3R – 446

WORKPLAN

03 / 29 / 2011

LWAT K-51 / 2010

Enterprise Products

ENTERPRISE PRODUCTS PARTNERS L.P.
ENTERPRISE PRODUCTS GP, LLC
(General Partner)

ENTERPRISE PRODUCTS OPERATING LLC

3R-446

RECEIVED OCD

2011 MAR 31 A 11: 40

March 29, 2011

Return Receipt Requested
7010 0290 0002 7763 7937

Mr. Glenn Von Gotten
New Mexico Energy, Minerals & Natural Resources Department
Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Supplemental Site Investigation & Corrective Action Work Plan
K-51 Pipeline Release Site
Off County Road 537
NE ¼ Section 34 & NW ¼, Sec 35, T26N, R6W
Rio Arriba County, New Mexico

Dear Mr. Von Gotten:

Enterprise Field Services, LLC (Enterprise) is submitting two (2) copies of the enclosed *Supplemental Site Investigation & Corrective Action Work Plan*, dated March 22, 2011. The report details supplemental site investigation activities proposed to further delineate constituents of concern (COCs) in soil and groundwater at the Site. In addition, the report details corrective actions (in-situ chemical oxidation) proposed to reduce COC concentrations in soil and groundwater to below the OCD *Remediation Action Levels* and New Mexico Water Quality Control Commission *Groundwater Quality Standards*, respectively.

The proposed supplemental site investigation and corrective action activities are scheduled for implementation and completion in April 2011. A Corrective Action Report detailing the results of supplemental site investigation and corrective action activities will be submitted to the OCD by September 31, 2011.

Please let us know if this schedule is not acceptable to the OCD. Please contact me at (713) 381-6629, if you have questions regarding the information in the report.

Sincerely,

Gregory E. Miller for

Rodney M. Sartor, REM
Manager, Remediation

Enclosure

/dep

cc: Jim Lieb, Enterprise

SUPPLEMENTAL SITE INVESTIGATION & CORRECTIVE ACTION WORK PLAN

K-51 PIPELINE RELEASE

NE ¼ Section 34 & NW ¼ , Sec 35, T26N, R6W
Rio Arriba County, New Mexico

March 22, 2011
SWG Project No. 0410003

Prepared for:

Enterprise Field Services, LLC
1100 Louisiana Street
Houston, Texas 77002
Attention: Mr. Rodney Sartor

Prepared by:

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Manager, Four Corners Office

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K-51 PIPELINE RELEASE

NE ¼ Section 34 and NW ¼, Section 35, T26N, R6W
Rio Arriba County, New Mexico

1.0 INTRODUCTION

1.1 SITE LOCATION AND HISTORY

The K51 Pipeline Release Site is located off County Road (CR) 537 in Rio Arriba County, New Mexico, referred to hereinafter as the "Site" or "subject Site". On April 13, 2010, approximately 10 barrels of natural gas condensate were released from the Enterprise Field Services, LLC (Enterprise) natural gas gathering pipeline at the Site due to internal corrosion. Subsequent to the completion of excavation and off-site disposal of petroleum hydrocarbon affected soils, confirmation soil samples were collected from the excavation by Souder, Miller and Associates (SMA). In addition, one (1) groundwater sample was collected from the groundwater which recharged into the excavation. The excavation was then backfilled with unaffected soils.

In June 2010, eight (8) soil borings (BH-1 through BH-8) were advanced on-site by LT Environmental (LTE). Subsequent to advancement, four (4) of the soil borings were converted to groundwater monitoring wells (MW-1 through MW-4). Based on the results of soil and groundwater sampling activities, constituent of concern (COC) concentrations were identified in soil above the New Mexico Energy, Minerals and Natural Resources Department (EMNRD), Oil Conservation Division (OCD) *Remediation Action Levels* (RALs) and in groundwater above the New Mexico Water Quality Control Commission (WQCC) *Groundwater Quality Standards (GQSs).*

The Site is subject to regulatory oversight by the New Mexico Energy, Minerals, and Natural Resources Department OCD. To address activities related to condensate releases, the New Mexico OCD utilizes the *Guidelines for Remediation of Leaks, Spills and Releases* as guidance, in addition to the OCD rules, specifically NMAC 19.15.30 Remediation. These guidance documents establish investigation and abatement action requirements for sites subject to reporting and/or corrective action.

The objective of the proposed supplemental investigation and corrective action activities is to:

1.) further evaluate the magnitude and extent of COCs in the on-site soil and groundwater; and,

2.) reduce the concentrations of COCs in soil and groundwater to below the OCD *RALs* and NMWQC *GQSs.*

The Site location is depicted on Figure 1 of Appendix A which was reproduced from a portion of the United States Geological Survey (USGS) 7.5-minute series topographic map. A Site Vicinity Map of the subject Site and adjoining properties is included as Figure 2 of Appendix A.

1.2 CHRONOLOGY OF EVENTS

Significant events and related activities associated with the Site, including the results of Site investigation activities and corrective action completed to date, are provided in the following summary:

April 2010	Release was discovered resulting from internal line corrosion of K-51 natural gas pipeline. Subsequent to line repairs, impacted soils were excavated from the release site and disposed off-site in accordance with applicable state and federal regulations. SMA collected confirmation samples from the excavation walls for laboratory analysis of total petroleum hydrocarbons (TPH) gasoline range organics (GRO)/diesel range organics (DRO) and benzene, toluene, ethylbenzene and xylenes (BTEX). Additionally, a water sample was collected from apparent groundwater that had collected in the open excavation. Confirmation groundwater analyses indicate remaining impact at the Site.
June-August 2010	*Subsurface Investigation Report K-51 Pipeline (LTE – August 9, 2010)*: Initial field investigation activities were performed by LTE during June of 2010. Eight (8) soil borings were advanced (BH-1 through BH-8) at the Site to 16 feet below grade surface (bgs). Groundwater was reported in each of the soil borings with static levels ranging from 8.0 to 13.0 feet bgs. Four (4) of the 8 soil borings were subsequently converted to 2-inch monitoring wells (MW-1 though MW-4) with average screened intervals of 5 feet bgs to 15 feet bgs. Based on the depth to groundwater and proximity to a surface water body, the Site was classified with a total ranking score greater than 19. LTE collected thirteen (13) soil samples from the eight (8) soil borings and submitted the samples to Hall Environmental Analysis Laboratory (Hall) in Albuquerque, NM for TPH GRO/DRO and BTEX analysis. In addition, four (4) groundwater samples collected from the monitoring wells were submitted for TPH and BTEX analysis. Based on the laboratory analytical results, the soil sample collected from soil boring BH-1 at 8 to 12 feet bgs exhibited TPH GRO/DRO and total BTEX concentrations above the OCD *RALs*. The groundwater samples collected from monitor wells MW-1, MW-2, MW-3, and MW-4 exhibited BTEX constituent concentrations (most notably benzene) above the New Mexico WQCC *GQSs*.
September 2010	SWG collected a groundwater sample from each monitoring well (MW-1 through MW-4) at the Site utilizing low flow sampling techniques to evaluate the current COC concentrations in groundwater. The groundwater samples collected from monitoring wells MW-1, MW-3, and MW-4 exhibited BTEX constituent concentrations (most notably benzene) above the WQCC *GQSs*.

1.3 CHEMICALS OF CONCERN

The soil and groundwater samples collected from the Site during the initial corrective actions and investigation activities were analyzed for TPH Gasoline Range Organics (GRO)/diesel range organics (DRO) utilizing EPA method SW-846 #8015B and BTEX using EPA SW-846 method #8021B.

