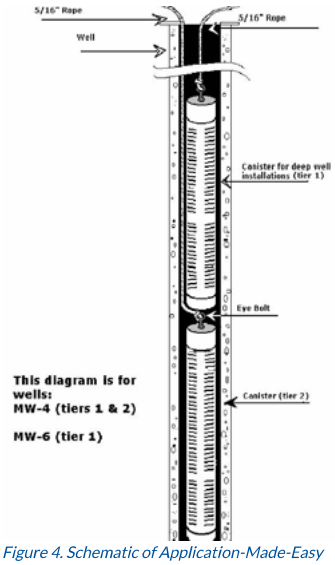


*Figure 4. Schematic of Application-Made-Easy Canisters in a treatment well*

Their purpose is centered around ease-of-application as the installer simply loads filter socks (up to 5) into the canister (no roping together of the individual filter socks is required) screws the top on and lowers the entire canister unit into the well. When the oxygen in the filter socks becomes depleted (after 8-12 months of use) the user simply removes the canister, opens the screw top, removes and disposes of the spent filter socks. Filter socks are often replaced to continue treatment on an as needed basis.

Filter sock canisters can also be used to avoid the lodging of socks in wells that are not entirely straight. In some cases the use of the laced rope method of application can result in lodging and cause difficulty in removal and replacement. When socks are used with canisters and inserted into wells, the added length and rigidity of the canisters does not allow for lodging in the well.

## Functionality/Installation

Filter socks canisters are made of durable, re-usable, slotted PVC and are designed to fit into 4" or 6" diameter wells. Each canister is 5 feet long and can hold up to 5 ORC or ORC Advanced Filter Socks. A maximum number of 3 canisters can be roped together for maximum treatment depth.

## Availability

Regenesis Application-Made-Easy Canisters are readily available and sold at our cost to ensure that ORC and ORC Advanced Filter Socks are easily and properly installed.



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