3R - 443

WORKPLAN

09 / 19 / 2012

GALLEGOS WELL TIE
3R-443

Animas Environmental Services, LLC
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Farmington, NM 87401
505 564-2281
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September 19, 2012

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

RE: Groundwater Treatment and Confirmation Sampling Work Plan
Gallegos Well Tie Line #908980-Gallegos #2
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 two releases of natural gas condensate, which occurred along the Enterprise Products Company (Enterprise) 4-inch diameter Gallegos Well Tie Line #90890-Gallegos #2 in May 2012. The release locations are in the Gallegos Wash and located approximately 17 miles south of Bloomfield, San Juan County, New Mexico. The release locations are also within the boundaries of the Navajo Nation and under the jurisdiction of the Navajo Nation Environmental Protection Agency (NNEPA). AES completed a groundwater investigation at the site in July 2012, and details of the investigation are included in the report entitled *Site Investigation Report for Enterprise Products Company Gallegos Well Tie Line #90898, Gallegos #2 Pipeline Release* dated September 18, 2012.

1.0 Release Information

1.1 Location

Location - SE¼ NE¼, Section 29, T26N, R11W, San Juan County, New Mexico
Release #1 Latitude/Longitude - N36.45979 and W108.02202, respectively
Release #2 Latitude/Longitude – N36.45988 and W108.02188, respectively
Surface Owner – Navajo Nation
Figure 1 - Topographic Site Location Map
Figure 2 - Aerial Site Map

1.2 Previous Site Activities

1.2.1 Release Assessment and Mitigation – May and June 2012

On May 28, 2012, the releases were discovered by Enterprise personnel, and employees were dispatched to confirm the releases and to shut in the affected well, de-pressurize the associated lines, and lock out/tag out associated control valves. The assessment of the pipeline was continued on June 6, 2012, when it was determined that the releases were a result of two corrosion holes (approximately 54 feet apart) in the pipeline. Enterprise contractors completed the repair of the pipeline on June 8, 2012.

On June 11 and 12, 2012, an Enterprise contractor excavated petroleum hydrocarbon impacted soil within the two release areas. The excavation was terminated on June 12, 2012, due to difficulties with heavy equipment ingress and egress in the wet, sandy soils. The final excavation dimensions measured approximately 98 feet by 14 feet by 2.5 feet deep. Prior to the excavation being backfilled, AES field screened soil samples for volatile organic compounds (VOCs) and collected confirmation soil samples from the excavation side walls for laboratory analysis. An additional sample was collected from a test hole that was excavated to 2 feet below ground surface (bgs) immediately adjacent to the northwest wall of the excavation in order to delineate the extent of the release.

All soil samples had reported concentrations of benzene and total benzene, toluene, ethyl-benzene, and xylenes (BTEX) below the applicable NNEPA action levels. However, concentrations of total petroleum hydrocarbons (TPH) were reported above the NNEPA action level of 100 mg/kg in two of the soil samples. The highest TPH concentration, as gasoline and diesel range organics, was reported in SC-5 with 291 mg/kg.

Groundwater was encountered within the excavation at approximately 2.5 feet bgs. On June 12, 2012, AES collected three confirmation groundwater samples in order to determine if groundwater had been impacted. Laboratory analytical results for TH-1W showed that dissolved phase concentrations were above NNEPA action levels for benzene (2,100 µg/L), toluene (8,400 µg/L), and xylenes (9,900 µg/L). Note that for oil and gas releases, NNEPA utilizes New Mexico Water Quality Control Commission (WQCC) groundwater standards. Details of the initial site assessment were submitted in the *Site Investigation Work Plan for the Gallegos Well Tie Line #90898, Gallegos #2,* dated June 22, 2012.

Based on field screening and laboratory analytical results, AES recommended a continued site investigation in order to delineate the hydrocarbon impacted soil and groundwater.

1.2.2 Site Investigation – July 2012

On July 6 through 11, 2012, AES completed a site investigation in order to delineate the full extent of petroleum hydrocarbon impact on soil and groundwater resulting from the releases. The investigation included the installation of 13 temporary wells (TW-1 through TW-13) using a HydroPunch sampling tool and the collection of soil and groundwater samples.