- Based on the laboratory analytical results, a TPH GRO/DRO concentration was identified in the soil sample collected from boring BH-1 at a depth of 8 to 12 feet bgs above the OCD *RAL* of 100 mg/Kg.

- Based on the laboratory analytical results, a total BTEX concentration was identified in the soil sample collected from boring BH-1 at a depth of 8 to 12 feet bgs above the OCD *RAL* of 50 mg/Kg.

- Based on the laboratory analytical results from the most recent groundwater sampling event (September 2010), BTEX constituent (most notably benzene) concentrations were identified in groundwater samples collected from monitoring wells MW-1, MW-3, and MW-4 above the NMWQCC *GQSs*.

Figure 3 indicates the approximate locations of the borings/monitoring wells installed at the Site in relation to pertinent Site features and general Site boundaries. Figures 4 and 5 detail the OCD *Remediation Action Level* Exceedance Zone in soil and NMWQCC *Groundwater Quality Standard* Exceedance Zone in groundwater, respectively. Comprehensive soil and groundwater analytical results for the Site are included in Tables 1 and 2, respectively.

1.4 SITE RANKING & PROPOSED CLEANUP GOALS

The Site is subject to regulatory oversight by the EMNRD, OCD. To address activities related to condensate releases, the New Mexico EMNRD OCD utilizes the *Guidelines for Remediation of Leaks, Spills and Releases* as guidance, in addition to the OCD rules, specifically NMAC 19.15.30 *Remediation*. These guidance documents establish investigation and abatement action requirements for sites subject to reporting and/or corrective action.

In accordance with the OCD's *Guidelines for Remediation of Leaks, Spills and Releases*, SWG utilized the general Site characteristics to determine the appropriate "ranking" for the Site. The ranking criteria and associated scoring are provided in the table below:

Ranking Criteria			Ranking Score
Depth to Groundwater	<50 feet	20	20
	50 to 99 feet	10	
	>100 feet	0	
Wellhead Protection Area • <1,000 feet from a water source, or; <200 feet from private domestic water source.	Yes	20	0
	No	0	
Distance to Surface Water Body	<200 feet	20	20
	200 to 1,000 feet	10	
	>1,000 feet	0	
Total Ranking Score			**40**

Based on SWG's evaluation of the scoring criteria, the Site would have a Total Ranking Score of 40. This ranking is based on the following:

- The depth to the initial groundwater-bearing zone is <50 feet at the Site.
- Nearby drinking water sources were not identified within 1,000 feet of the Site.
- Tapacito Creek, which is less than 100 feet north of the Site, is the nearest surface water feature.

Based on a Total Ranking Score of 40, cleanup goals for soil located at the Site include: 10 mg/Kg for benzene, 50 mg/Kg for total BTEX and 100 mg/Kg for TPH GRO/DRO.

In addition, cleanup goals for groundwater located at the Site include the New Mexico WQCC *Groundwater Quality Standards* of: 0.010 mg/L for benzene, 0.75 mg/L for toluene, 0.75 mg/L for ethylbenzene, and 0.62 mg/L for xylenes.

2.0 SUPPLEMENTAL SITE INVESTIGATION

The primary objective of the proposed supplemental site investigation activities is to further evaluate the magnitude and extent of COCs in groundwater at the Site.

2.1 SOIL BORING AND MONITORING WELL INSTALLATION

Five (5) soil borings will be advanced on-site utilizing a direct push Geoprobe® drilling rig under the supervision of a New Mexico Office of the State Engineer-licensed driller. The soil borings will be advanced at select locations hydrogeologically up-, cross- and down-gradient from the existing monitoring wells MW-1 through MW-4. The soil borings will be advanced to a maximum depth of approximately 20 feet bgs, five feet below the initial water table, or auger refusal, whichever is more shallow.

Reusable sampling and drilling equipment will be decontaminated using an Alconox® wash and potable water rinse prior to commencement of the project and between the advancement of each soil boring.

Soil samples will be collected continuously using core barrels or split spoon samplers to document lithology, color, relative moisture content and visual or olfactory evidence of impairment. In addition, the samples will be scanned with a photoionization detector (PID) for the presence of volatile organic compounds (VOCs).

Subsequent to the completion of the soil borings, each soil boring will be converted to a groundwater monitoring well to further evaluate the initial groundwater-bearing unit on the Site. The monitoring wells will be completed as follows:

- Installation of 5 to 10 feet of 2-inch diameter, machine slotted PVC well screen assembly with a threaded bottom plug;
- Installation of riser pipe to surface;
- Addition of graded silica sand for annular sand pack around the well screen from the bottom of the well to two feet above the top of the screen;
- Placement of 2 feet of hydrated bentonite pellets above the sand pack;

- Addition of cement/bentonite slurry to the surface; and
- Installation of a locking well cap and circular, bolt-down, flush mount well cover or above-grade steel riser.

2.2 SAMPLING PROGRAM

SWG's groundwater sampling program will consist of the following:

1) Collection of one (1) groundwater sample from each existing monitoring well and each proposed monitoring well.

Prior to sample collection, each monitoring well will be micro-purged utilizing low-flow sampling techniques. Low-flow refers to the velocity with which groundwater enters the peristaltic pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen. It does not necessarily refer to the flow rate of water discharged at the surface which can be affected by flow regulators or restrictions. Water level drawdown provides the best indication of the stress imparted by a given flow-rate for a given hydrological situation. The objective is to pump in a manner that minimizes stress (drawdown) to the system to the extent practical taking into account established site sampling objectives. Flow rates on the order of 0.1 to 0.5 L/min will be maintained during the sampling activities using dedicated sampling equipment.

The utilization of low-flow minimal drawdown techniques enables the isolation of the screened interval groundwater from the overlying stagnant casing water. The pump intake is placed within the screened interval such that the groundwater pumped is drawn in directly from the formation with little mixing of casing water or disturbance to the sampling zone.

The monitoring wells will be purged until produced groundwater is consistent in color, clarity, pH, temperature and conductivity.

The groundwater samples will be collected in laboratory prepared glassware and placed on ice in a cooler, which will be secured with a custody seal. The samples will be transported to a selected analytical laboratory along with a completed chain-of-custody form.

2.3 LABORATORY ANALYTICAL PROGRAM

The groundwater samples collected from the monitoring wells will be analyzed for TPH GRO/DRO utilizing EPA SW-846 Method 8015B and BTEX utilizing EPA SW-846 Method 8021B.

A summary of the analysis, sample type, sample frequency and EPA-approved methods are presented below:

Analysis	Sample Type	No. of Samples	EPA Method
TPH GRO/DRO	Groundwater	9	SW-846 8015B
BTEX	Groundwater	9	SW-846 8021B

3.0 CORRECTIVE ACTION

Corrective actions completed at the Site to date include the excavation and disposal of petroleum hydrocarbon impacted soils in the immediate vicinity of the release source and the removal of groundwater that recharged into the open excavation utilizing a vacuum truck. The excavation was then backfilled with imported unaffected fill material.

The primary objective of the proposed corrective actions is to further reduce the concentrations of COCs in soil and groundwater to below the OCD *RALs* and New Mexico WQCC *GQSs*, respectively. The corrective actions proposed for the Site include in-situ chemical oxidation (ISCO), which is a more active (vs. passive) remediation alternative.

3.1 INJECTION POINT INSTALLATION

Seventeen (17) soil borings will be advanced in the vicinity of the New Mexico WQCC Exceedance Zone for the installation of ISCO injection points, utilizing a Geoprobe® drilling rig. Each soil boring will be advanced to a maximum depth of approximately 20 feet bgs.

