1R - 272

GENERAL CORRESPONDENCE

YEAR(S): 2007-2002

1R0272

Matthew P. Hudson
Remediation Project Manager

Abandonment Business Unit
Chevron Environmental Management Company
11111 S Wilcrest Dr
Room N2104A
Houston, TX 77009
Tel 281 561 3466
Fax 281 561 3841
mhkw@chevron.com

April 4, 2007

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

Subject: Scope of Work for Additional Groundwater Plume Assessment
Lovington Paddock Remediation Site
Lea County, New Mexico
OGRID No. 4323
Permit No. 1R-272

Dear Mr. von Gonten:

Please find enclosed one copy of the above-referenced document. This scope of work was prepared to install additional groundwater assessment/delineation monitoring wells as part of the on-going remediation efforts at the Lovington Paddock Remediation Site. Please review and respond with any comments and/or suggestions. We plan to commence well installation in May 2007.

As discussed at our March 6, 2007 project update meeting, we are also preparing a scope of work to assess soil conditions related to former areas of known phase-separated hydrocarbons. We will forward you a copy of the soil assessment work plan when completed.

Should you have any questions concerning this report, please call myself at (281) 561-3466 or Scott Olivier with SECOR at (972) 872-5528.

Sincerely,

Matthew P. Hudson

Enclosure

cc: Scott Olivier, SECOR (cover letter only)

SCOPE OF WORK FOR PLUME ASSESSMENT AT

LOVINGTON PADDOCK GROUNDWATER REMEDIATION SITE

Lea County, New Mexico

March 22, 2007

89CH.49521.07.1500

Prepared by:

D. Scott Olivier

David Scott Olivier
Senior Project Manager

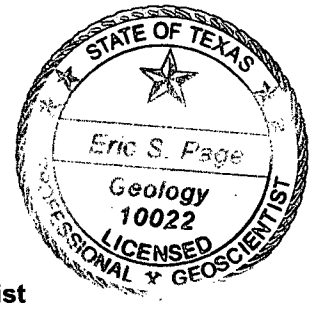
Matt Colvett for

Bo Vizcaino
Project Manager

Reviewed by:

Ronnie Kallus
Business Unit Manager

Eric Page
Professional Geologist



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1.0 SITE BACKGROUND

1.1 Site Location and Background

The Lovington Paddock Groundwater remediation Site (Site) is located approximately one mile west of the intersection of New Mexico Highway 18 and Stiles Road - south of the town of Lovington, Lea County, New Mexico. The legal site description is the southeast quarter of the southeast quarter of Section 1, Township17, Range 36 East. A Site Location Map is presented on **Figure 1**.

The areas adjacent to the Site include oil and gas production and transportation by underground pipelines. To the south of the Site is a fenced caliche paved yard and large steel building that housed a now closed udder cream manufacturing facility known as AST WEST. The facility appears to operate at least one water well. The location of the well(s) has not been established. Effluent from the udder cream manufacturing process was reportedly used to sprinkle irrigate an area immediately north of the fenced yard. A Site Satellite Photograph is presented on **Figure 2**.

A dairy cattle farm operated by Goff Dairies is located to the southeast of the Site. Several high volume irrigation wells border the south and east sides of the Site. The irrigation wells installed in 2001 and 2002 are used to irrigate farm land located near the dairy. The pumping of these irrigation wells has significantly altered the groundwater elevation, flow direction, and gradient at the Site. The reports form previous investigators indicate the site's groundwater gradient prior to the irrigation well installation was to the northeast, and changed to east southeast with the pumping of the wells. The local drop in the groundwater table has been so dramatic that the monitor wells installed prior to the installation of irrigation wells are now dry.

1.2 Remedial History

Previous groundwater and soil investigations were conducted at the Site by Highlander Environmental Corp. (Highlander) and ARCADIS G&M (ARCADIS). Remediation activities were authorized by the New Mexico's Oil Conservation Division (OCD) and initiated as a pilot, of what was termed a "low flow biosparge" system by ARCADIS, in one well in May of 2005. The system was expanded to three wells in March of 2006. Currently, the biosparge remediation system consists of three 4-inch wells screened in the upper 20 to 30 feet of the aquifer (saturated zone), with the screen extending upward above the static water level (vados zone) to a depth of 20 to 30 feet below the ground surface. An air compressor introduces atmospheric air into the sealed well's water column through an eductor pipe that has been perforated below the water level. The water column is oxygenated by the rising air bubbles and the air is then forced into the porous formation above the groundwater increasing volatilization of hydrocarbons and providing oxygen to naturally-occurring bacteria increasing their consumption of hydrocarbons in the soil and groundwater. A Site Details map is presented on **Figure 3**.

1.3 Regional Petroleum Geologic/Hydrogeologic Setting

The Site rests on a thin layer of Quaternary windblown cover sand overlying the Tertiary Ogallala Formation. The Ogallala Formation is the primary fresh water aquifer in the region and is commonly referred to as the Ogallala Aquifer or High plains Aquifer. The Ogallala Formation is generally fine to medium-grained quartz sand and gravel capped by caliche. The thickness of the Ogallala Formation is estimated at 200 feet at the Site.

2.0 PROJECT PLANNING AND PEPARATION

The following planning and preparation steps will be completed prior to site mobilization for the plume assessment activities outlined in this document.

2.1 Pre-Mobilization Preparations

Pre-mobilization activities will include:

- Preparation and establishment of an approved scope of work;
- Equipment procurement;
- Scheduling of all subcontractors, conducting line location notifications; and
- Health and safety program preparation.

2.2 Equipment Procurement

Equipment and materials for each of the tasks associated with plume assessment activities will be provided by the following:

- All well advancement, development and completion equipment will be provided, utilized and maintained by the well installation subcontractor Harrison & Cooper, Inc of Lubbock, Texas.
- Analytical testing materials will be provided by Lancaster Laboratories of Lancaster, Pennsylvania.
- Materials utilized during pumping test activities will be provided by SECOR.

2.3 Line Locate Notifications and Clearance

Utility clearance will be obtained prior to initiation of plume assessment activities. Anticipated utilities in the work zone include, but are not necessarily limited to: elevated and underground utility lines, underground water lines, and active and decommissioned petroleum and natural gas lines. No invasive work will be started until all utilities have been located and cleared.

Underground pipeline and utility clearance notifications and clearance will include, but will not necessarily be limited to:

- Notifying New Mexico One-Call and conducting a site visit to walk over the proposed locations with a line locating device;
- Meeting underground utility operators at the time of well advancement and completion to verify clearance; and
- Clearing borehole locations utilizing hydro-vac borehole clearance methods to the interface with native soils.

3.0 PLUME ASSESSMENT ACTIVITIES SCOPE OF WORK

The project scope of work consists of the safe, efficient and effective completion of the following tasks:

- Installation, development and completion of three groundwater monitor wells;
- Groundwater sample collection for compound-specific isotope analysis (CSIA); and
- Completion of an aquifer pumping test.

3.1.1 Groundwater Monitor Well Installation

The installation of three additional groundwater monitor wells is warranted to monitor downgradient constituents of concern (COC) migration. The wells will be advanced at equal distances between existing monitor wells MW-B and MW-Q. Proposed sample locations are included on the Site Details Map presented on **Figure 3**.

Following hydro-vac borehole clearance, the borings will be advanced through air rotary advancement techniques. Groundwater monitor wells will be completed to total depths of approximately 110 feet below ground surface and will be constructed of 4-inch diameter flush-joint schedule 40, polyvinyl chloride (PVC) with factory-slotted 0.020-inch slot screen. A sorted sand filter pack will be placed around the screen and a bentonite seal set above the sand pack to prevent the migration of contaminants to the sampling zone from the surface. The remainder of the well annulus will then be filled with cement.

The wells will be completed above the ground surface with a stick up completion set in a 4-foot by 4-foot concrete pad and secured with a locking lid. Well development will be conducted with a surge blocking event to settle the sand filter pack and maximize the flow of groundwater. Following installation, wells will be field surveyed for location and for elevation at the ground surface and top of casing.

3.2 Compound Specific Isotope Analysis

Following well installation and development, samples will be collected from the three newly-installed wells and two existing wells (total of five) to conduct CSIA. The CSIA is warranted to establish baseline isotopic fractionation conditions in groundwater monitor wells MW-B, MW-Q and the three newly installed wells.

Collected groundwater samples will be submitted to the University of Oklahoma and analyzed for carbon and hydrogen isotope ratios within benzene. This can provide useful information in determining if natural attenuation is occurring and will be utilized to monitor plume migration and constituent of concern parameters.

At each well, six hydrochloric acid-preserved 40-ml VOA vials need to be collected per compound. Therefore, to sample five wells for carbon and hydrogen isotopic ratios for benzene, a total of 30 VOAs will be collected. The holding time and shipping procedures are the same as for other VOA samples.

3.3 Pumping Test Activities

An aquifer pumping test will be conducted to collect site-specific aquifer parameters to estimate permeability and assess/model the rate of COC migration to determine an anticipated threat to down-gradient receptors. The pumping test will be comprised of:

- Background monitoring;
- Variable rate test (step-drawdown test);
- Constant-rate pumping test;
- Groundwater sample collection;
- Recovery monitoring; and
- Data evaluation.

The Pumping Test will be conducted in general accordance with ASTM Standard Test Method D 4050-96 *Field Procedure for Withdrawal and Injection Well Tests for Determining Hydraulic Properties of Aquifer Systems.* The test will utilize a monitor well network comprised of existing monitor wells MW-B, MW-Q and the three newly installed monitor wells.

3.3.1 Transducer Water Level Measurements

A network of data logging transducers will be used at selected observation wells in the vicinity of the test area. The transducers will record groundwater elevation data electronically that will be stored in the data logger memory. Electronically collected data will also be documented in both paper and electronic format. The transducer measurements will be field verified during testing at regular intervals and in the event anomalies are reported by the data logger.

3.3.2 Manual Water Level Measurements

Prior to and during the pumping test, groundwater level measurements will be taken at monitor wells MW-B, MW-Q, the three newly installed monitor wells, and at a distant monitor well chosen to be outside the influence area of the pumping test to verify automated groundwater elevation data measurements. Measurements will be taken at a frequency of one per hour for the duration of the test. Total depth of the well and depth to water will be recorded at each well. These data will be noted in the project field book and water elevation data sheets. Manual water level measurements will be utilized as quality control to verify the water level measurements collected with the transducer network.

3.3.3 Background Monitoring

Background monitoring data will be collected to determine if unidirectional or rhythmic fluctuations in groundwater head values exist and to correct for them, if necessary. Unidirectional variations are generally long term groundwater trends such as those caused by any natural recharge or discharge. Rhythmic variations are generally short term cyclical trends such as those caused by atmospheric pressure fluctuations or land tides. Potential regional groundwater fluctuations will be assessed by collecting periodic groundwater elevation data from representative wells within the monitoring network during non-stress conditions. Data loggers will be used to collect the background groundwater elevation data at a frequency of one measurement per minute. These data will be used to correct pumping test data, if necessary.

Rhythmic fluctuations such as those caused by variations in atmospheric pressure will be evaluated by collecting atmospheric pressure data during the entire period of the test. One of the data loggers used to collect groundwater head values during the test will also collect and record atmospheric pressure data. A record of the atmospheric data will be collected and compared to groundwater elevation data collected during the pumping test.

3.3.4 Variable Rate Test

Proposed pumping test activities will include an approximate 10-hour initial step-drawdown test, followed by a 48 to 72 hour constant-rate pumping test, and post-test recovery period.

A step-drawdown test will be performed to establish an appropriate pumping rate for use during the test. It is anticipated up to three steps will be performed during the step-drawdown test, with each step utilizing a constant extraction rate for two to four hours. The actual duration and number of steps will be determined through an evaluation of real-time data and aquifer responses in the field. Groundwater elevation data will be collected from the primary monitor well network at five-second intervals throughout the testing.

Following completion of the step-drawdown test, the aquifer will be allowed to recover to at least 95 percent of the pre-step elevation prior to initiation of the constant-rate pumping test.

3.3.5 Constant Rate Pumping Test

Results of the step-drawdown test will be utilized for the selection of the appropriate pumping rate for use during the test. The pumping rate will be maintained to within ten percent of the selected rate using a system of inline valves, pump controls, and flow meters. Discharge will be measured at a 5-minute frequency during the initial portion of the test when groundwater elevation values tend to fall quickly. Groundwater elevation data will be collected and recorded using a network of wells - including MW-B, MW-Q, the three newly installed monitor wells, and at a distant monitor well chosen to be outside the influence area of the pumping test. Measurements will be made at logarithmic intervals of time for all wells except the distant monitor well, which will be monitored manually at a frequency of once per four daylight hours.

The test will be conducted between 48 and 72 hours at the selected constant groundwater extraction rate. The duration of the pumping test will be determined by performing a preliminary analysis of the drawdown data using an appropriate test method such as ASTM D4105 or ASTM D4106. The test will be continued until the preliminary analysis shows adequate duration.

3.3.6 Groundwater Sample Collection

Groundwater samples will be collected to assess the influences groundwater extraction has on the distribution of the constituents of concern, and to confirm compliance with discharge and disposal requirements. One groundwater sample will be collected and submitted to an analytical laboratory for 24-hour turnaround during the step-drawdown test. The purpose of this sample collection and analysis is to verify existing groundwater quality information and to document the water quality for disposal purposes.

Additional groundwater samples will be collected from the discharge stream during the pumping test at a frequency of one sample per twelve hours (maximum of four samples). Analytical results of samples collected during the test will provide useful information for any future treatment system design. The samples will be analyzed for total suspended solids (TSS), total dissolved solids (TDS), volatile organic compounds (VOCs), specific electrical conductance and an anion/cation scan (Ca, Na, K, Mg, As, F, Cl, SO_4 and NO_3). Lancaster Laboratories will be used for these sample analyses.

3.3.7 Recovery Period

Groundwater elevation data will be collected during the post-pumping recovery period at the same time intervals as during the extraction until the aquifer has recovered to at least 95 percent of the pre-extraction test elevation. Similar sites indicate this time frame is anticipated to be less than 24 hours; however, the actual monitoring period will be determined based on field data. A foot-valve will be fitted at the base of the discharge line to prevent backflow from impacting the early recovery data.