A total of 13 soil samples were collected using a hand auger while installing soil borings to just above the capillary fringe. Soil field screening readings for VOCs and laboratory analytical results for benzene, total BTEX, and TPH showed reported concentrations below laboratory detection limits and NNEPA action levels in each soil boring.

Groundwater samples were collected from six of the temporary wells (TW-1, TW-2, TW-3, TW-5, TW-8, and TW-10) with a peristaltic pump. The remaining wells were not sampled because of insufficient water available for sample collection. Laboratory results confirmed groundwater impact in TW-3 with dissolved phase concentrations above WQCC standards for benzene (220 µg/L), toluene (770 µg/L), and xylene (1,400 µg/L). All other samples were below laboratory detection limits or WQCC standards.

Additionally, dissolved phase gasoline range organic (GRO) concentrations were reported in TW-3 with 6.0 mg/L and in TW-5 with 0.053 mg/L, and diesel range organic (DRO) concentrations were reported in TW-3 with 7.0 mg/L and in TW-8 with 1.1 mg/L. All other samples were below laboratory detection limits for TPH (as GRO/DRO). Note that WQCC standards have not been established for TPH (as GRO/DRO).

Details of the groundwater investigation were included in the report entitled *Site Investigation Report for Enterprise Products Company Gallegos Well Tie Line #90898, Gallegos #2 Pipeline Release* dated September 18, 2012.

2.0 Proposed Bio-Remedial Solution Application

In order enhance bioremediation of dissolved phase petroleum hydrocarbons in the area near TW-3, 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 four temporary groundwater sampling points (TW-10 through TW-13) in March 2013, approximately six months following the bio-remedial application. The temporary sampling points will be installed in the vicinity of TW-3 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 NNEPA and the NMOCD require notification prior to the installation of temporary groundwater sampling points. Approval from the Bureau of Indian Affairs (BIA) 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 Gallegos 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 HydroPunch 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-13 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-13 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 four HydroPunch temporary wells will be installed within the vicinity of TW-3. Following installation, three well volumes will be purged from each temporary well and then allowed to stabilize for a minimum of one hour prior to sample collection. Groundwater purged from the wells will be contained in labeled and sealed 55-gallon drums. Purged water will be transported back to the AES yard and kept in a secure location until proper disposal. 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 NNEPA 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

Cc: Steve Austin
Navajo Environmental Protection Agency
P.O. Box 1999
Shiprock, New Mexico 87420

Glenn von Gonten
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Brandon Powell
New Mexico Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