Reusable sampling and drilling equipment will be decontaminated utilizing an Alconox® wash and water rinse prior to commencement of the project and between the advancement of each injection point.

Subsequent to completion, the seventeen (17) soil borings will be converted to injection points to facilitate the delivery of the proposed injectate into the affected groundwater bearing unit. The injection points will be completed as follows:

- Installation of 10 feet of 2-inch diameter, machine slotted PVC well screen assembly with a threaded bottom plug;
- Installation of riser pipe to surface;
- Placement of 2 feet of hydrated bentonite pellets above an inflatable packer, installed immediately above the screened interval;
- Addition of cement/bentonite slurry to the surface; and
- Installation of a locking well cap and above-grade protective riser.

Figures 4 and 5 indicate the approximate locations of the proposed injection points in relation to the OCD RAL Exceedance Zone in Soil and New Mexico WQCC GQS Exceendance Zone in Groundwater, respectively.

3.2 IN-SITU CHEMICAL OXIDATION

Transitioning non-aqueous phase organics into an aqueous phase and producing persistent contact between the organic contaminant and the oxidant reagent is critical for achieving adequate destruction for reaching the treatment goals. Lateral propagation of an aqueous reagent can be controlled without much difficulty through adequate injection point placement, proper fluid flow rate and injection pressure. This will ensure adequate macro scale contact. However, micro-scale contact is much more difficult to achieve. Petroleum hydrocarbons sequestered within the interstitial pore space must be adequately contacted with an appropriate oxidant reagent dose for complete destruction. Aromatics and some straight chain alkanes have a particular affinity for strong sequestration between clay platelets (vander Waals force within the lattice structure). Inoculation of an oxidant reagent without proper adjustments for surface tension or ionization will result in inefficient oxidant-contaminant contact. The proposed in-situ oxidation inoculation procedures are designed with specific sequencing that will maximize oxidative persistence, penetration into interstitial pore space and partially de-ionize clay platelets easing contaminant desorption. A reduction-oxidation (redox) reaction that reaches third order kinetics can be highly exothermic, quickly driving aqueous phase contaminants into the vapor phase. Controlling the reaction kinetics is essential in maximizing contaminant contact persistence. The proposed in-situ oxidation procedures will form Windsor Type I micro-emulsion with petroleum hydrocarbons and the aqueous reagent maximizing destruction efficiency.

Subsurface Product Delivery

The formation will be prepared for contaminant oxidation by inoculating the treatment area with an alkaline oxidative de-ionizing solution. This will serve as a wetting agent, de-ionize clay platelets and optimize aqueous reagent contact with contaminants. The initial reagent will be delivered through a specifically sequenced treatment train. An aqueous solution containing sodium percarbonate and sodium persulfate will be injected through the seventeen (17) proposed injection locations. The pre-oxidation alkaline de-ionizing solution will also serve as a persulfate catalyst (producing sulfate radicals).

Twelve to twenty four hours after installing the initial oxidant blend, the treatment area will be subsequently inoculated using VeruSolve-HP™ aqueous reagent as a Surfactant-Enhanced In-Situ Chemical Oxidation (S-ISCO™) Coelution Technology™. VeruSOLVE-HP™ is a stabilized surfactant-cosolvent/oxidant combination effective for surgical destruction of source term contaminants. Because the rate of partitioning of contaminants into the aqueous phase determines the overall rate of reaction, as the concentration of stabilized surfactant-cosolvent fraction is increased, the partitioning and subsequent rate of chemical oxidation is increased. VeruTEK's stabilized surfactant-cosolvent/oxidant blend achieves Winsor Type I solubilization, where the contaminant is solubilized as a single-phase micro-emulsion and dissolution of constituents occur without mobilization. This allows for the destruction of the contaminants that are currently in a non-aqueous phase (i.e. the source term). The resulting redox reaction will occur over a very long period of time. Reaction kinetics are controlled, sustaining a highly oxidative environment for weeks. Extended persistence greatly increases the contaminant-oxidant contact occurrence, thereby producing very favorable results. Manufacturer's information for VeruSOLVE-HP™ is included in Appendix C.

The aqueous reagent will be injected through seventeen (17) injection points installed approximately within the OCD RAL Exceedance Zone in Soil and New Mexico WQCC GQS Exceendance Zone in Groundwater. The exact locations will be determined in the field subsequent to the locating of underground utilities. SWG will inject 10,500 gallons of aqueous reagent through the seventeen (17) installed injection wells. The reagent will be proportionally distributed through each of the injection wells. Due to the presumed aquifer properties, the aqueous solution of oxidant reagent will be injected at a low flow rate and pressure (<30 psi at the well head). In our experience, these application procedures provide the greatest control of oxidant distribution. In similar lithologic and hydrologic settings, these techniques have yielded homogeneous oxidant distribution and maximum contact with the contaminants.

Groundwater will be continuously monitored during injection activities for temperature, electrical conductance, total dissolved solids, dissolved oxygen, pH, oxidation-reduction potential and depth during injection through adjacent injection wells using YSI 556 multi-probe monitors and oil/water inter-phase probes. This real-time data will assist in monitoring reaction kinetics and subsurface reagent propagation allowing for fluid flow rate and pressure adjustments during injection.

The injection points will be constructed of 2-inch diameter Schedule 40 PVC with a ten foot screened interval, across the top of the initial groundwater-bearing unit. A good seal at the top of the sand pack is very important for insuring proper fluid control during injection.

4.0 CORRECTIVE ACTION EFFECTIVENESS

4.1 GROUNDWATER MONITORING

To evaluate the effectiveness of the proposed corrective actions, SWG will conduct two (2) groundwater sampling events at the Site subsequent to the completion of injection activities.

SWG's groundwater sampling program will consist of the following:

1. Collection of one (1) groundwater sample from each monitoring well utilizing low-flow minimal drawdown sampling techniques during each of two (2) quarterly groundwater sampling events.

The monitoring wells will be purged until produced groundwater is consistent in color, clarity, pH, DO, ORP, temperature and conductivity.

The groundwater samples will be collected in laboratory prepared glassware and placed on ice in a cooler, which will be secured with a custody seal. The samples will be transported to a selected analytical laboratory along with a completed chain-of-custody form.

4.2 LABORATORY ANALYTICAL PROGRAM

The groundwater samples collected from the monitoring wells will be analyzed for TPH GRO/DRO utilizing EPA method SW-846 #8015B and BTEX utilizing EPA Method SW-846 #8021B.

A summary of the analysis, sample type, sample frequency and EPA-approved methods are presented below:

Analysis	Sample Type	No. of Samples	EPA Method
TPH	Groundwater	18	SW-846#8015
BTEX	Groundwater	18	SW-846#8021B

4.3 CORRECTIVE ACTION REPORT

Upon completion of corrective action and groundwater monitoring activities, a Corrective Action Report will be prepared that will include documentation of corrective action activities, groundwater monitoring activities, a site plan detailing pertinent Site features, laboratory analytical results, an evaluation of sampling results and recommendations concerning further action, if necessary.