3.3.8 Data Evaluation

Aquifer pumping test data will be analyzed to determine hydraulic coefficients, such as transmissivity and storage coefficient, following standard methods given in ASTM D4105-96, D4106-96, or other applicable methods. Depth-to-water and discharge data will initially be plotted against time to identify any aberrations related to long-term recharge or discharge or any short-term rhythmic variations related to changes in atmospheric pressure. Appropriate corrections will be applied. Corrected data will then be analyzed using standard type-curves available in the literature. Results of the analysis and all data gathered during the pumping test will be presented in a technical memorandum.

3.4 Waste Management and Disposal

Soil wastes produced during groundwater monitor well advancement will be temporarily stored on-site in properly labeled and sealed drums. Following receipt of analytical data and preparation of proper waste removal documentation, the drums will be removed from the Site and transported to an approved landfill for final disposition.

Groundwater extracted during the Pumping Test will be routed to temporary holding tanks to guard against artificially recharging the aquifers. Stored water will be removed by a Chevron approved trucking company for disposal.

4.0 HEALTH AND SAFETY

All health and safety oversight will be conducted and documented by an on-site SECOR Health and Safety Coordinator.

4.1 Site Health and Safety

A site-specific health and safety plan (HASP), covering all anticipated work relating to plume assessment activities, has been prepared for the Site. The HASP will be reviewed by all site personnel and will be kept available to all personnel for review.

Job Safety Analysis documentation will be continuously modified and/or created to cover any additional contingencies realized in the field. The HASP will be kept available on site to all personnel.

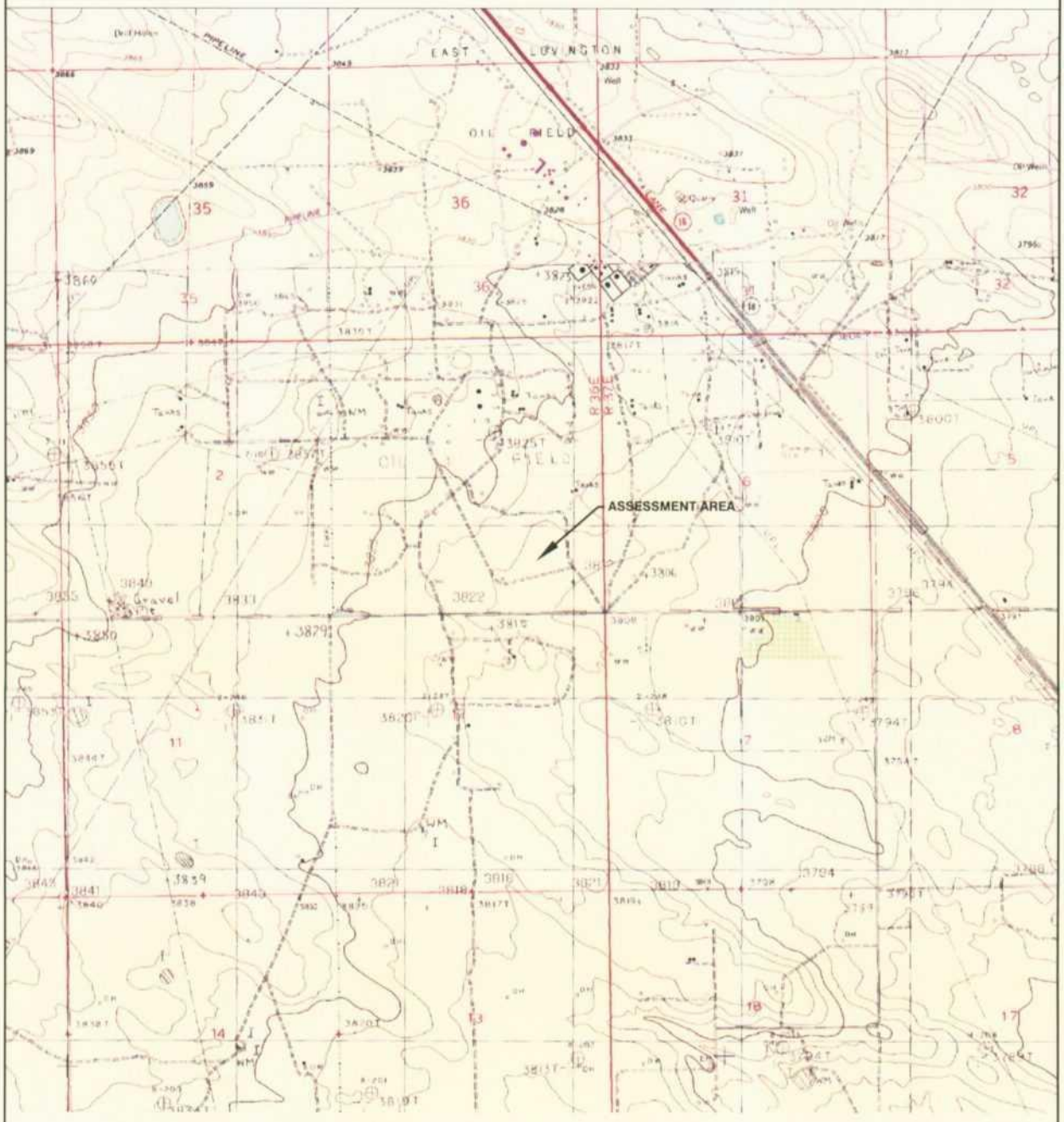
Health and safety tailgate meetings will be held twice daily (first thing in morning and after lunch prior to re-initiating work) throughout the duration of the project with SECOR personnel and all other subcontracted on-site personnel. These meetings will be utilized to promote awareness of health and safety concerns and to help ensure that a zero incident policy is stressed throughout the duration of the project.

4.2 Air Monitoring

Hydrogen sulfide (H_2S) air monitoring will be continuously conducted at the Site with personal H_2S monitors carried by all personnel. In the event that Site H_2S readings are above action levels as defined in the HASP, sampling activities will cease and all personnel will immediately leave the Site until best management practices can be evaluated and implemented.

4.3 Site Work Zones and Security

To minimize the number of personnel coming into contact with site work and to reduce health ands safety concerns, work zones will be established and marked for each task to be performed. All plume assessment activities will be conducted within their respective work zone boundary. Support zones will also be established outside the work zones in the vicinity of the equipment laydown area.



NEW MEXICO

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; LOVINGTON SOUTHEAST, NEW MEXICO, 1985

0 2000 4000

APPROXIMATE SCALE (FEET)

N

STATE OF TEXAS
Eric S. Page
Geology
10022
LICENSED
GEOSCIENTIST

SECOR

10235 WEST LITTLE YORK, SUITE 400
HOUSTON, TEXAS
PHONE: (713) 937-7973/983-6328 (FAX)

FOR:
LOVINGTON PADDOCK
GROUNDWATER REMEDIATION SITE
LEA COUNTY, NEW MEXICO

SITE LOCATION MAP

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
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APPROXIMATE SCALE (FEET)

SECOR
10235 WEST LITTLE YORK, SUITE 400
HOUSTON, TEXAS
PHONE: (713) 937-7973/983-8328 (FAX)

FOR:
LOVINGTON PADDOCK
GROUNDWATER REMEDIATION SITE
LEA COUNTY, NEW MEXICO

SITE SATELLITE PHOTOGRAPH

FIGURE: **2**

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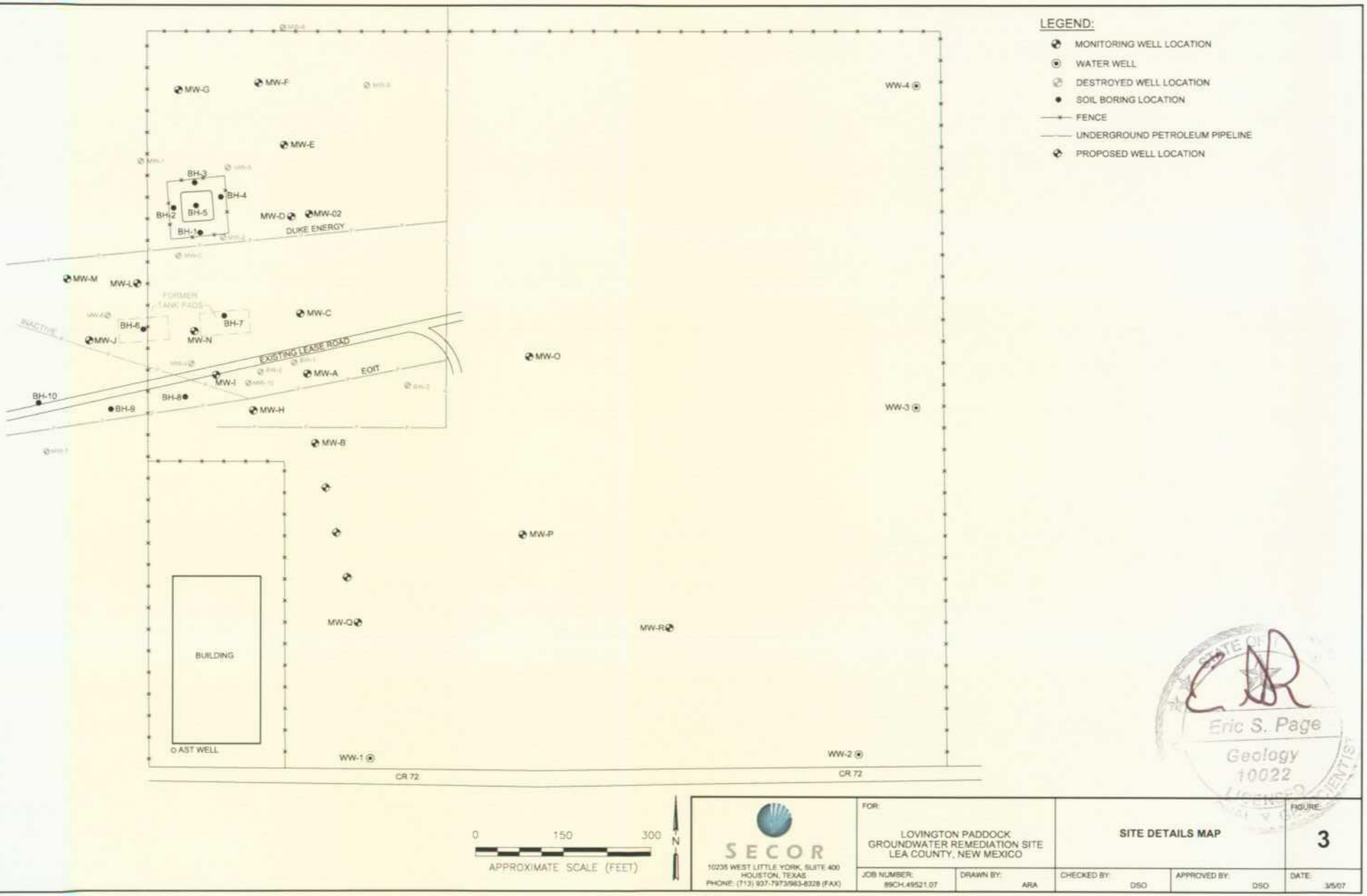

Eric S. Page
Geology
10022

SECOR
10235 WEST LITTLE YORK, SUITE 400
HOUSTON, TEXAS
PHONE: (713) 937-7973/963-8328 (FAX)

FOR:
LOVINGTON PADDOCK
GROUNDWATER REMEDIATION SITE
LEA COUNTY, NEW MEXICO

SITE DETAILS MAP

FIGURE: 3

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Price, Wayne

From: Price, Wayne
Sent: Tuesday, May 31, 2005 8:36 AM
To: 'rlechwar@pureresources.com'
Cc: 'fkieffer@arcadis-us.com'
Subject: Pure Resources Lovington Paddock Groundwater Contamination site 1R0272

Contacts: Ron Lechwar

Dear Ron:

OCD is in receipt of the Arcadis Remediation Pilot Project Report dated July 2004. Would you please provide us the current status of this project.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Price, Wayne
Sent: Friday, May 27, 2005 4:45 PM
To: 'shall@arcadis-us.com'
Subject: Pure Resources Lovington Paddock Project 1R0272

Contacts: Sharon Hall

Do you know the status of this project? Project manager is Frank Kieffer of Arcadis.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

ROB LECHWAR
PURE
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MID TEX 79701
432-498-8625
R LECHWAR@
PURERESOURCES.COM

FKIEFFER@
ARCADIS-US.COM

Price, Wayne

From: Price, Wayne
Sent: Friday, April 23, 2004 9:52 AM
To: 'rlechwar@pureresources.com'
Cc: Johnson, Larry; Sheeley, Paul
Subject: Lovington Paddock Site 1R0272

Contacts: Ron Lechwar

Dear Ron:

Please note I have assumed responsibility for the regulatory over-site for this project. Pursuant to our telephone conversation please provide this office and the district with a brief progress report by next week and a commitment to provide a detail report with conclusions and recommendations.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

From: Lechwar, Ron [rlechwar@PureResources.com]
Sent: Friday, April 23, 2004 10:25 AM
To: WPrice@state.nm.us
Cc: Flagan, Hugh R
Subject: Report on activities at Lovington, NM remediation site

Dear Mr. Price,

Attached is a copy of a report prepared by Arcadis at my request. It should serve to bring your office up to date on the activities that have taken place in the past six months or so. As indicated in the attached, we will be coming up on the ninety day sampling point for the pilot biosparge well around the last week in May, 2004. Given sufficient time to take and process these samples, I feel confident that we can have have a complete progress report, including recommendations for additional activites, in your office by July 15, 2004.

Thank you, <<ATB-1 Policy Procedures Draft 05-2003.doc>>

Ron Lechwar
HES Coordinator
Pure Resources
500 W. Illinois
Midland, Texas 79701
432 498-8625 Office
432 634-2239 Cell 1
432 664-2920 Cell 2

ARCADIS G&M, Inc.
1004 N. Big Spring Street
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Midland Texas 79701
Tel 432.687.5400
Fax 432.687.5401
www.arcadis-us.com

Mr. Wayne Price.
Hydrologist, Environmental Bureau
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Sante Fe, New Mexico 87505

ENVIRONMENTAL

Subject:
DRAFT Pure Resources Lovington Paddock Site Update

OCD File 1R-0272

Date:
23 April 2004

Contact:
Frank Kieffer

Phone:
432-687-5400

Email:
fkieffer@arcadis-us

Dear Mr. Price:

In response to your request of this morning, ARCADIS G&M, Inc. (ARCADIS) has prepared a highlights summary of activity at the Lovington Paddock Site for plume delineation and remediation conducted for Pure Resources, Inc. (Pure) recently.