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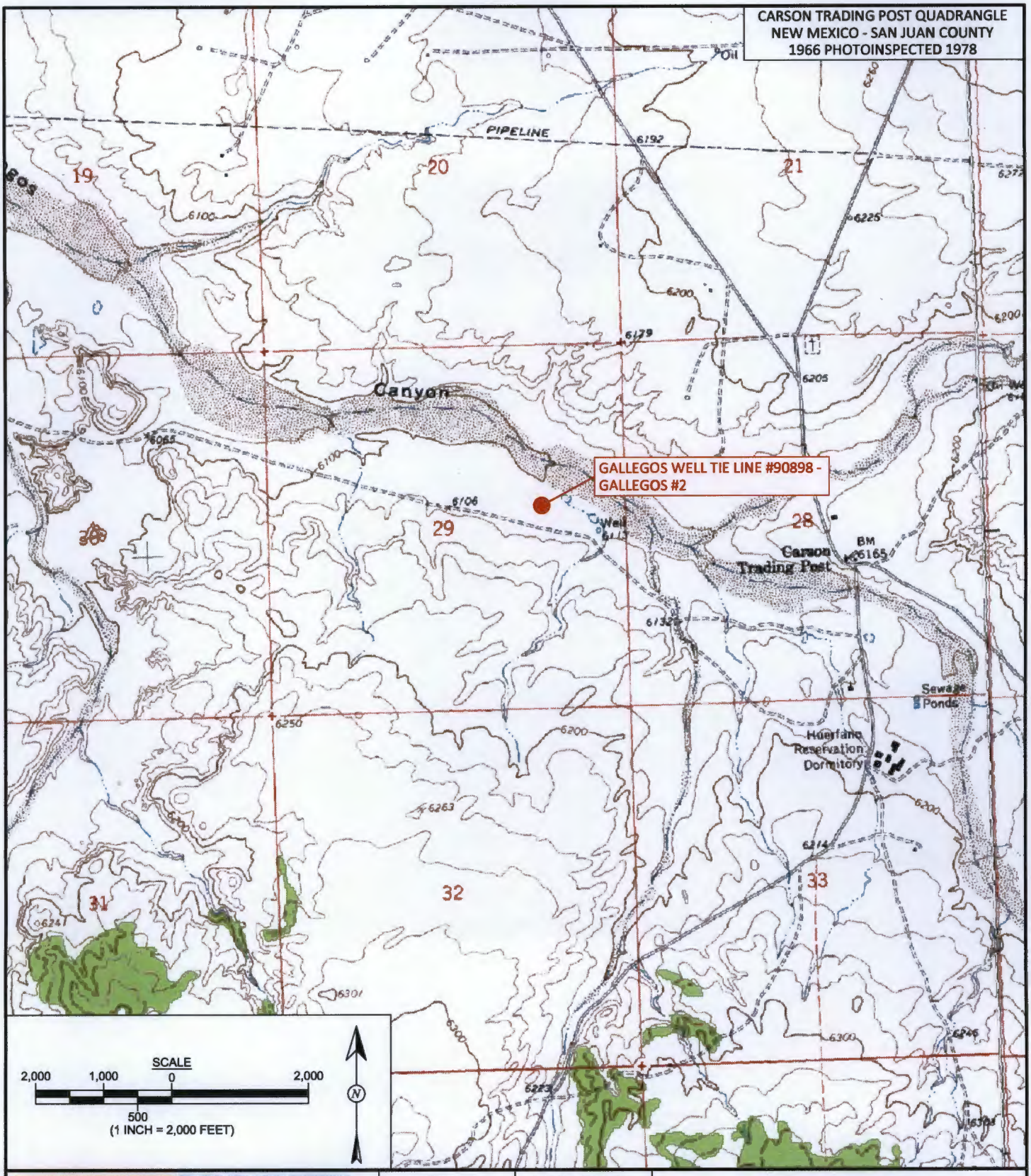

DRAWN BY: C. Lameman	**DATE DRAWN:** September 19, 2012	**FIGURE 1**
REVISIONS BY: C. Lameman	**DATE REVISED:** September 19, 2012	**TOPOGRAPHIC SITE LOCATION MAP** ENTERPRISE PRODUCTS COMPANY GALLEGOS WELL TIE LINE #90898, GALLEGOS #2 WORKPLAN SAN JUAN COUNTY, NEW MEXICO SE¼ NE¼, SECTION 29, T26N, R11W N36.45979, W108.02202
CHECKED BY: T. Ross	**DATE CHECKED:** September 19, 2012	
APPROVED BY: E. McNally	**DATE APPROVED:** September 19, 2012	