4.4 SCHEDULE

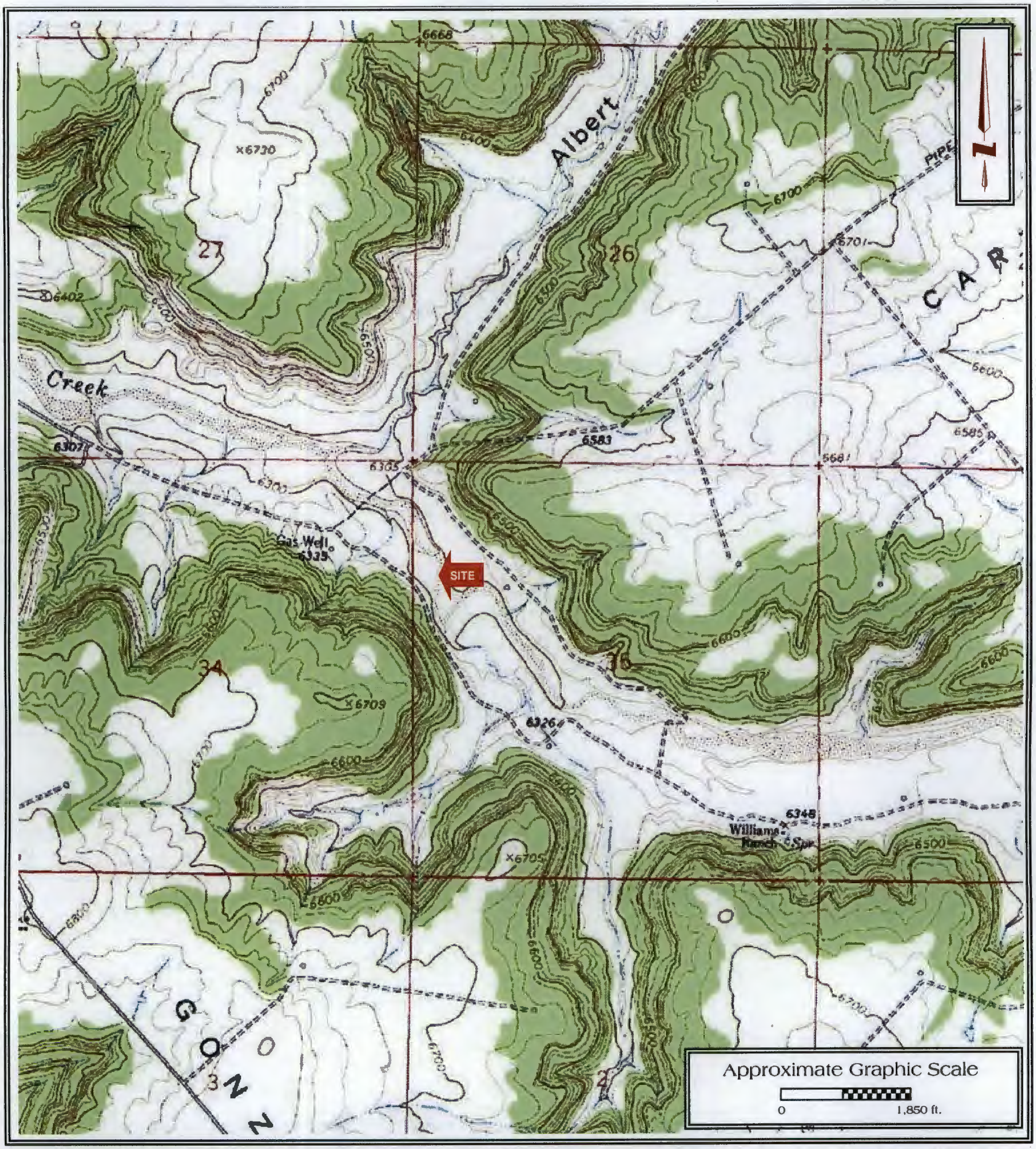
The completion of the ISCO activities will require an estimated two (2) weeks; however, time estimations regarding the completion of corrective actions depend upon several factors, many of which cannot be pre-determined.

Variables which may impact the estimated time required to attain project objectives include, inclement weather, laboratory analytical turn-around time, and additional work time if confirmation samples do not confirm the attainment of cleanup goals. Groundwater will be monitored on a quarterly basis for two (2) quarters (2 sampling events) to ensure the attainment of the proposed cleanup goals.

Proposed sampling events, report submittals and related dates are included in the following table:

April/May 2011	ISCO Event
May 2011	Groundwater Monitoring Event
August 2011	Groundwater Monitoring Event
September 2011	Corrective Action Report Submittal

The Corrective Action Report will be submitted to the New Mexico OCD in September 2011, subsequent to the completion of corrective action activities and groundwater monitoring at the Site.



Supplemental Investigation &
Corrective Action Work Plan
K-51 Pipeline Release
N36° 26' 47.77"; W107° 26' 46.04"
Off County Road 537
Rio Arriba, New Mexico
SWG Project No. 0410003

Southwest
GEOSCIENCE

FIGURE 1
Topographic Map
Gonzales Mesa, NM Quadrangle
Contour Interval - 10 Feet

APPENDIX A

Figures

Supplemental Investigation &
Corrective Action Work Plan
K-51 Pipeline Release
N36° 26' 47.77"; W107° 26' 46.04"
Off County Road 537
Rio Arriba, New Mexico
SWG Project No. 0410003

Southwest
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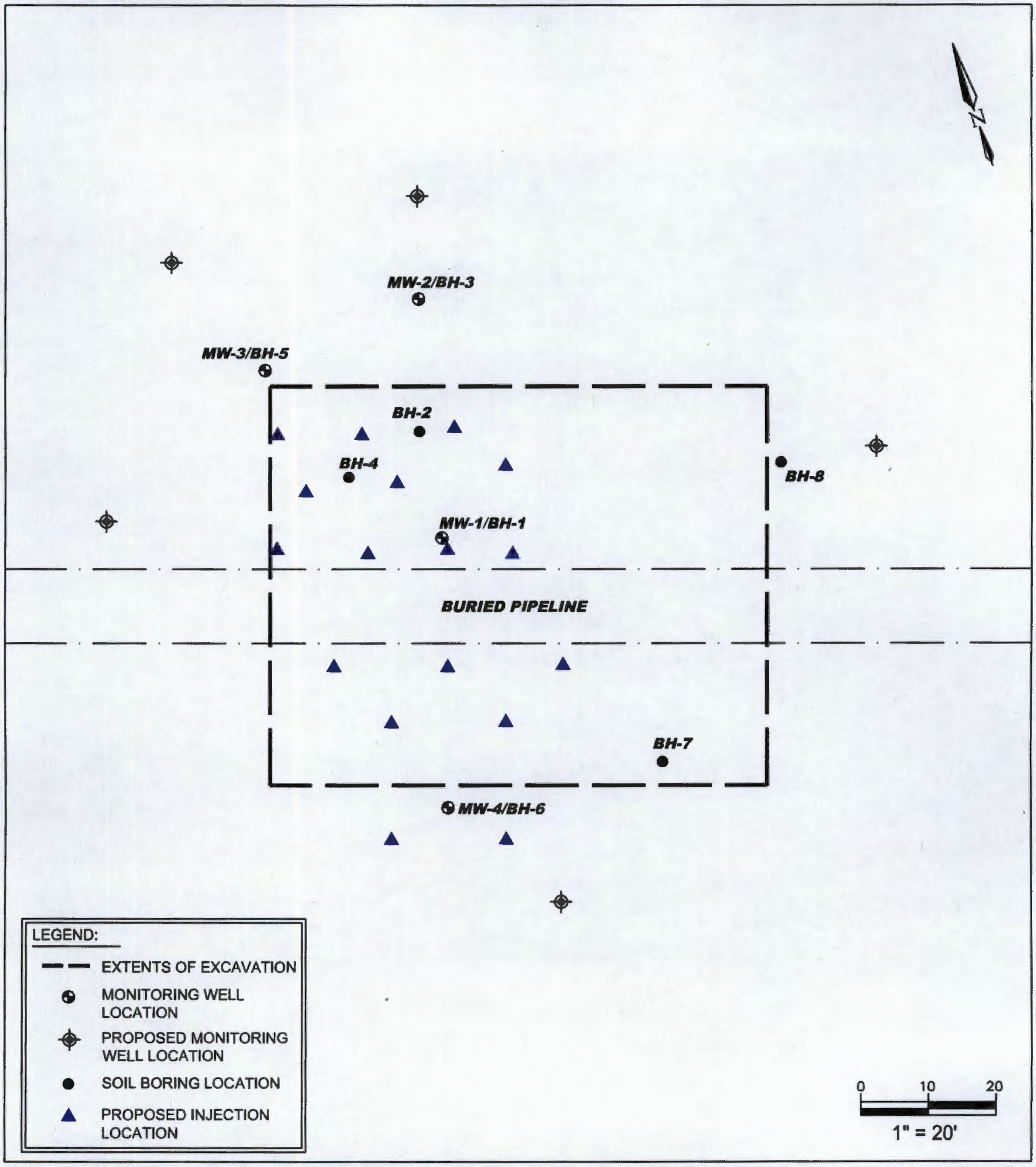
FIGURE 2
Site Vicinity Map
2005 Aerial Photograph