October 2003 – Delineation Activity

The six agricultural/commercial water wells located on the east and south sides of the investigation area were sampled for BTEX, TPH and general water quality parameters. No well indicated any BTEX or TPH. Water quality was overall good although two wells had chlorides (411 & 312 mg/L) above the State standard of 250 mg/L.

November 2003- Delineation Activity

Three monitoring wells were drilled downgradient and to the east, southeast and south of the existing groundwater BTEX plume. The only BTEX encountered was in the eastern monitor well where xylene was detected at a concentration of 0.0014 mg/L, just above the laboratory detection limit.

A fourth monitor well (MW-D2) was drilled within 50 feet of monitor well MW-D and downgradient to it. This monitoring well was drilled entirely through the upper aquifer to determine the vertical extent of the elevated chlorides (356 mg/L) observed in MW-D. A conductivity profile and interval sampling of the fully penetrating and screened well was run. There was no significant change in the conductivity in the aquifer through its entire depth and this was confirmed by the interval sampling. Chloride values for the interval sampling indicated a range of 248 to 314 mg/L.

November 2003 – Remedial Activity

A Biosparge Pilot Project was initiated with the drilling of a biosparge well. A biosparge well was drilled approximately 30 feet north-northwest of MW-A. The biosparge well was drilled to a depth of approximately125 feet and screened from TD to approximately 20 feet bgl.

The primary intent of low-flow air sparge systems is to quickly remediate hydrocarbon-affected groundwater and soils by injecting air into the groundwater column at a relatively low-flow rate. The injection of air also causes a rise in the water table at the well resulting in some degree of groundwater circulation. At the point of water table upwelling, aerated water spreads away from the well bore with a return flow of water beneath the water table. This circulation enhances the distribution of aerated groundwater generated in the well. Aeration will also take place as groundwater in transmissive layers flows through the biosparge well bore. In common with the increased biotic mass and activity is the production of quantities of biosurfactants. The biosurfactants are useful in freeing adsorbed hydrocarbons from soil particles and further accelerating the biodegradation rate of the hydrocarbons.

The sampling plan for the biosparge system monitors the impact of the biosparging system in three media:

- The groundwater in the saturated zone;
- soil gas in the vadose zone; and
- indirectly the geologic matrix in the saturated and vadose zone.

Pilot System Monitoring

The schedule for sampling the biosparging pilot system is shown below in Table 1.

Table 1 Biosparging Pilot Study - Sampling Schedule for Injection Well, Groundwater Monitor Wells, and Vapor Phase Monitor Wells and Points

	Base Line	Week 1	30 Days	60 Days	90 Days
Groundwater					
Field Parameters	X	X	X	X	X
BTEX	X		X	X	X
Other Lab Parameters	X		X		X
Lab Permanent Gases	X		X		X

Vapor Phase					
Field VOC	X	X	X	X	X
Lab Atmospheric Gases	X		X	X	X
Soil Vapor Probe[1]	X		X		X
Physical Parameters					
Water Level	X	X	X	X	X
Injection Well Data	X	X	X	X	X

[1]Three points at a depth of 3 to 4 feet and radial distance from injection well at 10, 30 and 90 feet

December 2003– Remedial Activity

A compressor was placed at the biosparge well. Background sampling was conducted on the wells to be used for monitoring the effects of biosparging. These include the following lists of wells

The following wells are being used to measure groundwater parameters:

- MW-A;
- MW-B;
- MW-C;
- MW-H;
- MW-I; and
- MW-N;
- BW-1 (biosparge well).

The following wells are being used to measure soil gas (vapor phase):

- MW-A;
- MW-C;
- MW-B;
- MW-H;
- MW-I;
- MW-N;
- MW-10;
- MW-4;
- MW-D;
- BW-1; and

Soil Vapor Probes.

After the system had been operational for one week, an abbreviated round of sampling was conducted as shown in Table 1.

January 2004– Remedial Activity

The 30 day sampling event was conducted in Mid January. At this time no observable indications of biological activity had taken place and none were expected. However, there were clear indications that the radius of influence of the air injection was good.

February-March 2004 – Remedial Activity

Compressor problems limited the effectiveness of the system. There were major breakdowns of the unit and repeated repairs were not successful in restoring long term operations.

A new compressor was installed in Mid-March and has operated optimimally.

April 2004– Remedial Activity

The 60 day sampling event was conducted the week of April 18, 2004. No results of that sampling event are available at this time.

If you have any questions or comments regarding the delineation phase or the remedial pilot project, please call Mr. Ron Lechwar, Pure Resources, Inc. at 432-498-8625.

Our ref:
MT000803.0001

Very truly yours,

ARCADIS G&M, Inc.

Frank Kieffer
Project Manager

Copies:
File

ARCADIS

Infrastructure, buildings, environment, communications

ARCADIS G&M, Inc.
1004 N. Big Spring Street
Suite 300
Midland Texas 79701
Tel 432.687.5400
Fax 432.687.5401
www.arcadis-us.com

Mr. Randolph Bayliss, P.E.
Hydrologist, Environmental Bureau
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Sante Fe, New Mexico 87505

ENVIRONMENTAL

Subject:
Pure Resources Remedial Action Pilot Plan
Lovington Paddock Site

OCD File 1R-0272

Date:
14 October 2003

Contact:
Frank Kieffer

Phone:
432-687-5400

Email:
fkieffer@arcadis-us

Dear Mr. Bayliss:

In response to your letter of October 2, 2003, ARCADIS G&M, Inc. (ARCADIS) has prepared a Lovington Paddock Site Remedial Action Pilot Plan for Pure Resources, Inc. (Pure).

Remedial Action Pilot Plan

The recommended Remedial Action Pilot Plan consists of a low-flow air sparging system designed to maximize in situ biodegradation and minimize volatilization of hydrocarbons. Operated in this fashion, it is more appropriately termed a biosparge system. The primary intent of low-flow air sparge systems is to quickly remediate hydrocarbon-affected groundwater and soils by injecting air into the groundwater column at a relatively low-flow rate. The sparging pressure will be governed by the depth and condition of the sparge point. This injection causes aeration of the groundwater stimulating naturally occurring aerobic bacteria to utilize the impacting hydrocarbons as an energy and carbon source and cause their numbers to multiply. Aerobic processes offer the greatest potential energy yield to bacteria making them the most effective, from a biochemical standpoint, for destruction of hydrocarbons.

The injection of air also causes a rise in the water table at the well resulting in some degree of groundwater circulation. At the point of water table upwelling, aerated water spreads away from the well bore with a return flow of water beneath the water table. This circulation enhances the distribution of aerated groundwater generated in the well. Aeration will also take place as groundwater in transmissive layers flows through the biosparge well bore. In common with the increased biotic mass and activity is the production of quantities of biosurfactants. The biosurfactants are useful in freeing adsorbed hydrocarbons from soil particles and further accelerating the biodegradation rate of the hydrocarbons.

The sparge well will have a screen that extends into the vadose zone. A significant portion of the injected air breaks the surface of the groundwater in the well bore (and beyond the well bore) and moves outward into the soil column adjacent to the screened interval in the well bore. The aerobic biostimulation processes that occur in the vadose zone soil column are the same as those stimulated in the saturated zone for the treatment of dissolved-phase hydrocarbons. Eventually some portion of the injected air is released into the atmosphere but at a point where the hydrocarbon mass has been converted to carbon dioxide.

The location of the remedial pilot biosparge system is shown on Figure 1.

The pilot system will consist of a single new air biosparge well located among several monitoring points.

When the pilot remediation system is shown to be successful, a complete biosparge system will be installed. A complete biosparging system to remediate soil and groundwater will involve the placement of biosparge wells in a linear or grid spacing equal to two times the area specific radius of influence of the biosparge well. In other words, if area biosparge wells have a radius of influence of 50 feet, they would be placed into a grid of biosparge wells located 100 feet apart. The placement of biosparge wells will also be controlled by the area and concentrations of the hydrocarbon in the groundwater and soil plumes. The complete system may also require some additional monitoring wells.

Pilot Well Installation

The pilot biosparge well will be drilled at the same time as the proposed plume delineation-monitoring wells (see Plume Delineation Plan, October 2003). During drilling, drill cuttings will be observed and monitored for hydrocarbons. If appropriate, discrete soil samples will be collected by split spoon or coring. Soil samples will be preserved and some samples may be submitted for laboratory analysis as described in the Plume Delineation Plan. No more than three soils samples will be submitted for laboratory analysis from the pilot biosparge well.

The biosparge well will be drilled to a depth of approximately 125 feet bgl and completed using four-inch threaded schedule 40 PVC casing. With the depth to water being approximately 85 feet below ground level (bgl), this will allow for the placement of 40 feet of screen below the water table. The screen above the water table will extend to within 25 feet of the surface of the ground. The well will be developed by purging approximately 1,000 gallons of groundwater. Groundwater sampling will occur after the well development and will be coincident with the monitoring program for the remedial system discussed later in this proposal. It is

estimated that the drilling, completion and development of the biosparge well will require two days if it is drilled at the same time as the other proposed wells.

System Equipment

The equipment list necessary for the Remedial Action Pilot System is as follows:

- Biosparge well;
- Electrical drop, 230 volt 3 phase (a variable of the compressor motor);
- Air compressor, single stage stationary, 15-20 SCFM @ 90-135 psi;
- Small shed for the compressor (optional);
- Drop tube, ½-inch to 2-inch ID PVC;
- Biosparge point, 1 foot of ¾-inch ID or similar PVC with 1/16 to 1/8-inch holes;
- Compressor to the biosparge well piping;
- Instrument Gauges
    - Pressure 100 psi to 25 psi ranges (several)
    - Temperature (several);
- One Flow Meter with a max flow rate of 25 SCFM;
- Flow control needle valve; and
- Adapted pressure control well head.

Figure 2 is a generalized construction diagram of a biosparge well. A 2-inch solid PVC drop pipe with a sparge point at its end will be used to conduct the compressed air into the well beneath the groundwater surface.

System Routine Operation and Maintenance

The biosparge well will be drilled and completed as previously discussed at a location approximately 30 feet north-northwest of monitoring well MW-A and approximately 70 feet north-northeast of MW-H. A wellhead airflow manifold will be constructed to control flow rates and injection pressures. An electrical drop will be necessary for the compressor.

At least weekly checks of the air compressor operational status, recording of manifold pressures and temperatures and flow control adjustments will be necessary. Pure Lovington field personnel will check the system at least weekly and report pertinent pressure and flow rate data to ARCADIS personnel ARCADIS will evaluate the system operation and maintenance needs. Routine manual modifications of the system will be made by Pure personnel. Field maintenance/repair of the system

will be the responsibility of ARCADIS. Based upon experience with previous biosparge system, ARCADIS believes that maintenance will be minimal.

System Evaluation

The evaluation of the system's effectiveness will be made by monitoring groundwater and soil parameters in existing surrounding monitor wells. The sampling plan has been designed with two key issues in mind. The first is the actual areal distribution of the sampling points around the biosparge well, and the second is the parameters to be analyzed from those points.

The selection of wells for monitoring has been made in order to determine the radial effect of sparging in both groundwater and soils. That is, the effect of sparging should be observable at successively further distances from the sparge well over time. Therefore, monitoring wells have been chosen at varying distances and directions to determine the actual time and distances over which the effects of sparging can be observed both in the soils and groundwater. This information will be used to evaluate the effectiveness of the remedial method and to design the location of future full system biosparge and monitoring wells.

The following wells will be used to measure groundwater parameters:

- MW-A;
- MW-B;
- MW-C;
- MW-H;
- MW-I; and
- MW-N.

The sampling plan will monitor the impact of the biosparging system in three media:

- The groundwater in the saturated zone;
- soil gas in the vadose zone; and
- indirectly the geologic matrix in the saturated and vadose zone.

The parameters that will be monitored will provide information on the dynamics of the following systems:

- VOCs in both groundwater and the vadose zone. There will be some initial transference of VOCs from the saturated to the vadose zone, followed by attenuation by biodegradation. The effect of the remediation program on the soils can also be inferred from the VOC data.

- Parameters indicative of biological activity such as ORP, pH, carbon dioxide in both groundwater and soil gas, other trace gases such as methane, and inorganic constituents such as iron, sulfate, and alkalinity.
- Parameters that provide background information on the groundwater system such as TDS and chloride.

In aggregate these parameters allow for the assessment of the total dynamic impact of the biosparge system on the VOCs and how the site biogeochemistry and physical setting will impact the final full-scale design.

Groundwater Measurements

Groundwater samples will be collected using low-flow sampling techniques. Field parameters will be measured in the field for groundwater using a flow-through cell for the qualities of:

- Temperature;
- Dissolved oxygen;
- Redox potential;
- pH;
- Specific conductance;
- Ferrous iron concentration (field kit); and
- Hydrogen sulfide concentration (field kit).

Upon stabilization of the groundwater flow parameters, samples for laboratory analysis will be collected for the determination of the concentrations of:

- BTEX by EPA Method 8021B;
- Total alkalinity;
- Total dissolved solids;
- Total iron;
- Dissolved iron;
- Sulfate;
- Chloride;
- Total organic carbon; and
- Permanent gases in groundwater (nitrogen, carbon dioxide, oxygen, & methane) by Microseeps.

Soil Gas Measurements

The following wells will be used to measure soil gas (vapor phase):

- MW-A;
- MW-C;

- MW-B;
- MW-H;
- MW-I;
- MW-N;
- MW-10;
- MW-4;
- MW-D; and
- Soil Vapor Probes.

Vapor phase monitoring will be conducted as shown in Table 1 using a photo-ionization detector for field measurements of volatile organic compounds in well bores. Soil gas for laboratory analysis will be collected using either a Tedlar bag or Summa Canister for the laboratory determination of BTEX by one of the EPA Methods TO-13/14/14A/MAAPH or similar approved method and permanent gases (nitrogen, carbon dioxide, oxygen and methane) by either EPA Methods 3C or ASTM Methods 1945 or 1946 or similar approved method. In addition, several soil vapor probes with adsorbent elements will be placed into the surface of the ground approximately 3-4 feet in depth at distances of 10, 30 and 90 feet (respectively) from the biosparge well. Samples will be collected from them as shown in the accompanying Pilot System Monitoring Table. Soil vapor analysis of BTEX by a sorbent collector will be by EPA Method TO-17 or NIOSH Method 1501 or similar approved method. It should be remembered that baseline measurements may indicate pre-existing shallow soil hydrocarbon contamination and soil vapor escaping to the atmosphere rather than vapor generated by the sparge well.

