

3R - 437

WORKPLAN

09 / 18 / 2012

3R-437



Animas Environmental Services, LLC

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505-564-2281

Durango, Colorado
970-403-3274

September 18, 2012

Aaron Dailey
Enterprise Products Company
614 Reilly Avenue
Farmington, New Mexico 87401

**RE: Groundwater Remediation and Confirmation Sampling Work Plan
Smyers LS #1
San Juan County, New Mexico**

Dear Mr. Dailey:

Animas Environmental Services, LLC (AES) is pleased to submit this work plan to conduct groundwater treatment and confirmation sampling associated with a small release of natural gas condensate, which occurred along the Enterprise Products Company (Enterprise) 3-inch diameter Smyers LS #1 pipeline in December 2011. The release location is approximately 7 miles northeast of Aztec, San Juan County, New Mexico, on Federal land under jurisdiction of the Bureau of Land Management (BLM). AES completed a groundwater investigation at the site in June 2012, and details of the investigation are included in the report entitled *Groundwater Investigation Report for Enterprise Products Company Smyers LS #1 Pipeline Release* dated September 14, 2012.

1.0 Release Information

1.1 Location

Location - SW¼ SW¼, Section 2, T31N, R11W, San Juan County, New Mexico

Latitude/Longitude - N36.9234 and W107.96485, respectively

Surface Owner – Federal (BLM)

Figure 1. Topographic Site Location Map

Figure 2. Aerial Site Location Map

1.2 Previous Site Activities

1.2.1 Initial Release Assessment - December 2011 and January 2012

A release was reported at the location on December 26, 2011, and the cause of the release was attributed to two ruptures in the pipeline due to freezing.

On December 28, 2011, an initial release assessment was completed by AES personnel. Using a hand auger, four soil borings were each advanced to a total depth of 3 feet below

ground surface (bgs), at which point groundwater was encountered. Soil samples were field screened, and confirmation soil and water samples were collected for laboratory analysis. Soil laboratory results confirmed that soil had been impacted above NMOCD action levels for benzene, total benzene, toluene, ethyl-benzene, and xylenes (BTEX), and total petroleum hydrocarbons (TPH). The highest concentrations were recorded in SB-4 with 98 mg/kg benzene, 1,800 mg/kg total BTEX, and 15,140 mg/kg TPH. The groundwater samples had reported concentrations of BTEX below applicable New Mexico Water Quality Control Commission (WQCC) standards. Based on laboratory results remedial excavation was scheduled.

On January 12 and 13, 2012, approximately 142 cubic yards of petroleum hydrocarbon contaminated soil were excavated and transported off-site for disposal by an Enterprise contractor. The final excavation dimensions measured approximately 21 feet by 29 feet by 3 feet deep. Prior to the excavation being backfilled, AES collected confirmation soil and groundwater samples, the results of which confirmed that all hydrocarbon contaminated soil had been excavated, but that groundwater had been impacted by the release. The highest concentrations of dissolved phase contaminants were reported in EXCW-1 with 15,000 µg/L benzene, 81,000 µg/L toluene, greater than 10,000 µg/L ethylbenzene, and 53,000 µg/L total xylenes. Details of the initial release assessment were submitted in the *Smyers LS #1 Release Report* prepared by AES and dated March 9, 2012. Based on laboratory analytical results, AES recommend further assessment of groundwater dissolved phase contaminant impacts using a HydroPunch to install temporary wells.

1.2.2 Groundwater Investigation – June 2012

On June 20, 2012, AES completed a groundwater investigation in order to delineate the full extent of petroleum hydrocarbon impacts on groundwater resulting from the release. The investigation included the installation of nine temporary wells using a HydroPunch sampling tool and the collection of groundwater samples.

Groundwater was encountered at depths ranging from about 4.0 feet bgs in TW-6 to 6.4 feet bgs in TW-4. Groundwater laboratory analytical results showed that dissolved phase benzene concentrations were above the WQCC standard of 10 µg/L in TW-2 (92 µg/L), TW-7 (44 µg/L), and TW-8 (150 µg/L). TW-8 exceeded the WQCC standard for toluene with 920 µg/L and for ethylbenzene with 1,200 µg/L. Dissolved phase xylene concentrations were above the WQCC standard of 620 µg/L in TW-2 (1,600 µg/L) and in TW-8 (11,000 µg/L). All other dissolved phase BTEX concentrations were below WQCC standards or below laboratory detection limits.