Corrective Action Work Plan
K-51 Pipeline Release
NE ¼ of S34 & NW ¼ of S35, T26N R6W
Rio Ariba County, New Mexico

SWG Project No. 0410003

Southwest
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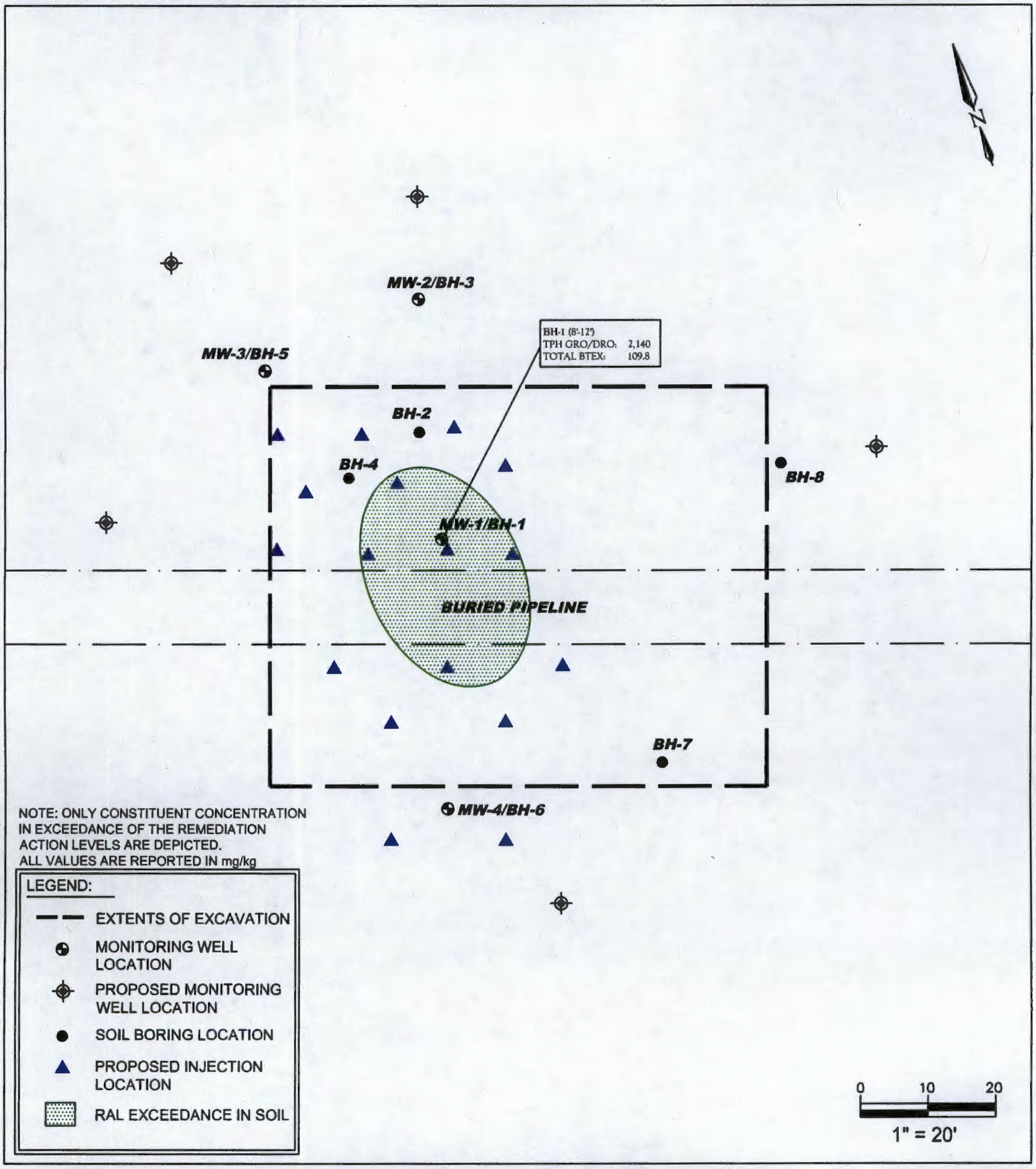
FIGURE 3

SITE MAP



Corrective Action Work Plan
K-51 Pipeline Release
N35° 26' 47.77"; W107° 26' 46.04"
Off County Road 537
Rio Ariba County, New Mexico

SWG Project No. 0410003

Southwest
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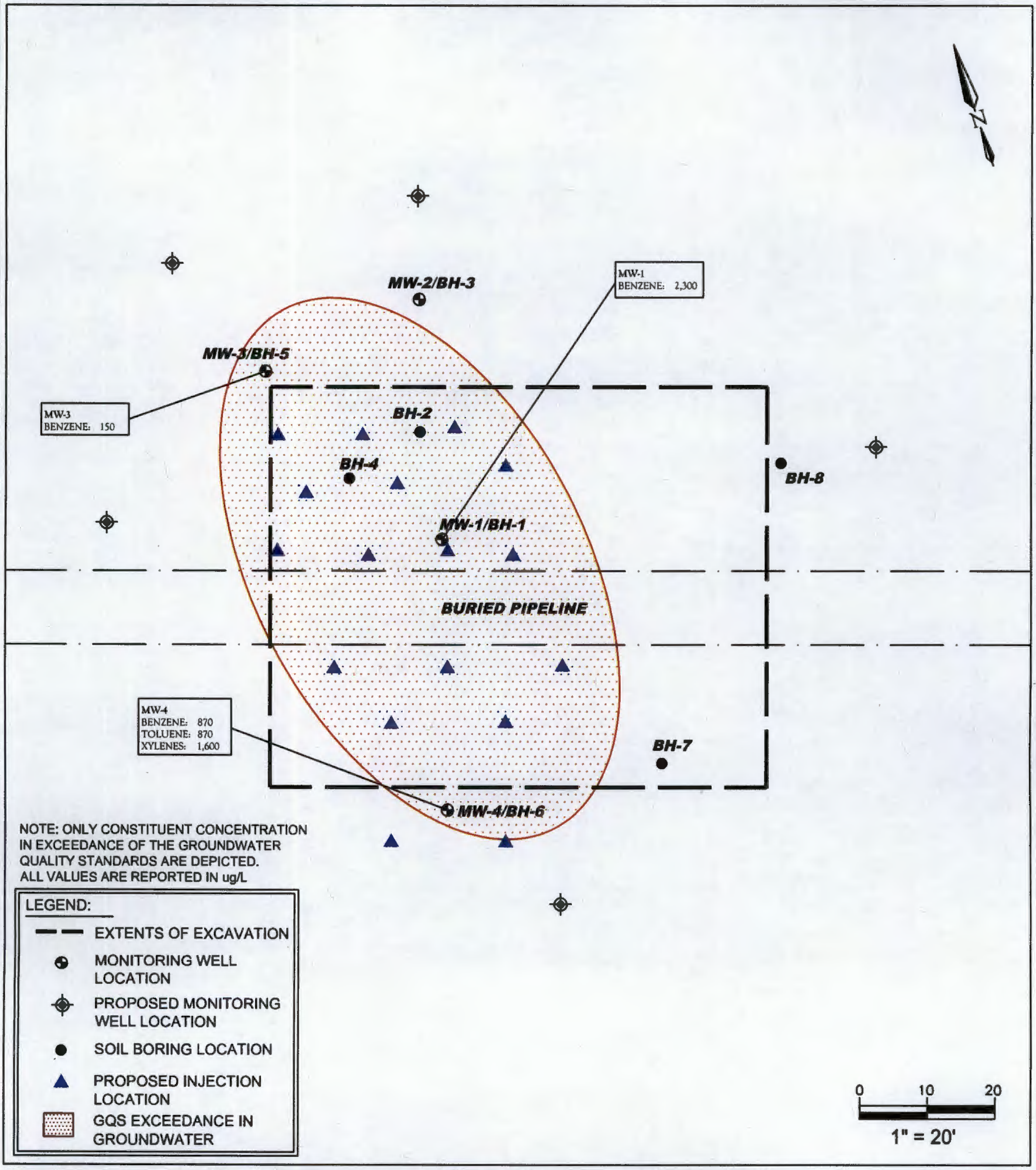
FIGURE 4