Pilot System Operation and Monitoring Schedule

Pilot System Start up

The pilot system equipment can be installed after the completion of the pilot well and the electrical line to the well site. Installation and testing of the system equipment is anticipated to require four days including the base line monitoring.

The anticipated pilot test period will be approximately 90 days. The actual test may be longer than the proposed period and will be dependent upon the uniformity of system operational uptime, field and laboratory results from the monitoring wells and the interpretation of the effectiveness of the system during this time period.

ARCADIS

Pilot System Monitoring

The schedule for sampling the biosparging pilot system is shown below in Table 1.

Table 1 Biosparging Pilot Study - Sampling Schedule for Injection Well, Groundwater Monitor Wells, and Vapor Phase Monitor Wells and Points

	Base Line	Week 1	30 Days	60 Days	90 Days
Groundwater					
Field Parameters	X	X	X	X	X
BTEX	X		X	X	X
Other Lab Parameters	X		X		X
Lab Permanent Gases	X		X		X
Vapor Phase					
Field VOC	X	X	X	X	X
Lab Atmospheric Gases	X		X	X	X
Soil Vapor Probe[1]	X		X		X
Physical Parameters					
Water Level	X	X	X	X	X
Injection Well Data	X	X	X	X	X

[1]Three points at a depth of 3 to 4 feet and radial distance from injection well at 10, 30 and 90 feet

Pilot System Report

Subsequent to the baseline sampling event, 30 day and 60 day sampling events and the receipt of laboratory analytical data, the field and analytical data will be presented in interim reports. Any responses to the operational parameters of the system will be made at these times.

After completion of the pilot system operation and monitoring phase, a report will be prepared within 60 days of the completion of the pilot field activity presenting the activities conducted for the pilot test, tables of the field and laboratory data collected and an interpretation of the data. If appropriate, a generalized plan for the installation of a full-scale biosparging system will be presented.

Project Schedule

Work on the project may begin within one month of receiving written authorization from the Environmental Bureau. This assumes a drilling contractor can be available within this time frame.

ARCADIS

If you have any questions or comments regarding this remedial plan or the project in general, please call Mr. Pete Wilkinson, Operations Superintendent, Pure Resources, Inc. at 432-498-8642.

Very truly yours,

ARCADIS G&M, Inc.

Frank Kieffer
Project Manager

David Vance
Project Advisor

A. Joseph Reed
Senior Project Advisor

Our ref:
MT000803.0001

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Mr. Randolph Bayliss, P.E.
Hydrologist, Environmental Bureau
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Sante Fe, New Mexico 87505

ENVIRONMENTAL

Subject:
Pure Resources Remedial Action Pilot Plan
Lovington Paddock Site

OCD File 1R-0272

Date:
14 October 2003

Contact:
Frank Kieffer

Phone:
432-687-5400

Email:
fkieffer@arcadis-us

Dear Mr. Bayliss:

In response to your letter of October 2, 2003, ARCADIS G&M, Inc. (ARCADIS) has prepared a Lovington Paddock Site Remedial Action Pilot Plan for Pure Resources, Inc. (Pure).

Remedial Action Pilot Plan

The recommended Remedial Action Pilot Plan consists of a low-flow air sparging system designed to maximize in situ biodegradation and minimize volatilization of hydrocarbons. Operated in this fashion, it is more appropriately termed a biosparge system. The primary intent of low-flow air sparge systems is to quickly remediate hydrocarbon-affected groundwater and soils by injecting air into the groundwater column at a relatively low-flow rate. The sparging pressure will be governed by the depth and condition of the sparge point. This injection causes aeration of the groundwater stimulating naturally occurring aerobic bacteria to utilize the impacting hydrocarbons as an energy and carbon source and cause their numbers to multiply. Aerobic processes offer the greatest potential energy yield to bacteria making them the most effective, from a biochemical standpoint, for destruction of hydrocarbons.

The injection of air also causes a rise in the water table at the well resulting in some degree of groundwater circulation. At the point of water table upwelling, aerated water spreads away from the well bore with a return flow of water beneath the water table. This circulation enhances the distribution of aerated groundwater generated in the well. Aeration will also take place as groundwater in transmissive layers flows through the biosparge well bore. In common with the increased biotic mass and activity is the production of quantities of biosurfactants. The biosurfactants are useful in freeing adsorbed hydrocarbons from soil particles and further accelerating the biodegradation rate of the hydrocarbons.

The sparge well will have a screen that extends into the vadose zone. A significant portion of the injected air breaks the surface of the groundwater in the well bore (and beyond the well bore) and moves outward into the soil column adjacent to the screened interval in the well bore. The aerobic biostimulation processes that occur in the vadose zone soil column are the same as those stimulated in the saturated zone for the treatment of dissolved-phase hydrocarbons. Eventually some portion of the injected air is released into the atmosphere but at a point where the hydrocarbon mass has been converted to carbon dioxide.

The location of the remedial pilot biosparge system is shown on Figure 1.

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estimated that the drilling, completion and development of the biosparge well will require two days if it is drilled at the same time as the other proposed wells.

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The equipment list necessary for the Remedial Action Pilot System is as follows:

- Biosparge well;
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    - Pressure 100 psi to 25 psi ranges (several)
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- Adapted pressure control well head.

Figure 2 is a generalized construction diagram of a biosparge well. A 2-inch solid PVC drop pipe with a sparge point at its end will be used to conduct the compressed air into the well beneath the groundwater surface.

System Routine Operation and Maintenance

The biosparge well will be drilled and completed as previously discussed at a location approximately 30 feet north-northwest of monitoring well MW-A and approximately 70 feet north-northeast of MW-H. A wellhead airflow manifold will be constructed to control flow rates and injection pressures. An electrical drop will be necessary for the compressor.

At least weekly checks of the air compressor operational status, recording of manifold pressures and temperatures and flow control adjustments will be necessary. Pure Lovington field personnel will check the system at least weekly and report pertinent pressure and flow rate data to ARCADIS personnel ARCADIS will evaluate the system operation and maintenance needs. Routine manual modifications of the system will be made by Pure personnel. Field maintenance/repair of the system

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The following wells will be used to measure groundwater parameters:

- MW-A;
- MW-B;
- MW-C;
- MW-H;
- MW-I; and
- MW-N.

The sampling plan will monitor the impact of the biosparging system in three media:

- The groundwater in the saturated zone;
- soil gas in the vadose zone; and
- indirectly the geologic matrix in the saturated and vadose zone.

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- Parameters indicative of biological activity such as ORP, pH, carbon dioxide in both groundwater and soil gas, other trace gases such as methane, and inorganic constituents such as iron, sulfate, and alkalinity.
- Parameters that provide background information on the groundwater system such as TDS and chloride.

In aggregate these parameters allow for the assessment of the total dynamic impact of the biosparge system on the VOCs and how the site biogeochemistry and physical setting will impact the final full-scale design.

Groundwater Measurements

Groundwater samples will be collected using low-flow sampling techniques. Field parameters will be measured in the field for groundwater using a flow-through cell for the qualities of:

- Temperature;
- Dissolved oxygen;
- Redox potential;
- pH;
- Specific conductance;
- Ferrous iron concentration (field kit); and
- Hydrogen sulfide concentration (field kit).

Upon stabilization of the groundwater flow parameters, samples for laboratory analysis will be collected for the determination of the concentrations of:

- BTEX by EPA Method 8021B;
- Total alkalinity;
- Total dissolved solids;
- Total iron;
- Dissolved iron;
- Sulfate;
- Chloride;
- Total organic carbon; and
- Permanent gases in groundwater (nitrogen, carbon dioxide, oxygen, & methane) by Microseeps.

Soil Gas Measurements

The following wells will be used to measure soil gas (vapor phase):

- MW-A;
- MW-C;

- MW-B;
- MW-H;
- MW-I;
- MW-N;
- MW-10;
- MW-4;
- MW-D; and
- Soil Vapor Probes.

Vapor phase monitoring will be conducted as shown in Table 1 using a photo-ionization detector for field measurements of volatile organic compounds in well bores. Soil gas for laboratory analysis will be collected using either a Tedlar bag or Summa Canister for the laboratory determination of BTEX by one of the EPA Methods TO-13/14/14A/MAAPH or similar approved method and permanent gases (nitrogen, carbon dioxide, oxygen and methane) by either EPA Methods 3C or ASTM Methods 1945 or 1946 or similar approved method. In addition, several soil vapor probes with adsorbent elements will be placed into the surface of the ground approximately 3-4 feet in depth at distances of 10, 30 and 90 feet (respectively) from the biosparge well. Samples will be collected from them as shown in the accompanying Pilot System Monitoring Table. Soil vapor analysis of BTEX by a sorbent collector will be by EPA Method TO-17 or NIOSH Method 1501 or similar approved method. It should be remembered that baseline measurements may indicate pre-existing shallow soil hydrocarbon contamination and soil vapor escaping to the atmosphere rather than vapor generated by the sparge well.

Pilot System Operation and Monitoring Schedule

Pilot System Start up

The pilot system equipment can be installed after the completion of the pilot well and the electrical line to the well site. Installation and testing of the system equipment is anticipated to require four days including the base line monitoring.

The anticipated pilot test period will be approximately 90 days. The actual test may be longer than the proposed period and will be dependent upon the uniformity of system operational uptime, field and laboratory results from the monitoring wells and the interpretation of the effectiveness of the system during this time period.

ARCADIS

Pilot System Monitoring

The schedule for sampling the biosparging pilot system is shown below in Table 1.

Table 1 Biosparging Pilot Study - Sampling Schedule for Injection Well, Groundwater Monitor Wells, and Vapor Phase Monitor Wells and Points

	Base Line	Week 1	30 Days	60 Days	90 Days
Groundwater					
Field Parameters	X	X	X	X	X
BTEX	X		X	X	X
Other Lab Parameters	X		X		X
Lab Permanent Gases	X		X		X
Vapor Phase					
Field VOC	X	X	X	X	X
Lab Atmospheric Gases	X		X	X	X
Soil Vapor Probe[1]	X		X		X
Physical Parameters					
Water Level	X	X	X	X	X
Injection Well Data	X	X	X	X	X

[1]Three points at a depth of 3 to 4 feet and radial distance from injection well at 10, 30 and 90 feet

Pilot System Report

Subsequent to the baseline sampling event, 30 day and 60 day sampling events and the receipt of laboratory analytical data, the field and analytical data will be presented in interim reports. Any responses to the operational parameters of the system will be made at these times.

After completion of the pilot system operation and monitoring phase, a report will be prepared within 60 days of the completion of the pilot field activity presenting the activities conducted for the pilot test, tables of the field and laboratory data collected and an interpretation of the data. If appropriate, a generalized plan for the installation of a full-scale biosparging system will be presented.

Project Schedule

Work on the project may begin within one month of receiving written authorization from the Environmental Bureau. This assumes a drilling contractor can be available within this time frame.

ARCADIS

If you have any questions or comments regarding this remedial plan or the project in general, please call Mr. Pete Wilkinson, Operations Superintendent, Pure Resources, Inc. at 432-498-8642.

Very truly yours,

ARCADIS G&M, Inc.

Frank Kieffer
Project Manager

David Vance
Project Advisor

A. Joseph Reed
Senior Project Advisor

Our ref:
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File

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Mr. Randolph Bayliss, P.E.
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Sante Fe, New Mexico 87505

ENVIRONMENTAL

Subject:

Plume Delineation Work Plan
Lovington Paddock Site

Date:
14 October 2003

OCD File 1R-0272

Contact:
Frank Kieffer

Phone:
432 687 5400

Email:
fkieffer@arcadis-us.com

Dear Mr. Bayliss:

In response to your letter of October 2, 2003, ARCADIS G&M, Inc. (ARCADIS) has prepared a Lovington Paddock Site Plume Delineation Work Plan for Pure Resources, Inc. (Pure).

Water Well Sampling

Goff Dairies and the AST West Corporation, individually, operate a total of five water wells in the southeast quarter of Section 1 as shown in Figure 1. These wells are for the most part downgradient to the area of concern. The groundwater in these wells will be sampled and laboratory analyzed to determine if there is impact in any of the wells. The most recent testing of these wells on April 3, 2003 indicated no BTEX impact.

If the wells are actively pumping, a water sample will be collected immediately. If the wells are dormant, they will be sampled after each well has produced for no less than 15 minutes.

Water samples will be analyzed for general water chemistry, BTEX and TPH as well as bromide. The AST WEST effluent, which is being applied to the land in the area of concern, will also be tested for the above-mentioned parameters as well as alcohols and surfactants.

If possible during the site visit, pumping and/or static water levels will be collected.

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Plume Delineation

ARCADIS proposes drilling a total of three hydrocarbon plume delineation wells and one chloride plume delineation well. The locations of the wells are shown on Figure 1. Access to several of the proposed drilling locations in this area is unknown. Potentially, access will need to be obtained for some well locations.

Hydrocarbon Plume Wells

The purpose of the hydrocarbon plume delineation wells is to determine the general location of the benzene plume isoconcentration line for 0.01 mg/L, the New Mexico Human Health Standard for benzene. These well locations are approximately 200-300 feet east-southeast of current well locations and were chosen based upon an assumed logarithmic distribution of the benzene plume's groundwater concentrations. It is anticipated that the water quality at these locations will be less than the human health standard.

Wells will be drilled to a depth at least 25 feet into the water table. Assuming that the groundwater gradient is steepening towards the pumping water wells, the estimated total depth of the hydrocarbon plume delineation wells is 115 feet. Monitoring wells will be completed with 40 feet of screen and constructed in the same manner as existing Plan A and Plan B four-inch monitoring wells.

Following construction, the wells will be developed by removing at least 1,000 gallons of water and sampled for BTEX by EPA Method 8021B, TPH by EPA Method 8015B and general water chemistry including chloride and bromide. Static water levels and pumping levels, as well as other field quality data, will be collected during development.

Chloride Plume Well

Monitoring well MW-D had an elevated chloride concentration of 356 mg/L when sampled in the shallow portion of the aquifer. The significance of this occurrence for the aquifer at depth should be determined.