Dissolved phase GRO concentrations were reported in TW-1 (0.065 mg/L), TW-2 (8.2 mg/L), TW-7 (0.74 mg/L), and TW-8 (77 mg/L), and DRO was reported in TW-7 with a

concentration of 1.2 mg/L. All other samples were below laboratory detection limits for TPH (as GRO/DRO). Details of the groundwater investigation were included in the report entitled *Groundwater Investigation Report for Enterprise Products Company Smyers LS #1 Pipeline Release* prepared by AES and submitted on September 14, 2012.

2.0 Proposed Bio-Remedial Solution Application

In order enhance bioremediation of dissolved phase petroleum hydrocarbons in the areas near TW-2, TW-7, and TW-8, AES recommends injecting a bio-remedial solution directly into the shallow groundwater. This solution will consist of water, low concentrations of nutrients, hydrocarbon degrading microbes, and an enzyme catalyst. Injections will be completed in a grid pattern on 5 foot centers to a depth of approximately 3 feet bgs. In order to achieve a sufficient distribution of the solution, an injection pressure of approximately 500 pounds per square inch (psi) will be used. The bio-remedial solution is manufactured by Micro-TES, Inc. and its application will be provided by Alpha Bioscience, Inc., Farmington, New Mexico. The locations of the areas to be treated are included on Figure 3, and Material Safety Data Sheets (MSDSs) of the solution are attached.

3.0 Proposed Confirmation Sampling

In order to assess the effectiveness of the bio-remedial efforts, AES proposes to install eight temporary groundwater sampling points (TW-10 through TW-17) in March 2013, approximately six months following the bio-remedial application. The temporary sampling points will be installed in the vicinities of TW-2, TW-7, and TW-8 and will be removed following sample collection. The proposed locations of the temporary wells, along with a construction schematic of a temporary well, are shown on Figure 3.

3.1 *Notifications and Access Agreement*

The Bureau of Land Management (BLM) Farmington Field Office (FFO) and the NMOCD require notification prior to the installation of temporary groundwater sampling points. Approval from the BLM-FFO will be required in the event that the confirmation sampling extends beyond the Enterprise pipeline right-of-way (ROW). The sampling is non-invasive, no vehicles will enter Kiffen Wash, and no “filling” will occur as part of the investigation. Therefore, U.S. Army Corps of Engineers (USACE) consultation and/or permitting is not anticipated.

3.2 *Utilities Notification*

AES will utilize the New Mexico One-Call system to identify and mark all underground utilities at the site before initiating the confirmation sampling.

3.3 Health and Safety Plan

AES has a company health and safety plan in place, and each employee is required to complete a health and safety orientation prior to participating in field operations for the first time. All on-site personnel are 40-hour HazWoper trained in accordance with OSHA regulations outlined in 29 CFR 1910.120(e). Prior to the start of the investigation, AES will prepare and implement a comprehensive site-specific Job Safety Analysis (JSA) addressing the investigation activities and associated groundwater sampling. All employees and subcontractors will be required to read and sign the JSA to acknowledge their understanding of the information contained within the JSA. The JSA will be implemented and enforced on site by the assigned Site Safety and Health Officer.

3.4 Temporary Well Installation

In order to complete the confirmation sampling in a non-invasive manner, TW-10 through TW-17 will be “temporary” and installed by hand. If the results of the confirmation sampling warrant the installation of permanent monitoring wells, a separate work plan will be submitted at that time.

Temporary wells TW-10 through TW-17 will be installed utilizing a hand-driven HydroPunch sampling tool, which allows for in-situ collection of groundwater samples (see Figure 3 for schematic). At least eight HydroPunch temporary wells will be installed within the vicinities of TW-2, TW-7, and TW-8. Following installation, each temporary well will be purged and then allowed to stabilize for a minimum of one hour prior to sample collection. Following sample collection, each well will be fully removed and the well void allowed to collapse.

3.5 Groundwater Sample Collection

Groundwater is expected to be encountered within 3 feet of the ground surface. A peristaltic pump, with new tubing for each sampling point, will be used to collect the groundwater samples. Prior to collection of each sample, depth to groundwater will be measured with a water level indicator. Additionally, water quality parameters (pH, temperature, electrical conductivity, dissolved oxygen and oxygen reduction potential) will be measured and recorded on sampling forms.