REMEDIATION ACTION LEVEL (RAL) EXCEEDANCE ZONE IN SOIL



NOTE: ONLY CONSTITUENT CONCENTRATION IN EXCEEDANCE OF THE GROUNDWATER QUALITY STANDARDS ARE DEPICTED.
ALL VALUES ARE REPORTED IN ug/L

Corrective Action Work Plan
K-51 Pipeline Release
N35° 26' 47.77"; W107° 26' 46.04"
Off County Road 537
Rio Ariba County, New Mexico

SWG Project No. 0410003

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FIGURE 5

GROUNDWATER QUALITY STANDARDS (GQS) EXCEEDANCE ZONE IN GROUNDWATER

SAMPLE DATE: 9.24.2010

APPENDIX B

Tables

TABLE 1
K-51 PIPELINE RELEASE
SOIL ANALYTICAL SUMMARY

Sample I.D.	Date	Sample Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)	TPH GRO (mg/kg)	TPH DRO (mg/kg)
New Mexico Entergy, Mineral & Natural Resources Department, Oil Conservation Division, Remediation Action Level			10	NE	NE	NE	50	100	
SMA Confirmation Samples									
North Wall	4.21.10	-	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	49
South Wall	4.23.10	-	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	10
East Wall	4.23.10	-	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	26
West Wall	4.24.10	-	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0
Soil Borings Installed by LTE									
BH-1	6.8.10	8-12 (Above Clay)	<2.5	31	6.8	72	**109.8**	**740**	**1,400**
BH-1	6.8.10	8-12 (Below Clay)	0.12	<0.05	<0.05	<0.1	0.12	<5.0	<10.0
BH-1	6.8.10	12-16	<0.05	<0.05	<0.05	<0.1	<0.25	<5.0	<10.0
BH-2	6.8.10	8-12	<0.05	0.062	<0.05	0.19	0.19	8.5	12
BH-2	6.8.10	12-16	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0
BH-3	6.8.10	12-16	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0
BH-4	6.8.10	8-12	0.055	0.74	0.12	1.3	1.3	25	45
BH-4	6.8.10	12-16	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0
BH-5	6.8.10	8-12	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0
BH-5	6.8.10	12-16	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0
BH-6	6.8.10	12-16	<0.05	0.72	0.12	1.2	1.2	16	<10.0
BH-7	6.8.10	12-16	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0
BH-8	6.8.10	12-16	<0.05	<0.05	<0.05	<0.1	<0.1	<5.0	<10.0

Note: Concentrations in **bold** and yellow exceed the applicable OCD Remediation Action Level

NE = Not Established

TABLE 2
K-51 PIPELINE RELEASE
GROUNDWATER ANALYTICAL SUMMARY

Sample I.D.	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	TPH GRO (mg/L)	TPH DRO (mg/L)
New Mexico Water Quality Control Commmission Groundwater Quality Standards		10	750	750	620	NE	NE
Excavation*	4.21.10	**7,000**	**13,000**	540	**5,200**	NA	NA
MW-1	6.21.10	**8,400**	**1,300**	560	**4,200**	NA	NA
	9.24.10	**2,300**	28	200	520	8.4	<1.0
MW-2	6.21.10	**200**	53	14	96	NA	NA
	9.24.10	2.3	<1.0	<1.0	<2.0	<0.050	<1.0
MW-3	6.21.10	**640**	57	72	**1,000**	NA	NA
	9.24.10	**150**	<1.0	16	28	0.48	<1.0
MW-4	6.21.10	**3,600**	**10,000**	600	**6,600**	NA	NA
	9.24.10	**870**	**870**	260	**1,600**	12	1

Note: Concentrations in **bold** and yellow exceed the applicable New Mexico WQCC Groundwater Quality Standards

NA = Not Analyzed

NE = Not Established

*Sample collected from the open excavation by SMA.

APPENDIX C

Remediation Technologies Information

VeruSOLVE-HP™

What is VeruSOLVE-HP™?

VeruTEK® Technology's green chemistry platform provides innovative solutions to today's most challenging environmental cleanups. VeruSOLVE-HP™ is a stabilized surfactant/oxidant combination effective for surgical destruction of DNAPLs and source term wastes like MGP waste, creosote, hydrocarbons and chlorinated solvents. Clients apply VeruSOLVE-HP™ in-situ via injection, or ex-situ as a direct spray application.

Why is VeruSOLVE-HP™ better than current methods?

- VeruSOLVE-HP™ safely destroys organic contamination in place such as beneath buildings and structures.
- S-ISCO® is a less expensive process overall and is a far more complete remedy.
- Previous applications of VeruSOLVE-HP™ have demonstrated successful destruction of fuel oil and gasoline constituents to achieve closure of sites in a short duration (less than two weeks).
- Injected in close proximity to homes and high traffic areas safely and without disruption to occupancy.
- VeruSOLVE-HP™ can be used for source removal, enhanced product recovery and as an aerobic biostimulant (for plume control).
- The carbon footprint of S-ISCO® remediation with VeruSOLVE-HP™ is less than 10 percent than that of traditional remedies such as excavation/landfilling.

VeruSOLVE-HP™ application is easy.

- VeruSOLVE-HP™ is shipped ready to inject into the subsurface through geoprobe points, permanent injection wells, or monitoring wells.
- VeruSOLVE-HP™ can be delivered in 55-gallon drums, 1000 L totes, or by tanker truck.
- Ex-situ application can treat stockpiled contaminated soil at rates of 400-800 tons per day.