A single monitoring well should be drilled to fully penetrate the aquifer as shown on Figure 1. The location is approximately 30 feet east of MW-D and is meant to twin MW-D to be certain that the entire aquifer thickness is tested in an area that is already indicated to be impacted by chlorides and hydrocarbons.

A fully penetrating well is a well that completely penetrates the entire aquifer. In this case the shallowest aquifer is the Ogallala. The total depth of this well is estimated to be 200 feet below ground level (bgl) based upon the reported total depth of Goff irrigation water wells (State Engineer's data base). The actual depth of the test well will be determined by drilling to the top of the Triassic red beds immediately below the Ogallala.

The purpose of this well is to determine the chloride concentration of the groundwater at various depths. The chloride concentration can be determined by

either directly collecting discrete samples at various depths or by estimating values of chloride concentration based upon the conductivity of the groundwater at various depths as calibrated with analyses from two or three discrete samples collected from differing depth intervals.

Sodium Chloride Brine in water causes an increase in the density of the water. Therefore higher chloride concentration waters sink and become stratified at the base of the aquifer. The highly impacted chloride plume frequently follows the topography of the base of the aquifer in conjunction with the groundwater gradient. The topography (slope) of the base of the aquifer may be significantly different than the groundwater gradient causing a movement vector somewhat different from the hydraulic gradient. . The slope of the base of the aquifer at the Lovington Paddock site is unknown.

Water well WW-1 (as identified by Highlander), located approximately 530 feet southeast of monitoring well MW-B, is reported in Highlander data to have been laboratory analyzed at 665 parts per million (ppm) chlorides. With information supplied by the State Engineer, ARCADIS hopes to determine the significance, if any, of the elevated chlorides in MW-D and water well WW-1 and potential sources. While these two elevated chloride concentrations are not likely to be related to each other by a common source, an effort should be made to separate theses elevated chloride occurrences and define the nature and extent of chloride impact.

The chloride delineation well will be drilled to a depth of approximately 200 feet to the base of the Ogallala as stated above, but in any case will be into the Triassic red beds. The well will be completed with approximately 140 feet of screen and constructed in the same manner as existing Plan A and Plan B four-inch monitoring wells.

Following construction, the well will be developed by removing at least 1,000 gallons of water and sampled for BTEX, TPH and general water chemistry. Static water levels and pumping levels as well as other field quality data will be collected during development. One week following sampling, a conductivity profile of the well will be made. In addition, discrete shallow, medium and deep groundwater samples will be collected using a Kemmerer sampling device or similar instrument. The three samples will be analyzed for BTEX, TPH and general water chemistry including chloride and bromide.

Drilling Schedule

Prior to drilling, the location of all wells to be drilled must be staked and cleared by utility operators. If possible, this task will combined with the water well sampling event. However, the acceptability of the staked locations by utility operators cannot be assumed. A single man-day is allocated for the staking and clearing of utilities for locations.

The drilling, completion and development of four wells is estimated to require at least eight days to complete.

ARCADIS

An additional, separate field day will be required to run the conductivity profile and to collect the three discrete samples on the chloride monitoring well. The sampling and conductivity profiling will be sometime after the groundwater in the well is allowed to equilibrate (become stratified) with the aquifer.

A registered professional surveyor will determine the location and elevation of each new well and other important points, as necessary, to allow interpretation of the data collected for this study with the pre-existing data. It is estimated that the survey will be scheduled after the completion of all wells and will require approximately one day of fieldwork for an ARCADIS representative.

Project Schedule

Work can begin within two weeks of authorization to proceed assuming that there are no access problems for drilling wells and a drilling contractor is available.

If you have any questions or comments regarding this plan or the project in general, please contact Mr. Pete Wilkinson, Operations Superintendent, Pure Resources, Inc. at 432-498-8642.

Very truly yours,

ARCADIS G&M, Inc.

Frank Kieffer
Project Manager

A. Joseph Reed
Senior Project Advisor

Copies:
File

Our ref:
MT000803.0001

ARCADIS

Infrastructure, buildings, environment, communications

ARCADIS G&M, Inc.
1004 N. Big Spring Street
Suite 300
Midland Texas 79701
Tel 432.687.5400
Fax 432.687.5401

Transmittal Letter

To:
Randolph Bayliss
NMOCD

Copies:

ENVIRONMENTAL

From:
Frank Kieffer

Date:
14 October 2003

Subject:
Lovington Paddock Site

ARCADIS Project No.:
MT000803.0001.00PM

We are sending you:

☐ Attached ☐ Under Separate Cover Via _____ the Following Items:

☐ Shop Drawings ☐ Plans ☐ Specifications ☐ Change Order
☐ Prints ☐ Samples ☐ Copy of Letter ☐ Reports
☐ Other:

Copies	Date	Drawing No.	Rev.	Description	Action*
2	10/15/03			Pure Resources Remedial Action Pilot Plan	
2	10/15/03			Plume Delineation Work Plan	
2	10/15/03			Proposed Biosparge Well Diagram Figure 2	
2	10/15/03			Proposed Monitor and Biosparge Wells Figure 1	

Action*

☐ A Approved ☐ CR Correct and Resubmit ☐ Resubmit _____ Copies
☐ AN Approved As Noted ☐ F File ☐ Return _____ Copies
☐ AS As Requested ☐ FA For Approval ☐ Review and Comment
☐ Other:

Mailing Method

☐ U.S. Postal Service 1st Class ☐ Courier/Hand Delivery ☐ FedEx Priority Overnight ☐ FedEx 2-Day Delivery
☐ Certified/Registered Mail ☐ United Postal Service (UPS) ☐ FedEx Standard Overnight ☐ FedEx Economy
☐ Other:

Comments:

document2

ARCADIS

Infrastructure, buildings, environment, communications

ARCADIS G&M, Inc.
1004 N. Big Spring Street
Suite 300
Midland Texas 79701
Tel 432.687.5400
Fax 432.687.5401
www.arcadis-us.com

Mr. Randolph Bayliss, P.E.
Hydrologist, Environmental Bureau
New Mexico Energy, Minerals and Natural Resources Department
1220 South St. Francis Drive
Sante Fe, New Mexico 87505

ENVIRONMENTAL

Subject:

Plume Delineation Work Plan
Lovington Paddock Site

Date:
14 October 2003

OCD File 1R-0272

Contact:
Frank Kieffer

Phone:
432 687 5400

Email:
fkieffer@arcadis-us.com

Dear Mr. Bayliss:

In response to your letter of October 2, 2003, ARCADIS G&M, Inc. (ARCADIS) has prepared a Lovington Paddock Site Plume Delineation Work Plan for Pure Resources, Inc. (Pure).

Water Well Sampling

Goff Dairies and the AST West Corporation, individually, operate a total of five water wells in the southeast quarter of Section 1 as shown in Figure 1. These wells are for the most part downgradient to the area of concern. The groundwater in these wells will be sampled and laboratory analyzed to determine if there is impact in any of the wells. The most recent testing of these wells on April 3, 2003 indicated no BTEX impact.

If the wells are actively pumping, a water sample will be collected immediately. If the wells are dormant, they will be sampled after each well has produced for no less than 15 minutes.

Water samples will be analyzed for general water chemistry, BTEX and TPH as well as bromide. The AST WEST effluent, which is being applied to the land in the area of concern, will also be tested for the above-mentioned parameters as well as alcohols and surfactants.

If possible during the site visit, pumping and/or static water levels will be collected.

ARCADIS

Plume Delineation

ARCADIS proposes drilling a total of three hydrocarbon plume delineation wells and one chloride plume delineation well. The locations of the wells are shown on Figure 1. Access to several of the proposed drilling locations in this area is unknown. Potentially, access will need to be obtained for some well locations.

Hydrocarbon Plume Wells

The purpose of the hydrocarbon plume delineation wells is to determine the general location of the benzene plume isoconcentration line for 0.01 mg/L, the New Mexico Human Health Standard for benzene. These well locations are approximately 200-300 feet east-southeast of current well locations and were chosen based upon an assumed logarithmic distribution of the benzene plume's groundwater concentrations. It is anticipated that the water quality at these locations will be less than the human health standard.

Wells will be drilled to a depth at least 25 feet into the water table. Assuming that the groundwater gradient is steepening towards the pumping water wells, the estimated total depth of the hydrocarbon plume delineation wells is 115 feet. Monitoring wells will be completed with 40 feet of screen and constructed in the same manner as existing Plan A and Plan B four-inch monitoring wells.

Following construction, the wells will be developed by removing at least 1,000 gallons of water and sampled for BTEX by EPA Method 8021B, TPH by EPA Method 8015B and general water chemistry including chloride and bromide. Static water levels and pumping levels, as well as other field quality data, will be collected during development.

Chloride Plume Well

Monitoring well MW-D had an elevated chloride concentration of 356 mg/L when sampled in the shallow portion of the aquifer. The significance of this occurrence for the aquifer at depth should be determined.

A single monitoring well should be drilled to fully penetrate the aquifer as shown on Figure 1. The location is approximately 30 feet east of MW-D and is meant to twin MW-D to be certain that the entire aquifer thickness is tested in an area that is already indicated to be impacted by chlorides and hydrocarbons.

A fully penetrating well is a well that completely penetrates the entire aquifer. In this case the shallowest aquifer is the Ogallala. The total depth of this well is estimated to be 200 feet below ground level (bgl) based upon the reported total depth of Goff irrigation water wells (State Engineer's data base). The actual depth of the test well will be determined by drilling to the top of the Triassic red beds immediately below the Ogallala.

The purpose of this well is to determine the chloride concentration of the groundwater at various depths. The chloride concentration can be determined by

either directly collecting discrete samples at various depths or by estimating values of chloride concentration based upon the conductivity of the groundwater at various depths as calibrated with analyses from two or three discrete samples collected from differing depth intervals.

Sodium Chloride Brine in water causes an increase in the density of the water. Therefore higher chloride concentration waters sink and become stratified at the base of the aquifer. The highly impacted chloride plume frequently follows the topography of the base of the aquifer in conjunction with the groundwater gradient. The topography (slope) of the base of the aquifer may be significantly different than the groundwater gradient causing a movement vector somewhat different from the hydraulic gradient. . The slope of the base of the aquifer at the Lovington Paddock site is unknown.

Water well WW-1 (as identified by Highlander), located approximately 530 feet southeast of monitoring well MW-B, is reported in Highlander data to have been laboratory analyzed at 665 parts per million (ppm) chlorides. With information supplied by the State Engineer, ARCADIS hopes to determine the significance, if any, of the elevated chlorides in MW-D and water well WW-1 and potential sources. While these two elevated chloride concentrations are not likely to be related to each other by a common source, an effort should be made to separate theses elevated chloride occurrences and define the nature and extent of chloride impact.

The chloride delineation well will be drilled to a depth of approximately 200 feet to the base of the Ogallala as stated above, but in any case will be into the Triassic red beds. The well will be completed with approximately 140 feet of screen and constructed in the same manner as existing Plan A and Plan B four-inch monitoring wells.

Following construction, the well will be developed by removing at least 1,000 gallons of water and sampled for BTEX, TPH and general water chemistry. Static water levels and pumping levels as well as other field quality data will be collected during development. One week following sampling, a conductivity profile of the well will be made. In addition, discrete shallow, medium and deep groundwater samples will be collected using a Kemmerer sampling device or similar instrument. The three samples will be analyzed for BTEX, TPH and general water chemistry including chloride and bromide.

Drilling Schedule

Prior to drilling, the location of all wells to be drilled must be staked and cleared by utility operators. If possible, this task will combined with the water well sampling event. However, the acceptability of the staked locations by utility operators cannot be assumed. A single man-day is allocated for the staking and clearing of utilities for locations.

The drilling, completion and development of four wells is estimated to require at least eight days to complete.

ARCADIS

An additional, separate field day will be required to run the conductivity profile and to collect the three discrete samples on the chloride monitoring well. The sampling and conductivity profiling will be sometime after the groundwater in the well is allowed to equilibrate (become stratified) with the aquifer.

A registered professional surveyor will determine the location and elevation of each new well and other important points, as necessary, to allow interpretation of the data collected for this study with the pre-existing data. It is estimated that the survey will be scheduled after the completion of all wells and will require approximately one day of fieldwork for an ARCADIS representative.

Project Schedule

Work can begin within two weeks of authorization to proceed assuming that there are no access problems for drilling wells and a drilling contractor is available.

If you have any questions or comments regarding this plan or the project in general, please contact Mr. Pete Wilkinson, Operations Superintendent, Pure Resources, Inc. at 432-498-8642.

Very truly yours,

ARCADIS G&M, Inc.