3.6 Laboratory Analysis

All groundwater analytical samples will be submitted for laboratory analysis of the following parameters:

- BTEX per USEPA Method 8021B or 8260B;

Once collected, all samples will be preserved in laboratory-supplied containers and stored in an insulated cooler containing ice. Samples will be shipped via bus to the laboratory, Hall Environmental Analysis Laboratory (Hall) in Albuquerque, New Mexico, in insulated coolers containing ice at less than 6°C.

3.7 Deliverables – Bio-Remedial Application and Confirmation Sampling Report

Once the groundwater sampling results are received, a detailed report will be prepared. The report will include:

- A summary of the bio-remedial application (September 2012) and HydroPunch temporary well installation and groundwater sampling (March 2013) activities performed;
- Tabulated groundwater quality measurements and laboratory analytical results;
- Photographic documentation;
- Scaled site maps showing temporary well locations and contaminant concentration results and contours;
- Conclusions and recommendations.

3.8 Project Schedule

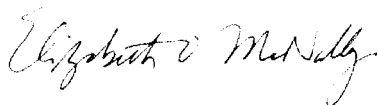
Upon work plan approval, AES will confirm approval from BLM-FFO for the proposed scope of work. AES will complete utility locates and project notifications prior to beginning field work. AES anticipates that field work for the bio-remedial application will take about one day to complete (September 2012) and the confirmation sampling will take about two days to complete (March 2013).

If you have any questions regarding site conditions or this work plan, please do not hesitate to contact me at (505) 564-2281.

Sincerely,



Ross Kennemer
Senior Project Manager



Elizabeth McNally, P.E.

Attachments:

- Figure 1. Topographic Site Location Map
- Figure 2. Aerial Site Location Map
- Figure 3. Proposed Temporary Monitoring Well Locations
- Bio-Remedial Solution MSDS (Micro-TES, Inc)

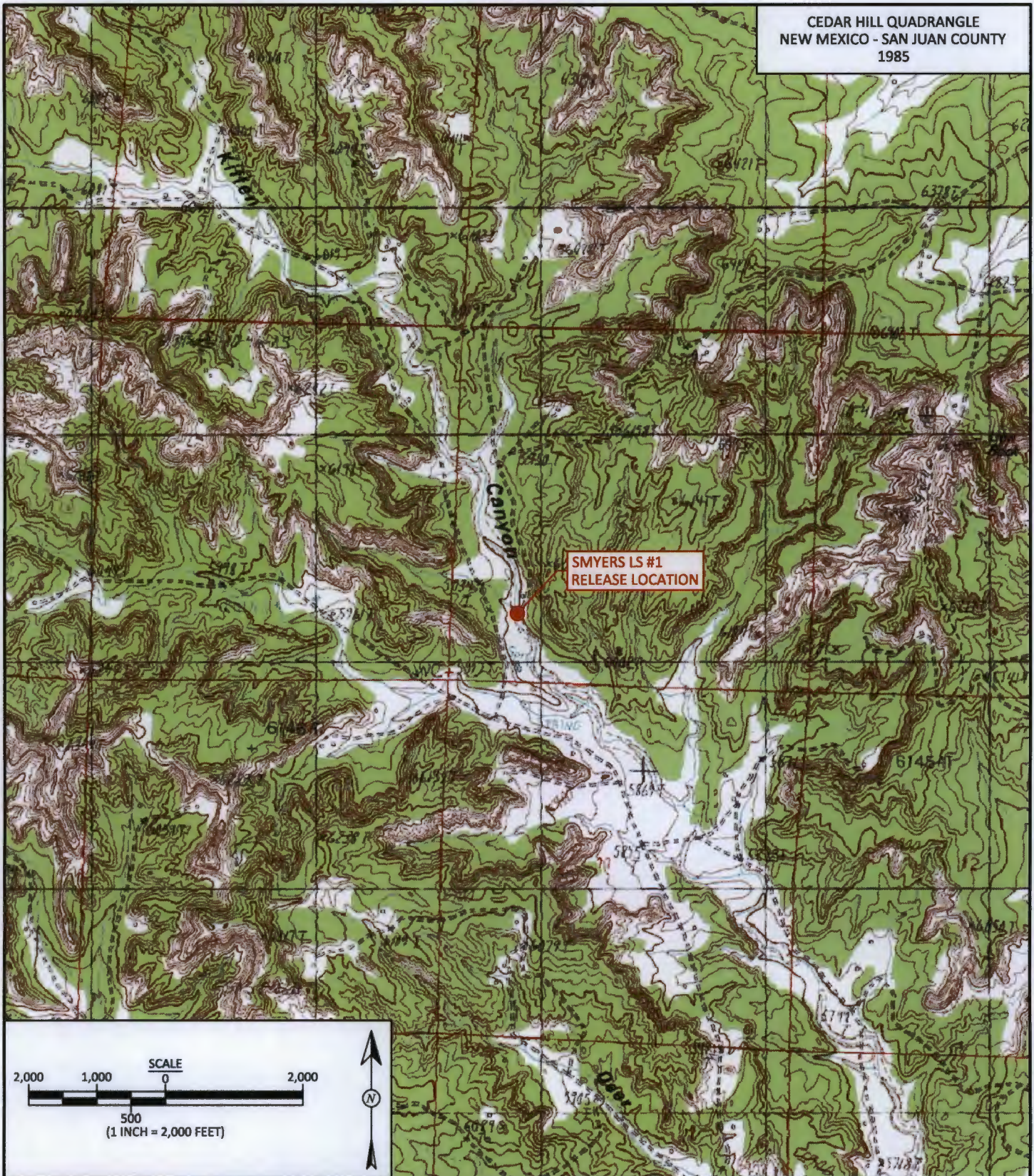
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CEDAR HILL QUADRANGLE
NEW MEXICO - SAN JUAN COUNTY
1985