VeruSOLVE-HP™ is the preferred solution for Engineers, Injection Contractors, and the following Industries:

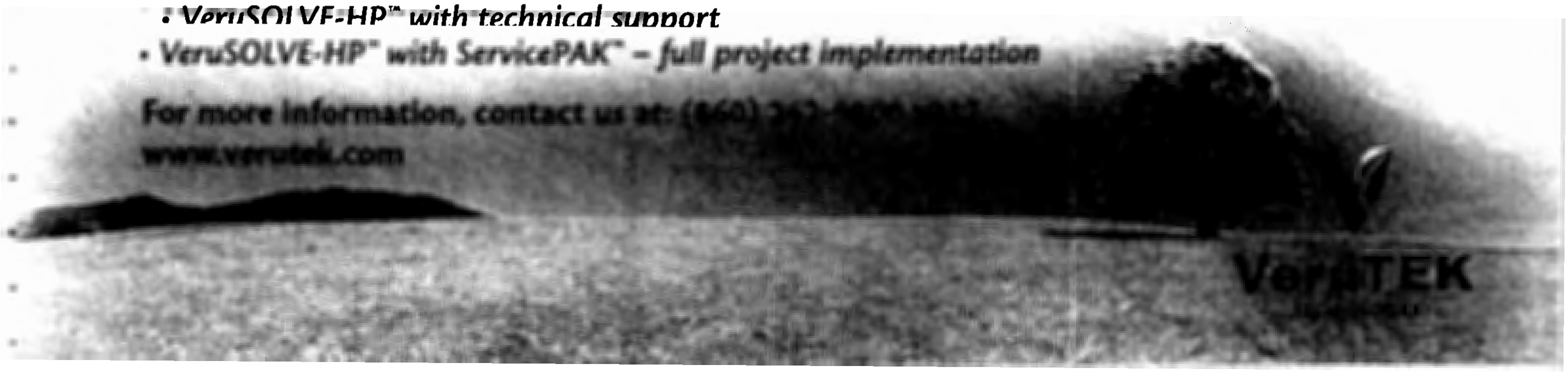
Real Estate
Utilities
Manufacturing
Industrial
Pharmaceutical
Municipal
Homeowners
State and Federal Government
Banks
Lawyers
Insurance Companies

VeruSOLVE-HP™ is available for direct purchase. VeruTEK® provides multiple levels of support, based on site specific needs from training to full scale implementation.

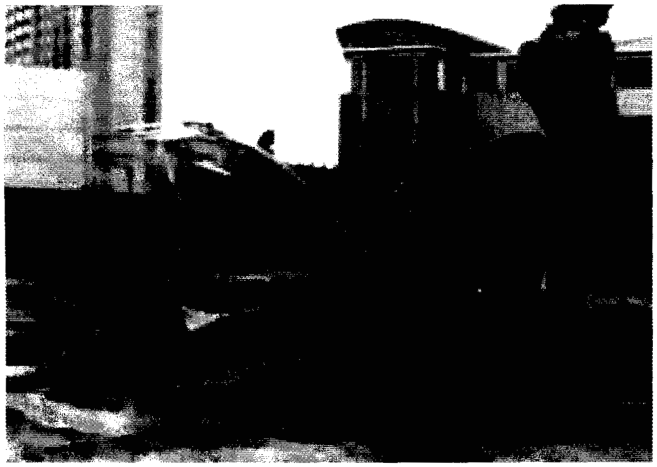
Applicators can choose from the following:

- *VeruSOLVE-HP™ direct purchase*
- *VeruSOLVE-HP™ with technical support*
- *VeruSOLVE-HP™ with ServicePAK™ – full project implementation*

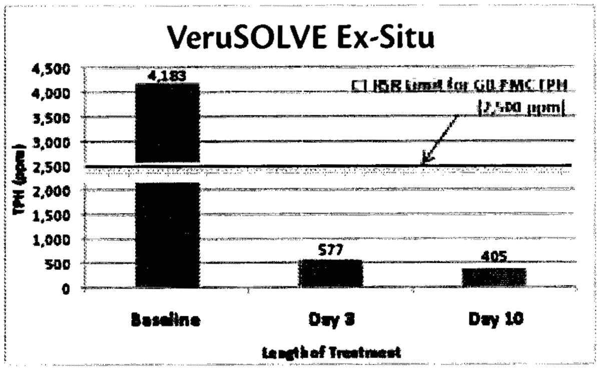
For more information, contact us at: (860) 242-9800 [illegible]
www.verutek.com



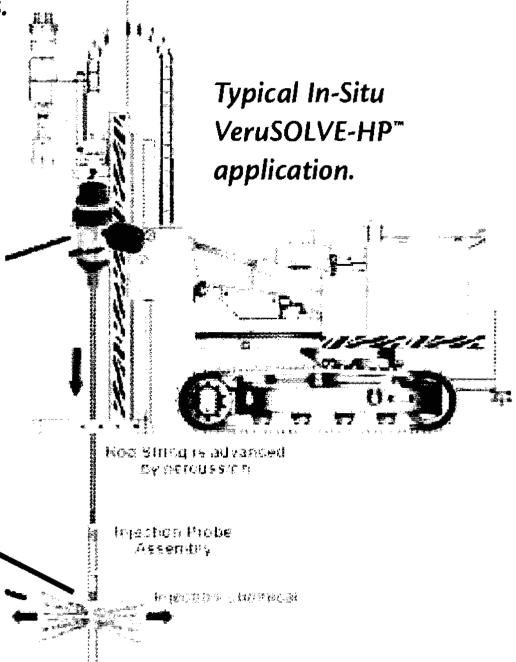
VeruSOLVE-HP™



EX-Situ VeruSOLVE-HP™ can treat up to 400-800 ton per day. More economical and sustainable option to excavation and alternate remedial techniques. On average 25-50% less than dig and haul.



VeruSOLVE-HP™ EX-Situ application successfully treats contaminant concentrations to below state standards.



Typical In-Situ VeruSOLVE-HP™ application.

VeruSOLVE-HP™ is applicable to all size sites and available for direct purchase.

VeruTEK® provides multiple levels of support, based on site specific needs from training to full scale implementation.

Complete the Project Survey available on our website to determine the appropriate level of support.

Call or visit our website
for more information.
(860) 242-9800 x317
www.verutek.com

VeruSOLVE-HP™

Application Guidelines

Cleaning up the Environment for the Benefit of Clients and their communities

"Work for something because it is good, not just because it stands a chance of success"

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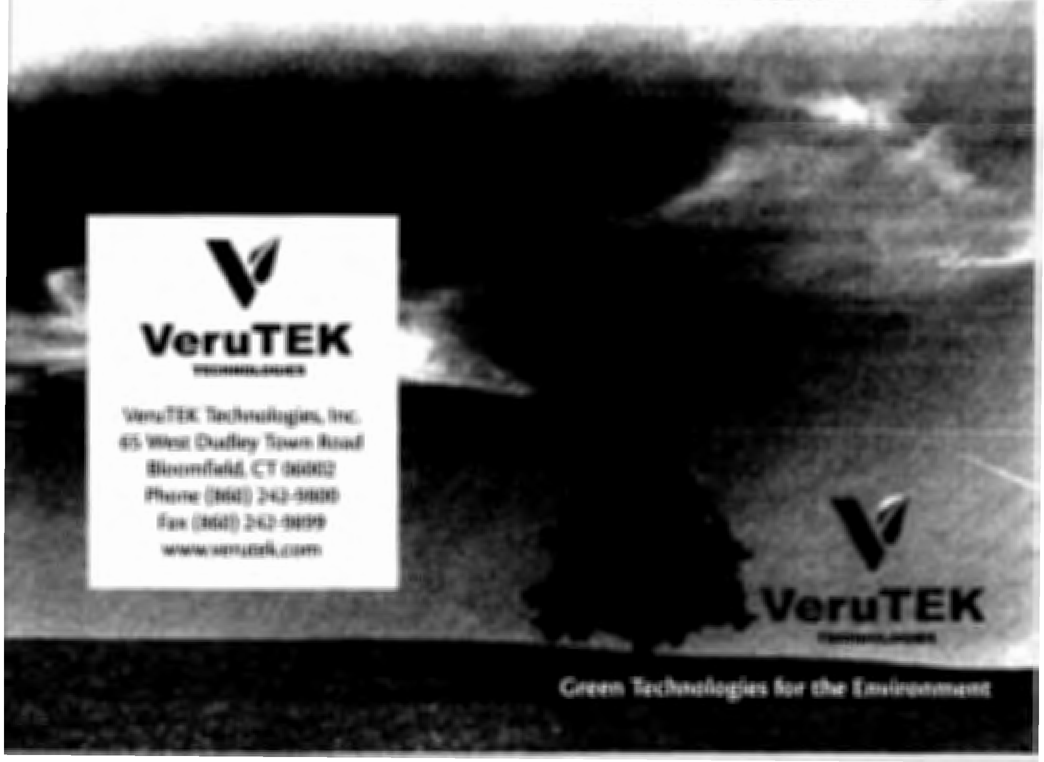