Frank Kieffer
Project Manager

A. Joseph Reed
Senior Project Advisor

Copies:
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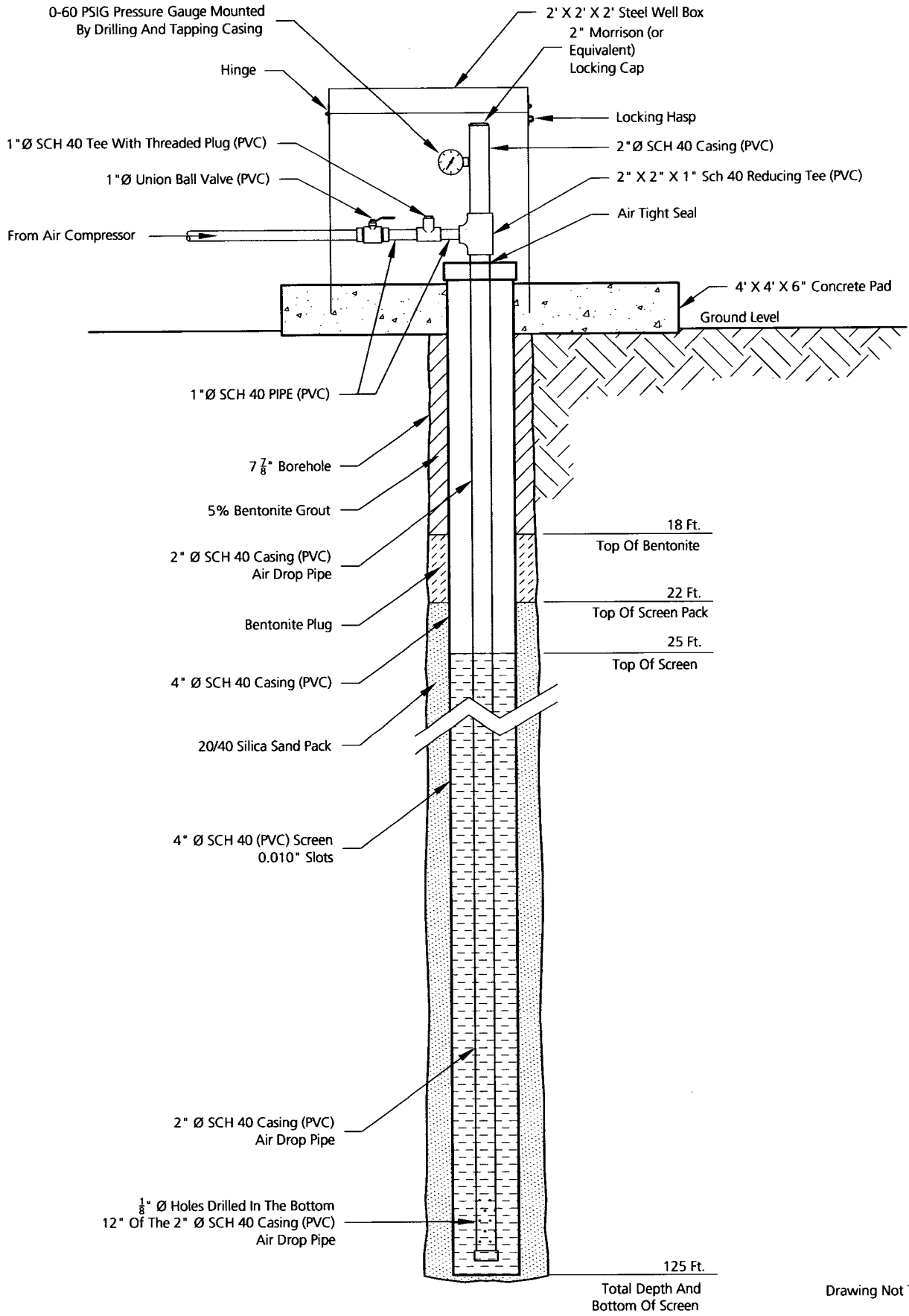
Our ref:
MT000803.0001



ARCADIS
1004 N. Big Spring Street, Suite 300
Midland, TX 79701-3383
Tel 432 687 5400 Fax 432 687 5401

Drawing Date	File Name	File Location	Task Manager	Project Director	Area Manager
09 October 2003	MT803112.dwg	\AutoCAD\DWG\Pure Resources Inc\MT000803.001\	F. Kieffer	F. Kieffer	A. Schmidt

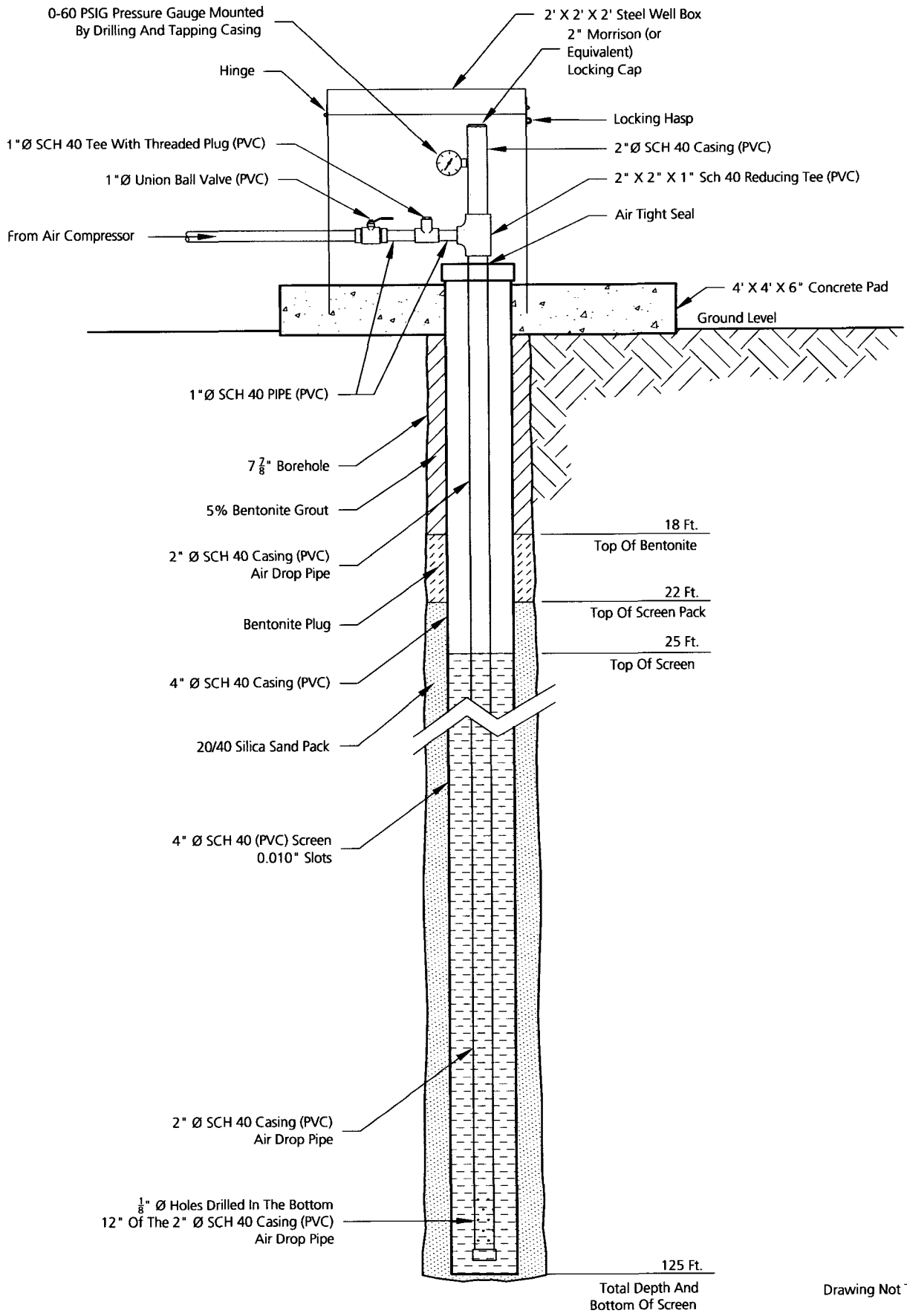
Pure Resources, Inc.
Lovington Paddock Site

Proposed Biosparge Well Diagram

Lea Conty, New Mexico

Technical Review	Unique Number
S. Tischer	34-014-00606

Project Number	Figure
MT000803.0001	2



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09 October 2003	MT803112.dwg	\AutoCAD\DWG\Pure Resources Inc\MT000803.001\	F. Kieffer	F. Kieffer	A. Schmidt

Pure Resources, Inc.
Lovington Paddock Site

Proposed Biosparge Well Diagram

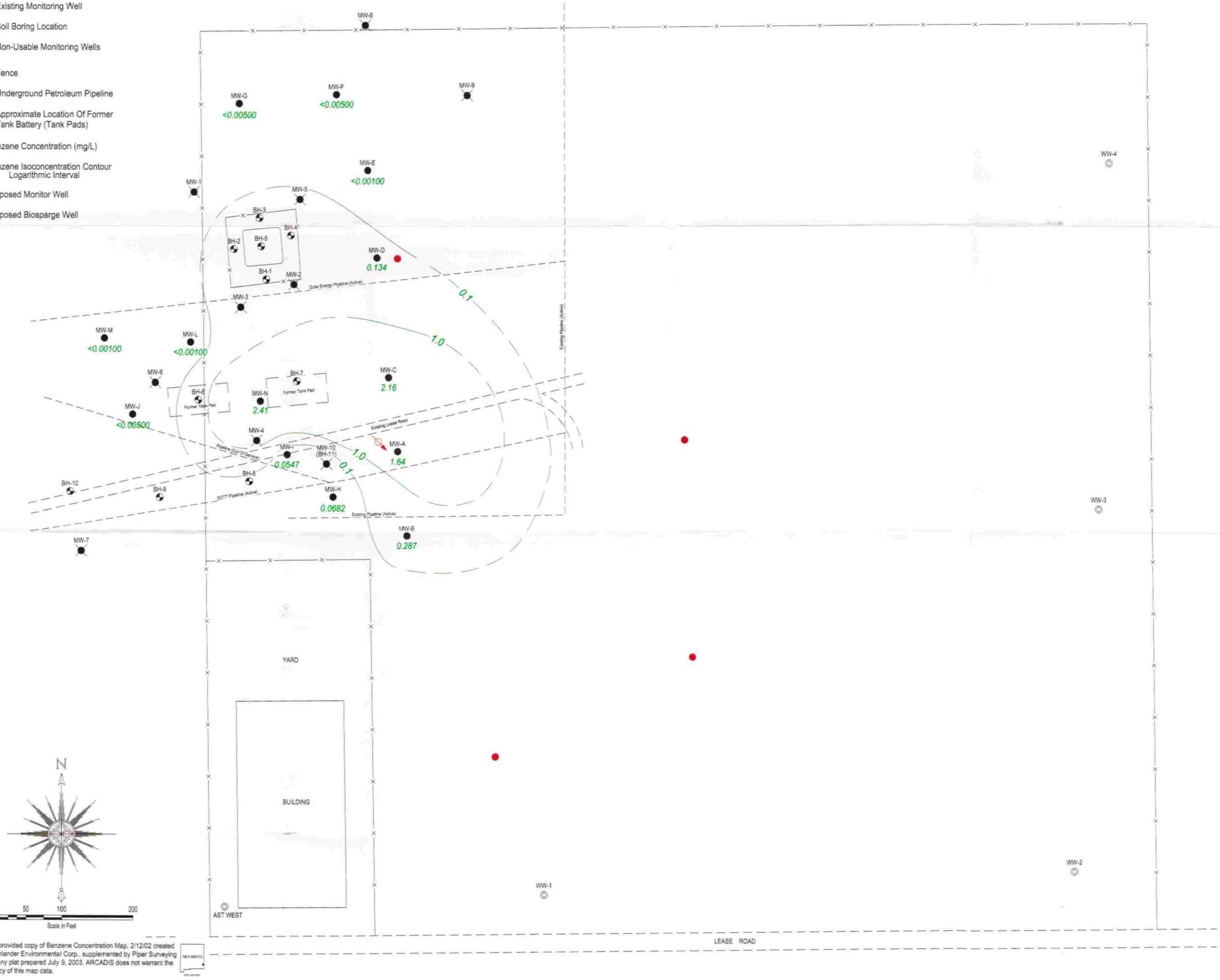
Lea Conty, New Mexico

Technical Review	Unique Number
S. Tischer	34-014-00606

Project Number	Figure
MT000803.0001	2

Explanation

- Existing Monitoring Well
- Soil Boring Location
- Non-Usable Monitoring Wells
- Fence
- Underground Petroleum Pipeline
- Approximate Location Of Former Tank Battery (Tank Pads)
- 2.16 Benzene Concentration (mg/L)
- 1.0 Benzene Isoconcentration Contour Logarithmic Interval
- Proposed Monitor Well
- Proposed Biosparge Well



Source: Client-provided copy of Benzene Concentration Map, 2/12/02 created by Highlander Environmental Corp., supplemented by Piper Surveying Company plat prepared July 9, 2003. ARCADIS does not warrant the accuracy of this map data.

No.	Date	Revision Description	By	Ckd

ARCADIS
1004 N. Big Spring Street, Suite 300
Midland, TX 79701-3383
Tel 432 687 5400 Fax 432 687 5401

Drawn By	Drawing Date	File Location	File Name	Unique Number	Project Director	Area Manager
H. Clardy	23 September 2003	\Autocad\DWG\Pure Resources Inc\MT000803.001	MT803111.dwg	31-014-00565	F. Kieffer	A. Schmidt

Pure Resources, Inc.
Lovington Paddock Site

Proposed Monitor and Biosparge Wells

Lea County, New Mexico

Task Manager	Technical Review
F. Kieffer	S. Tischer

Project Number	Figure
MT000803.0001	1

Explanation

- Existing Monitoring Well
- Soil Boring Location
- Non-Usable Monitoring Wells
- Fence
- Underground Petroleum Pipeline
- Approximate Location Of Former Tank Battery (Tank Pads)
- 2.16 Benzene Concentration (mg/L)
- 1.0 Benzene Isoconcentration Contour Logarithmic Interval
- Proposed Monitor Well
- Proposed Biosparge Well

MW-8
MW-G <0.00500
MW-F <0.00500
MW-9
MW-E <0.00100
WW-4
MW-1
MW-5
BH-3
BH-4
BH-2
BH-5
MW-D 0.134
BH-1
MW-2
Duke Energy Pipeline (Active)
MW-3
0.1
1.0
Existing Pipeline (Active)
MW-M <0.00100
MW-L <0.00100
MW-6
BH-6 Former Tank Pad
BH-7 Former Tank Pad
MW-N 2.41
MW-C 2.16
MW-J <0.00500
Existing Lease Road
MW-4
Pipeline (Out Of Service)
MW-I 0.0547
MW-10 (BH-11)
MW-A 1.64
1.0
0.1
BH-8
BH-10
BH-9
EOTT Pipeline (Active)
MW-H 0.0682
Existing Pipeline (Active)
WW-3
MW-B 0.287
MW-7
YARD
BUILDING
AST WEST
WW-1
WW-2
LEASE ROAD

N

0 50 100 200
Scale in Feet

Source: Client-provided copy of Benzene Concentration Map, 2/12/02 created by Highlander Environmental Corp., supplemented by Piper Surveying Company plat prepared July 9, 2003. ARCADIS does not warrant the accuracy of this map data.