DRAWN BY: C. Lameman	DATE DRAWN: September 15, 2012
REVISIONS BY: C. Lameman	DATE REVISED: September 15, 2012
CHECKED BY: T. Ross	DATE CHECKED: September 15, 2012
APPROVED BY: E. McNally	DATE APPROVED: September 15, 2012

FIGURE 1

TOPOGRAPHIC SITE LOCATION MAP
ENTERPRISE PRODUCTS COMPANY
SMYERS LS #1 GROUNDWATER TREATMENT AND
CONFIRMATION SAMPLING WORKPLAN
SAN JUAN COUNTY, NEW MEXICO
SW¼ SW¼, SEC. 2, T31N, R11W
N 36.9234, W107.96485

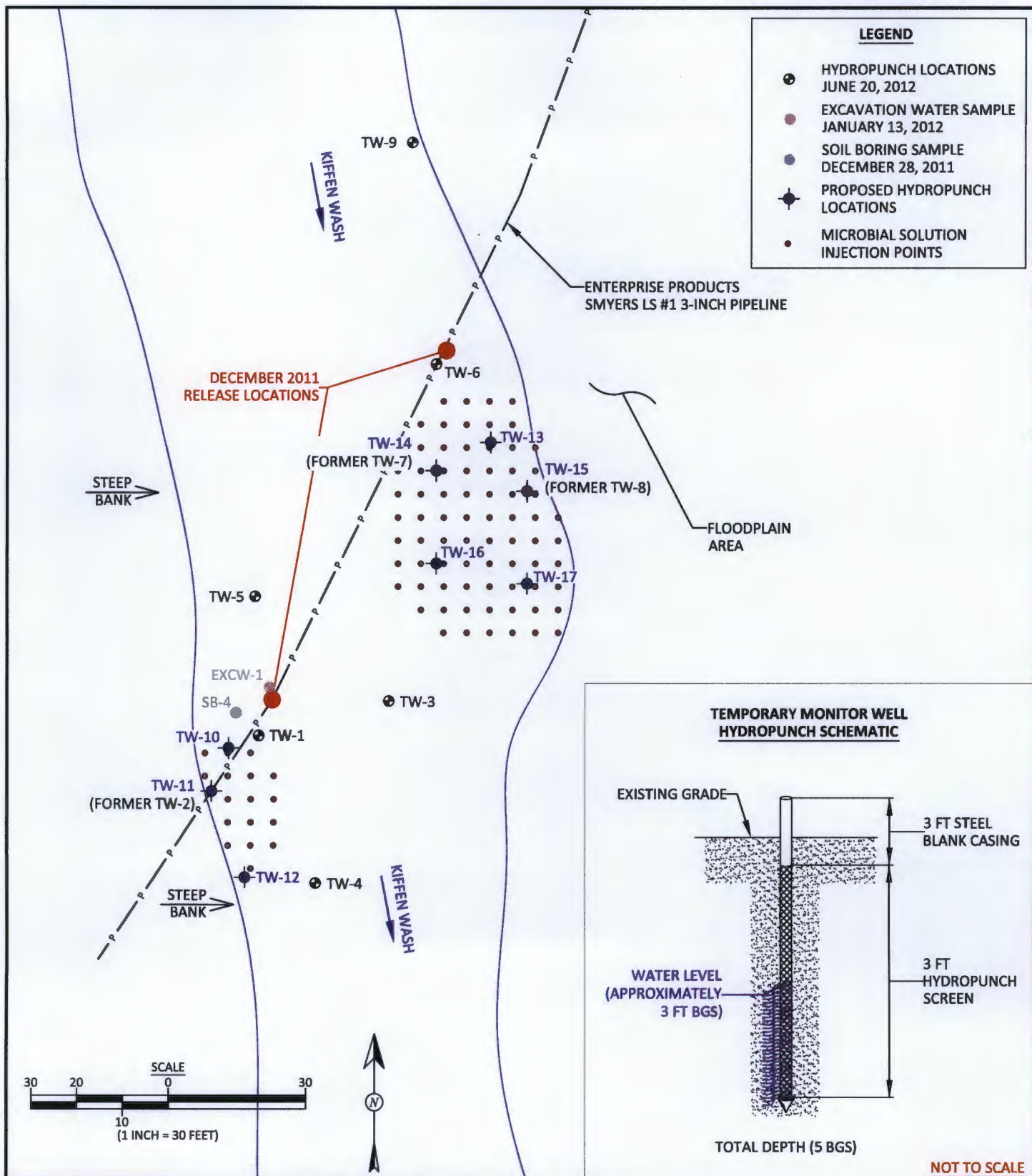


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FIGURE 2

AERIAL SITE MAP
 ENTERPRISE PRODUCTS COMPANY
 SMYERS LS #1 GROUNDWATER TREATMENT AND
 CONFIRMATION SAMPLING WORKPLAN
 SAN JUAN COUNTY, NEW MEXICO
 SW¼ SW¼, SEC. 2, T31N, R11W
 N 36.9234, W107.96485



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FIGURE 3

PROPOSED TEMPORARY WELL LOCATIONS
ENTERPRISE PRODUCTS COMPANY
SMYERS LS #1 GROUNDWATER TREATMENT
AND CONFIRMATION SAMPLING WORKPLAN
SAN JUAN COUNTY, NEW MEXICO
SW¼ SW¼, SEC. 2, T31N, R11W
N 36.9234, W107.96485

MATERIAL SAFETY DATA SHEET FOR LFS-1™

1. Product Identification

Product Name: LFS-1™
Chemical Name: Bacterial Additive
Chemical Family: Bacterial
Formula: Bacteria Blend
Manufacturer: **Micro-TES, Inc.**
12500 Network, Suite 201
San Antonio, Texas 78249
(210) 558-4757

2. Hazardous Ingredients

Ingredient: None
TLV: None

3. Physical Properties

Tan/Off white liquid with slight odor.
Specific Gravity: One
Boiling Point: 212 degrees Fahrenheit
Evaporation Rate: Equal to Water
Melting Point: N/A
Vapor Pressure: N/A
Solubility in Water: N/A
Percent Volatile: N/A

4. First Aid Measures

Inhalation: Normal use should not cause irritation. If reaction occurs, remove to fresh air and consult your physician. Eyes: If product contacts eye area, flush with water. Skin: Normal use should not cause irritation. Wash skin with soap and water after contact with product. If irritation occurs, consult your physician. Internal: Product is not to be taken internally. If this occurs do not induce vomiting and seek medical attention.

5. Health Hazard Information

Threshold Limit Value: N/A
Effects of Overexposure: If taken internally will cause slight intestinal upset. Emergency and First Aid: Product is for external use only. If taken internally, call a physician.