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DRAWN BY: C. Lameman	**DATE DRAWN:** September 19, 2012	**FIGURE 2**
REVISIONS BY: C. Lameman	**DATE REVISED:** September 19, 2012	**AERIAL SITE MAP** ENTERPRISE PRODUCTS COMPANY GALLEGOS WELL TIE LINE #90898, GALLEGOS #2 WORKPLAN SAN JUAN COUNTY, NEW MEXICO SE¼ NE¼, SECTION 29, T26N, R11W N36.45979, W108.02202
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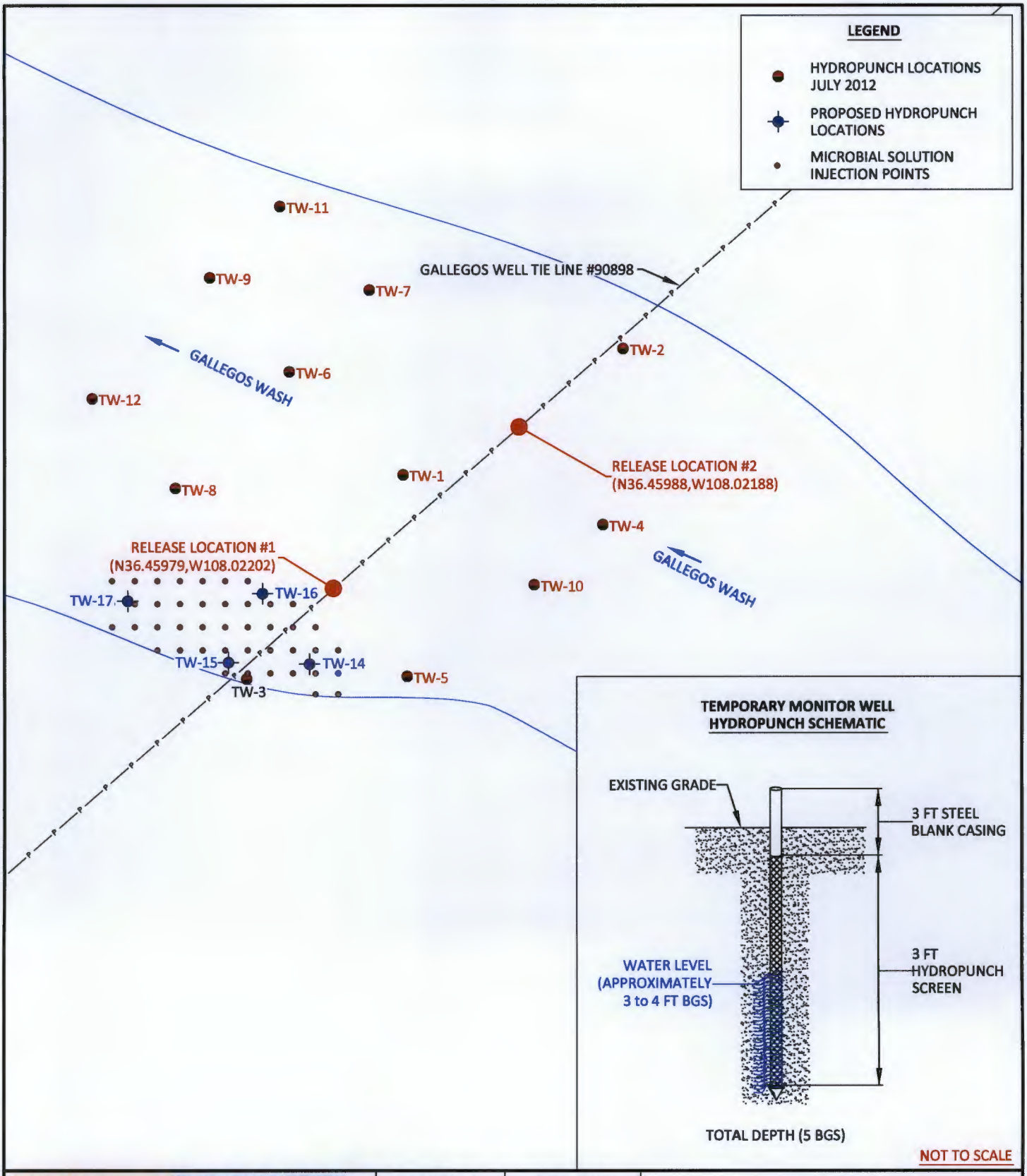

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FIGURE 3

PROPOSED MICROBIAL SOLUTION INJECTION AND TEMPORARY WELL LOCATIONS
ENTERPRISE PRODUCTS COMPANY
GALLEGOS WELL TIE LINE #90898,
GALLEGOS #2 WORKPLAN
SAN JUAN COUNTY, NEW MEXICO
SE¼ NE¼, SECTION 29, T26N, R11W
N36.45979, W108.02202

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.