No.	Date	Revision Description	By	Ckd

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H. Clardy	23 September 2003	\Autocad\DWG\Pure Resources Inc\MT000803.001	MT803111.dwg	31-014-00565	F. Kieffer	A. Schmidt

Pure Resources, Inc.
Lovington Paddock Site

Proposed Monitor and Biosparge Wells

Lea County, New Mexico

Task Manager	Technical Review
F. Kieffer	S. Tischer

Project Number	Figure
MT000803.0001	1

From: Price, Wayne
Sent: Wednesday, April 10, 2002 11:38 AM
To: 'enviplus1@aol.com'
Cc: Sheeley, Paul; Johnson, Brian
Subject: EOTT/Pure Resources Lovington Paddock ABT 1-1 OCD Case # 1R0272

Contacts: Pat McCasland
Dear Pat:

Frank Hernandez e-mail is not working so he requested that I e-mail to you site information for the above subject site, please pass this along to Frank. It appears that there is approximately 10-11 feet of PSH below the two pipelines. Please inform EOTT that under Rule 19 there is an emergency provision for the company to start immediate recovery. I would like to know within 10 days as to EOTT's intentions. OCD is concerned about new water wells installed in close proximity to this site.


Lovington Paddock.tif


LP#2.tif


LP#3.tif

Price, Wayne

From: Ken Dutton [kdutton@etgi.cc]
Sent: Thursday, March 21, 2002 12:00 PM
To: WPrice@state.nm.us
Subject: Frank Hernandez & Wayne Brunette Info

Wayne

Lo ington Paddock is assigned to Frank Hernandez.

Frank's cell phone is:
915 638-3799

Mailing address:

ENRON Transportation Services, Inc.
P. O. Box 1660
Midland, TX 79702

Also Wayne Brunette's info:

ENRON Transportation Services, Inc.
P. O. Box 1660
Midland, Tx 79702

cell phone: 915 553-7557
office phone: 915 684-3479

Ken

Highlander Environmental Corp.
Midland, Texas

facsimile
TRANSMITTAL

DATE SENT: 10/4/01

COMPANY NAME: NMOCD

CONTACT NAME: Wayne Price

FAX NUMBER: 505-476-3462

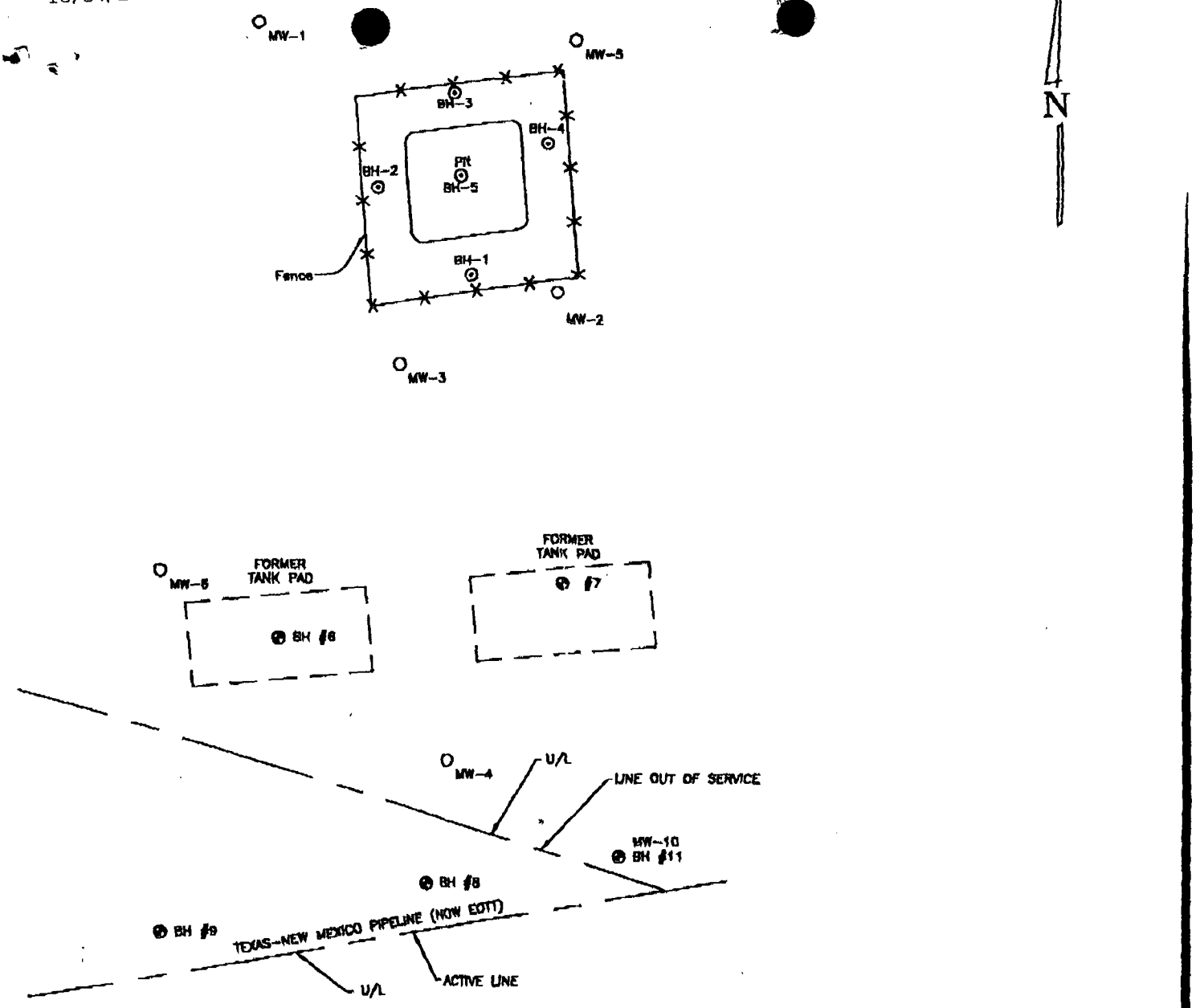
SENDER: Tim Reed

DESCRIPTION: OVM readings & map for BH-11. This is next to the line coming into the main line. Call me when you have had a chance to review. Thanks, Tim

NUMBER OF PAGES (Including cover sheet): 34

I added in the analytical table for BH-11 showing impact throughout the borehole.

1910 N. Big Spring • Midland, Texas 79705 • (915) 682-4559 • Fax (915) 682-3946



GRAPHIC SCALE IN FEET

0 50 100 150

LEGEND

U/L	UNDERGROUND LINE
BH	BOREHOLE LOCATIONS (PLACED 3/29-3/30/00)
BH-1	ORIGINAL BOREHOLE LOCATION
MW-2	MONITOR WELL LOCATION
	APPROXIMATE LOCATION OF FORMER TANK BATTERY (TANK PADS)

FIGURE NO. 2

LEA COUNTY, NEW MEXICO

PURE RESOURCES, L.P.

LOVINGTON PADDOCK BOREHOLE LOCATIONS

DATE: 01/24/00
NAME:

TABLE 1 (con't)
Pure Resources, LP
Lovington Paddock Unit - ATB 1-1 Investigation
Cumulative OVM Readings

Sample ID	Date	Depth (ft)	OVM (ppm)		Sample ID	Date	Depth (ft)	OVM (ppm)
BH-8	3/29/00	5-6	2		BH-11	3/30/00	5-6	39
		10-11	2		(MW-10)		10-11	630
		15-16	0				15-16	225
		20-21	5				20-21	666
		25-26	3				25-26	365
		30-31	4				30-31	69
		35-36	14				35-36	14
		40-41	18				40-41	7
		45-46	10				45-46	8
		50-51	25				50-51	518
		55-56	5				55-56	601
		60-61	5				62-63	370
		62-63	78					
BH-9	3/30/00	5-6	0					
		10-11	0					
		15-16	0					
		20-21	0					
		25-26	0					
		30-31	1					
		35-36	0					
		40-41	0					
		45-46	1					
		50-51	1					
		55-56	2					
		62-63	2					
BH-10	3/30/00	5-6	1					
		10-11	2					
		15-16	2					
		20-21	3					
		25-26	2					
		30-31	2					
		35-36	3					
		40-41	8					
		45-46	2					
		50-51	3					
		55-56	4					
		62-63	3					
		70-71	1					

Table 2 (con't)
Pure Resources, LP
Lovington Paddock Unit
Cumulative Soil Sample Results
TPH, BTEX and Chloride

Sample ID	Date Sampled	Depth (ft)	TPH GRO (mg/kg)	TPH DRO (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
BH-6	3/29/00	20-21	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
	3/31/00	62-63	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
BH-7	3/29/00	20-21	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
	3/29/00	62-63	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
BH-8	3/29/00	40-41	<5.00	64	<0.05	<0.05	<0.05	<0.05	<0.05	NA
	3/29/00	62-63	<5.00	69	<0.05	<0.05	<0.05	<0.05	<0.05	NA
BH-9	3/30/00	30-31	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
	3/30/00	62-63	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
BH-10	3/30/00	40-41	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
	3/30/00	62-63	<5.00	<50	<0.05	<0.05	<0.05	<0.05	<0.05	NA
BH-11	3/30/00	10-11	100	181	<0.1	0.147	0.222	0.442	0.811	NA
(MW-10)	3/30/00	20-21	114	325	<0.1	<0.1	0.164	0.335	0.5	NA
	3/30/00	50-51	424	721	<0.5	0.575	1.6	4.51	6.69	NA
	3/30/00	62-63	10,200	11,300	103	319	92.8	272	788	NA

NA - Not Anayized

Price, Wayne

From: Price, Wayne
Sent: Tuesday, October 02, 2001 11:38 AM
To: 'treed@hec-enviro.com'
Subject: Lovington Paddock ABT 1-1 NMOCD Casre # 1R0272

Dear Mr. Reed:

Please find attached a copy of the March 19, 2001 EOTT letter and findings. Since OCD does not have a contact for the new owners please forward this to them. OCD is requesting that Pure Resources provides OCD an update on this project by October 31, 2001.


SCAN1.JPG


SCAN2.JPG


SCAN3.JPG


SCAN4.JPG


SCAN5.JPG

ENVIRONMENTAL PLUS, INC. Micro-Blaze Micro-Blaze Out™
STATE APPROVED LAND FARM AND ENVIRONMENTAL SERVICES

March 19, 2001

Mr. Frank Hernandez 915-638-3799
E.O.T.T. Energy Pipeline
P.O. Box 1660
Midland, Texas 79703

FAX: 915.684.3456

Subject: EOTT/Pure Resources Lovington Paddock ABT 1-1: NMOCD Case # 1R0272

Dear Mr. Hernandez,

Previously, Environmental Plus, Inc. (EPI) provided you with a visual assessment of the Pure Resources Lovington Paddock ABT1-1 remediation site. The conclusions were as follows;

- The E.O.T.T. pipeline has leaked a sufficient quantity of crude to reach ground water and should be investigated and remediated.
- Contamination at MWs #3, #4, and #5 must originate at an up gradient site.
- The E.O.T.T. pipeline leak origin is located transverse-gradient and down-gradient and should not be considered a source of pollution of MWs #3, #4, and #5.

On March 12-13, 2001, at your request and direction, EPI equipment and personnel conducted an investigation, in the presence of Mr. Larry Williams, the Pure Resources representative, to visually confirm that the E.O.T.T. crude oil pipeline traversing the southern part of the Pure Resources remediation site had leaked in the past. The plan was to expose the pipeline with a backhoe and shovels and locate and photograph any repair clamps or replaced pipeline. Replacement pipe would not have factory "dope" on the exterior. The investigation did not find any repair clamps or replacement pipe along 300' of pipeline and identified the stained soil as being moist with water and not hydrocarbon. The initial conclusion, based on visual observation only, is therefore incorrect. The correct conclusion, confirmed by this investigation, is that the E.O.T.T. pipeline has not leaked or contributed to the crude oil source term at the Pure Resources Lovington Paddock ABT1-1 remediation site and is not responsible for the site ground water contamination. Furthermore, E.O.T.T. nor the New Mexico Oil Conservation Division records indicate a leak being repaired or reported at this location. A map and photographs of the exposed line are attached. This should preclude E.O.T.T. as a participant in the remediation of the ground water at this site. If questions remain, please call me at the office or at 505.390.7864.

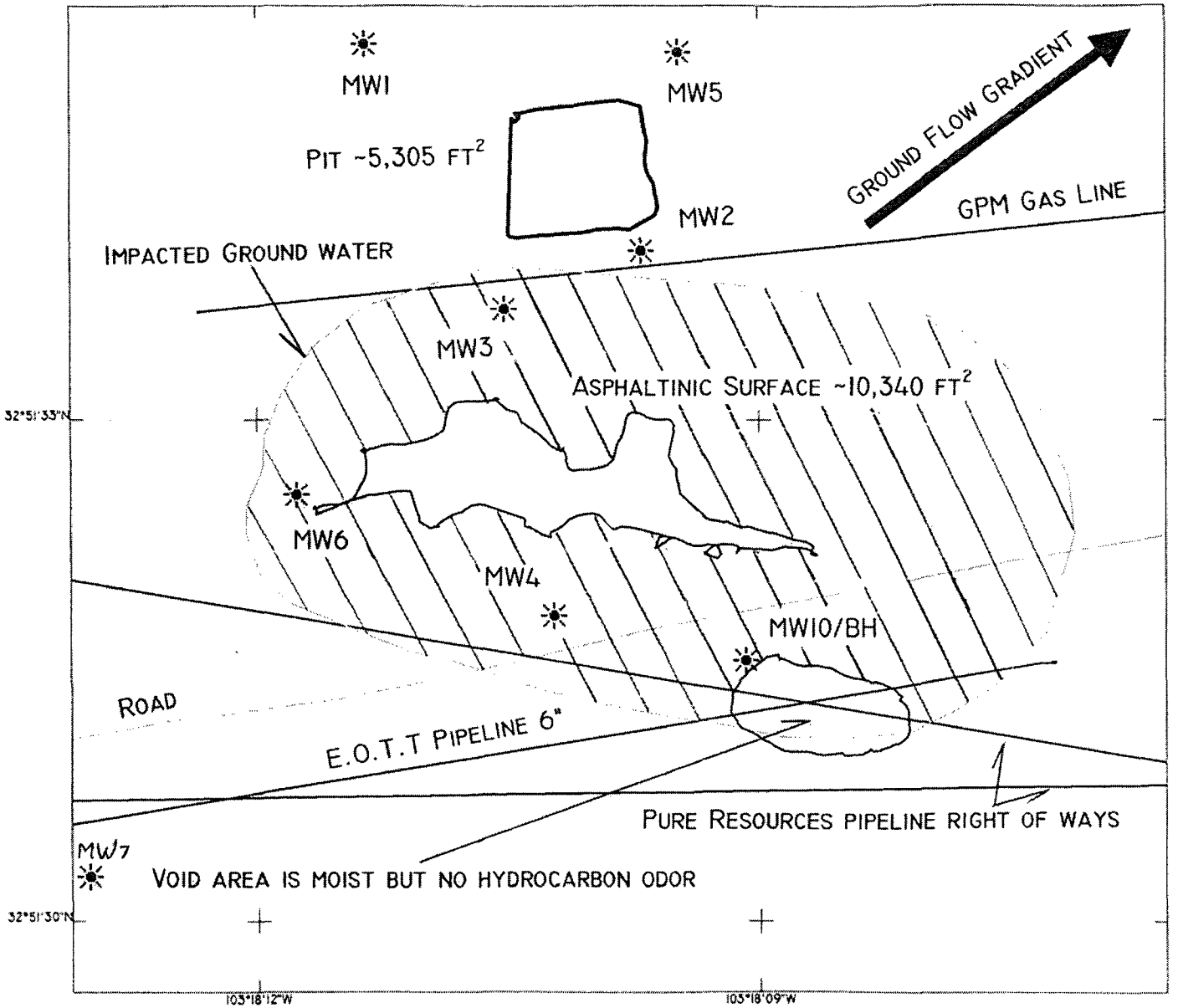
Sincerely,

Pat McCasland
EPI TECHNICAL SERVICES MANAGER

ENVIRONMENTAL PLUS, INC.

cc: Ben Miller, EPI Vice President and General Manager
Sherry Miller, EPI President
file

ENVIRONMENTAL PLUS, INC.