6. Fire and Explosion Hazard Information

Flash Point: N/A
Flammable Limits: N/A
Extinguishing Media: N/A
Special Fire Provisions: None
Unusual Fire Hazard: None

7. Hazardous Reactivity

Stability: Stable
Conditions to Avoid: Extreme heat, strong acids and bases.
Incompatibility: Not compatible with strong acids.
Hazardous Decomposition Products: N/A
Hazardous Polymerization: N/A

8. Spill or Leak Procedure

In the event of a spill or leak, rinse thoroughly with soap and water. Comply with all Local, State and Federal regulations for disposal.

9. Special Precautions

Handling and Storage Precautions: Avoid extreme heat, store in a cool dry place, do not freeze.
Other Precautions: Practice good housekeeping procedures.
Container Disposal: Do not reuse container. When empty, rinse before disposing. Dispose of in accordance with local laws and ordinance.

10. Notice

All statements, information and data provided in this MSDS are believed to be accurate and reliable, but are presented without guarantee, warranty, or responsibility of any kind, expressed or implied, on our part. Users should make their own investigations to determine the suitability of the information or products for their particular purpose. Nothing contained herein is intended as permission, inducement or recommendation to violate any laws or to practice any invention covered by existing patents.

MATERIAL SAFETY DATA SHEET FOR BACTERIAL NUTRIENT

Product Identification

Product Name: **Bacterial Nutrient**
Manufacturer: **Micro-TES, Inc.**
12500 Network, Suite 201
San Antonio, Texas 78249
(210) 558-4757
Chemical Family: Fertilizer
Hazardous Classification: Not Regulated by
DOT. IATA I.D. No. 2071

Hazardous Ingredients

Name: Ammonia Nitrate
Percent: 10% by weight
TLV: 15mg/cubic meters

Physical Properties

Cream colored granules with slight odor
Specific Gravity: N/A
Vapor Pressure: N/A
Evaporation Rate: N/A
Solubility in Water: Soluble

Fire and Explosion Hazard Data

Flash Point: N/A
Flammability Limits: N/A
Extinguisher Media: Water
Special Fire Provisions: Do not use steam, carbon dioxide, dry chemicals, foam extinguishers or smothering agents. Do not use salt water.
Unusual Fire and Explosion Hazard: At 410 degrees F, emits toxic Nitrogen Oxide gases. If contaminated with combustible substances potential for possible explosion.

Health Hazard Data

Threshold Limit Data: 15mg/cubic meters
Effects of Overexposure: Acute cyanosis, nausea, vertigo, collapse, vomiting, rapid heartbeat and breathing, coma, convulsion, and death can occur. Chronic small repeated doses may lead to weakness, general depression, headache and mental impairment.
First Aid Procedures: Eyes-flush thoroughly with water, call physician. Ingestion-dilute by drinking large quantities of water induce vomiting and call physician. Skin-wash area thoroughly with soap and water. Inhalation-move individual to fresh air.

Reactivity Data

Stability: Stable
Incompatibility: Avoid mixing with oxidizable material.
Hazardous Decomposition Products: Nitrogen Oxide gases.
Hazardous Polymerization: N/A

Special Protection Information

Respiratory Protection: Wear an approved dust mask.
Protective Clothing: Not required
Eye Protection: Goggles not required, may be used to protect eyes from dust. Adequate ventilation recommended.

Environmental Data

Spill and Leak Procedures: Contain large spill to prevent contact with waterways or vegetation.
Waste Disposal Methods: If uncontaminated recover and reuse. Dispose of contaminated product according to local, state and federal regulations.

Special Precautions

Special Handling/Storage: Store in original container in a cool dry area out of direct sunlight and out of the reach of children and animals. Do not store with feed or foodstuffs. Keep container tightly closed and in good repair.
Special Work Place Controls: Adequate ventilation and appropriate local exhaust needed to keep dust below personnel tolerance levels.
Container Disposal: Do not reuse container. When empty, rinse before disposing. Dispose of in accordance with local laws.

NOTICE: All statements, information and data provided in this MSDS are believed to be accurate and reliable, but are presented without guarantee, warranty, or responsibility of any kind, expressed or implied, on our part. Users should make their own investigations to determine the suitability of the information or products for their particular purpose.