LOVINGTON PADDOCK ABT 1-1 NMOCD CASE #1R0272 SAN ANDRES UNIT ABANDONED BATTERY AND PIT

N

SCALE 1:1000

0 100.0

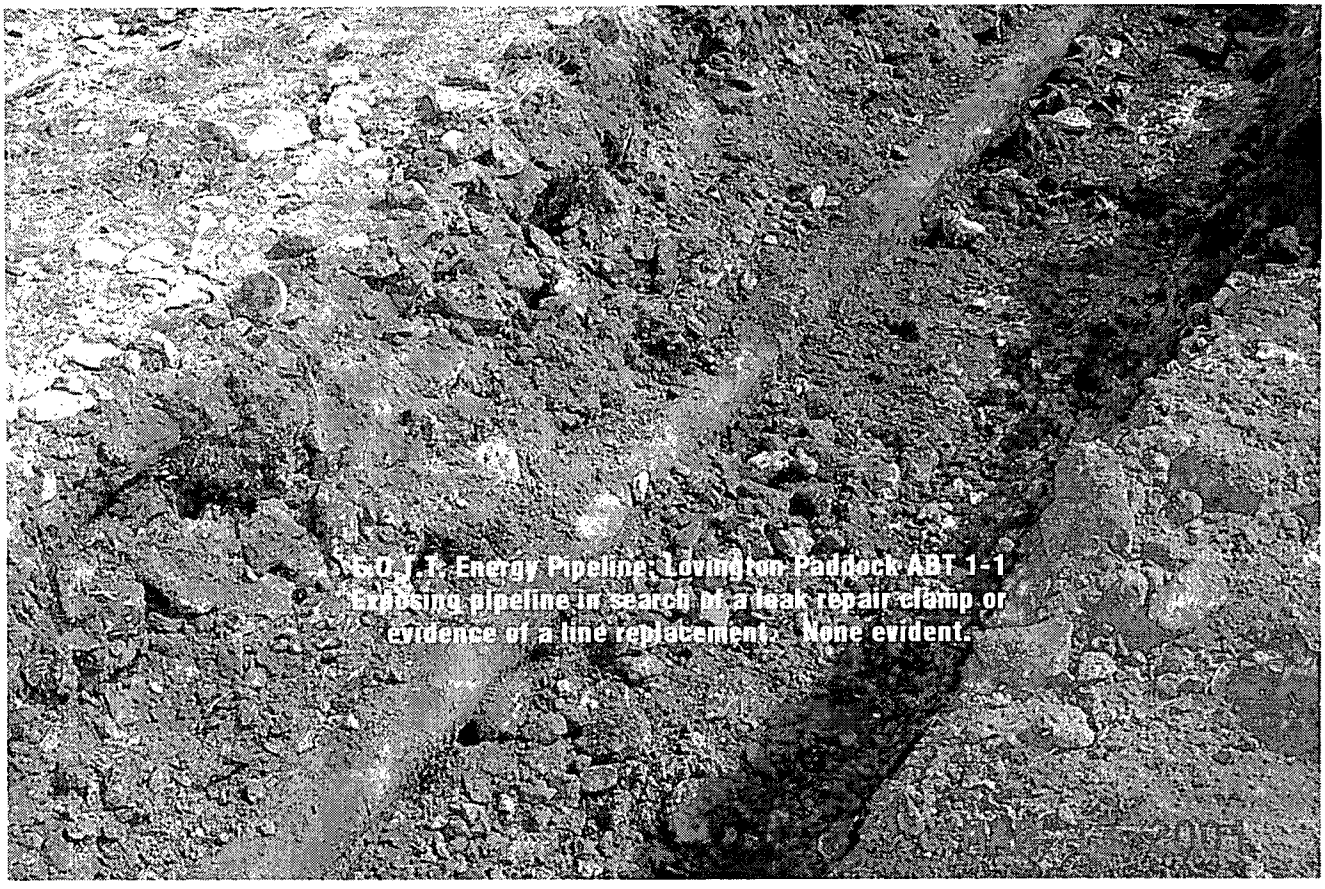
FEET

LAT/LONG
NAD 1927 (WESTERN US)

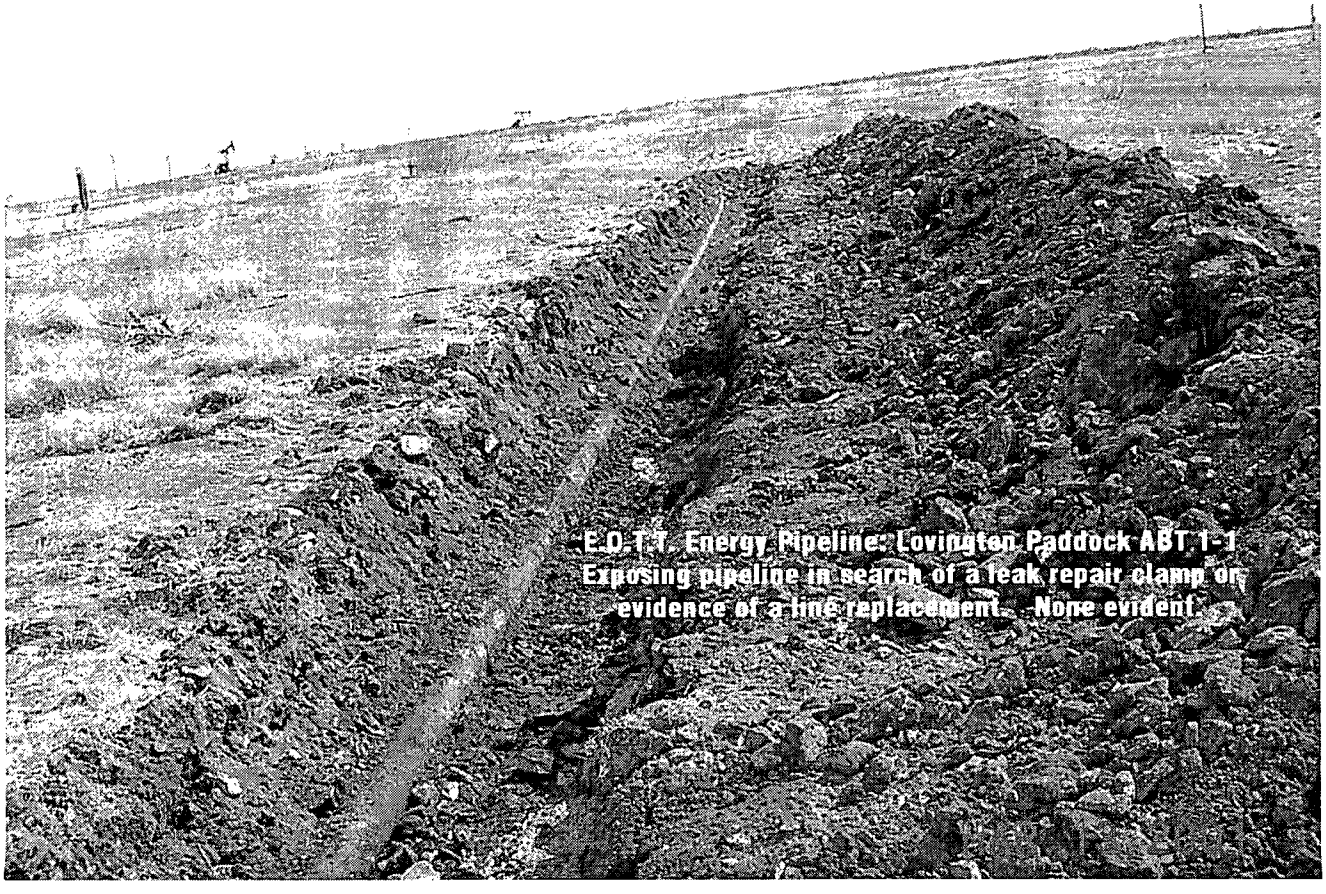
LOVPADABT.COR

3/19/2001

MW = MONITOR WELL BH = BOREHOLE



E.O.T.T. Energy Pipeline: Lovington Paddock ABT 1-1
Exposing pipeline in search of a leak repair clamp or evidence of a line replacement. None evident.



E.O.T.T. Energy Pipeline: Lovington Paddock ABT 1-1
Exposing pipeline in search of a leak repair clamp or evidence of a line replacement. None evident.

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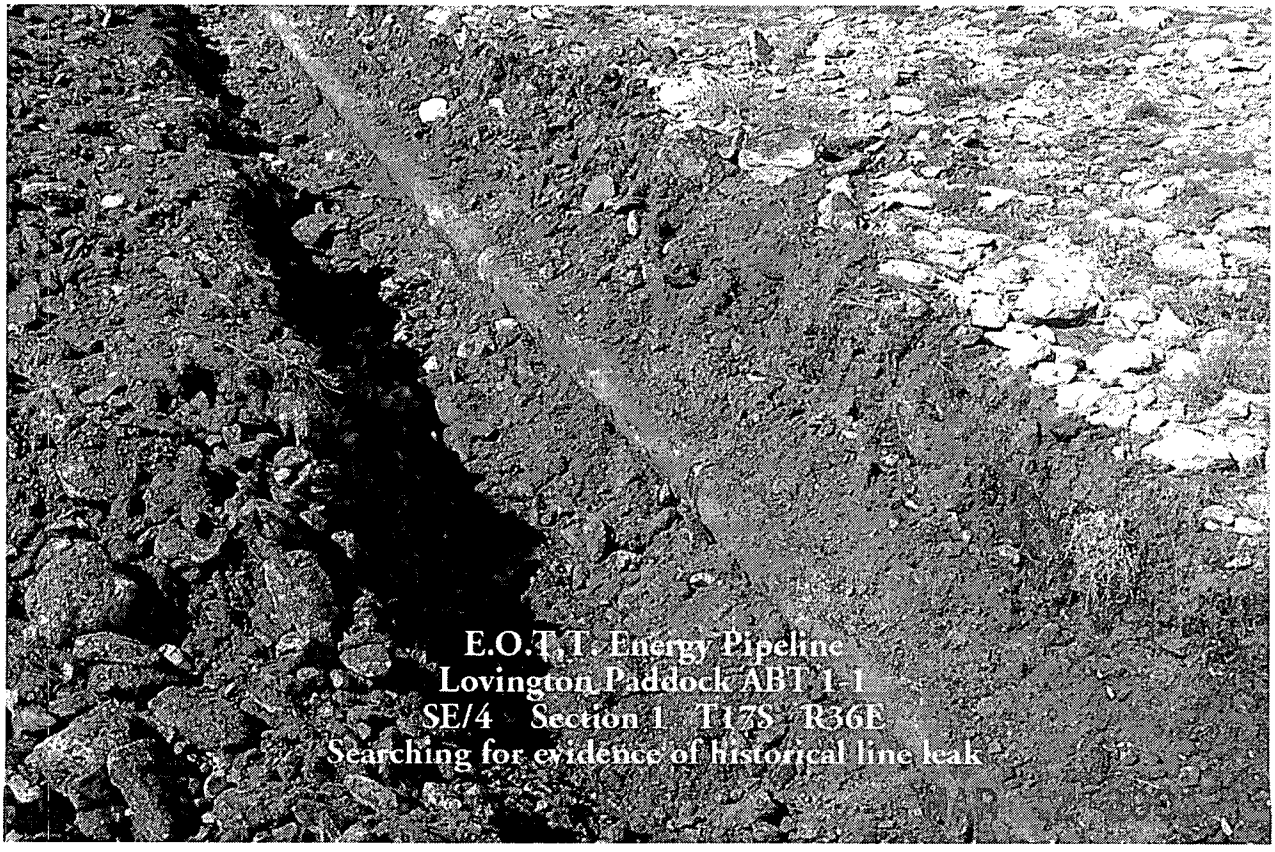

E.O.T.T. Energy Pipeline
Lovington Paddock ABT 1-1
SE/4 Section 1 T17S R36E
Searching for evidence of historical line leak

Price, Wayne

From: Price, Wayne
Sent: Monday, February 05, 2001 2:31 PM
To: 'wayne.brunette@eott.com'
Subject: Lovington Paddock ABT 1-1 Groundwater Contamination--Case #1R0272

Dear Mr. Brunette:

Re: Case #1R0272

Please find enclosed portions of the Pure Resources, LP file. The OCD has reviewed the file and it appears that EOTT might have some responsibility in this case. Please review and if applicable please submit a site investigation/remediation plan for OCD approval by March 30, 2001.


Scan1.jpg.jpeg


Scan2.jpg.jpeg


Scan3.jpg.jpeg


Scan4.jpg.jpeg


Scan5.jpg.jpeg


Scan6.jpg.jpeg


Scan7.jpg.jpeg


Scan8.jpg.jpeg


Scan9.jpg.jpeg


Scan10.jpg.jpeg


Scan11.jpg.jpeg


Scan12.jpg.jpeg


Scan13.jpg.jpeg


Scan14.jpg.jpeg


Scan15.jpg.jpeg