VeruTEK
Technologies
VeruTEK Technologies, Inc.
65 West Dudley Town Road
Bloomfield, CT 06002
Phone (860) 242-9800
Fax (860) 242-9899
www.verutek.com

What is VeruSOLVE-HP™?

VeruTEK's® green chemistry platform provides innovative solutions to today's most challenging environmental cleanups. VeruSOLVE-HP™ is a stabilized surfactant/oxidant combination effective for surgical destruction of DNAPLs and source term wastes like MGP, creosote, and hydrocarbons. Clients apply VeruSOLVE-HP in-situ via injection, or ex-situ as a direct spray application.

Step 1: How to Order VeruSOLVE-HP™

VeruSOLVE-HP™, is typically delivered *Ready-to-Inject*, in bulk volume tankers, totes, or drums. VeruSOVE is safe to handle and use, and not subject to regulatory reporting or DOT transportation restrictions or labeling. First step is to obtain a site survey form from VeruTEK – **info@verutek.com** or **www.verutek.com** – Complete one form for each site and return to VeruTEK. This will enable you to obtain the quantity and cost of VeruSOLVE-HP™ required for treatment at your site; custom to the type of waste, treatment area, and lithology.

Step 2: Select Your Applicator

Clients apply VeruSOLVE-HP in-situ through injection, or ex-situ as a direct spray-on application. Work with internal resources, or if applicable, identify qualified external applicators, to determine if in-situ or ex-situ application will be best suited for your site. Most any company experienced with Geoprobe® in-situ investigation and injection implementor, or remediation contractor, can successfully apply VeruSOLVE. VeruTEK has worked with numerous qualified and experienced companies across most states, and may be able to identify an applicator or consultant.

VeruSOLVE-HP is available for direct purchase. VeruTEK provides multiple levels of support based on site specific needs from training to full scale implementation.

Applicators can choose from the following:

- ***VeruSOLVE-HP™ direct purchase***
- ***VeruSOLVE-HP™ with technical support***
- ***VeruSOLVE-HP™ with ServicePAK™ full project implementation***

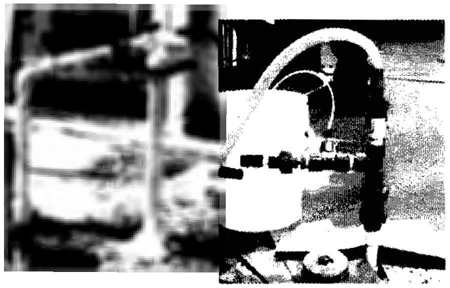
Step 3: How to Apply VeruSOLVE-HP™

Application equipment

For in-situ remediation of free phase, dissolved or DNAPL wastes, VeruSOLVE-HP™ is injected into the treatment zone through Geoprobe® rods or installed injection points using a chemically compatible pump. Both methods require an injection well head to monitor pressure and purge air from the injection line.

To treat ex-situ, a series of spray bars are assembled at the end of a power grader or pug mill. VeruSOLVE-HP is directly sprayed onto the loose contaminated material upon exit. Treated materials are piled in a controlled fashion and contaminant destruction occurs over one to several days depending on contaminant concentrations and desired cleanup levels. As with injection, a chemically compatible pump, hose, fittings and spray bars are necessary. When pumping or applying VeruSOLVE-HP™ with non-VeruTEK equipment, cross-check the wetted materials of your pumping equipment to ensure compatibility:

Compatible Materials	**Viton, HDPE, SS, PVC, Nylon, and Polycarbonate**
Incompatible Materials	**Steel, cast iron, other metal alloys**



Typical well head assemblies for delivery of VeruSOLVE-HP™

Optimizing Your In-situ application

How many injection points do I need?

Typically, it is recommended for small treatment areas to space out injection points approximately 10-15 feet apart equally throughout the treatment area.

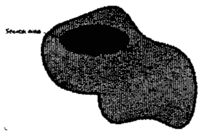
For larger areas, it is best to start in a known source area and monitor the initial injection of VeruSOLVE-HP™ to verify site specific in-situ transport properties. This will aid in determining the optimal injection point spacing, and injection operating parameters.

How do I construct the injection wells? Can I use existing wells?

Injection wells are generally constructed of the same material as a standard monitoring well. Injections can also be performed through existing monitoring wells or through direct push Geoprobe rods.

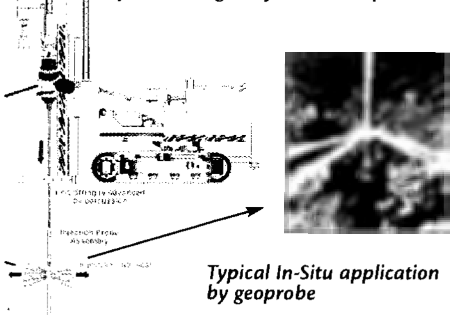
How many injection treatments?

Since VeruSOLVE-HP can successfully destroy DNAPL and free phase wastes, typically no repeat treatments are required for adequately characterized sites. Detailed monitoring of the injections is important to optimize the radius of influence of treatment laterally and at depth, as well as the progress of contaminant destruction. In many cases, areas of the site may have less waste than anticipated, or contaminant destruction occurs more rapidly - allowing injection points to be turned off ahead of schedule.

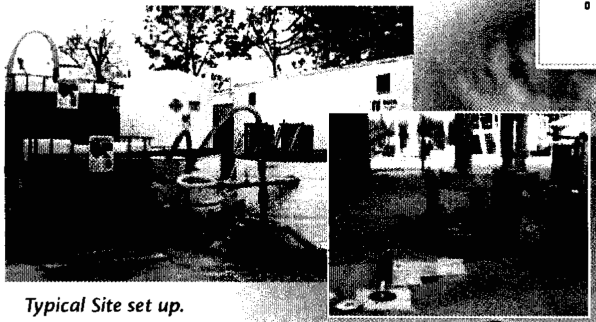


VeruSOLVE-HP is available for direct purchase. Quantities are based on client provided information including area of concern and contaminant concentrations.

VeruTEK provides multiple levels of support, based on site specific needs from training and injection design to full scale implementation.



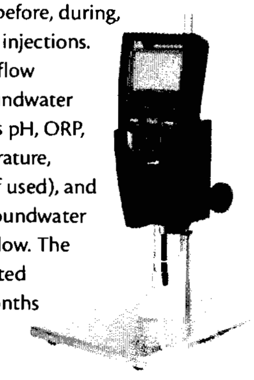
Typical In-Situ application by geoprobe



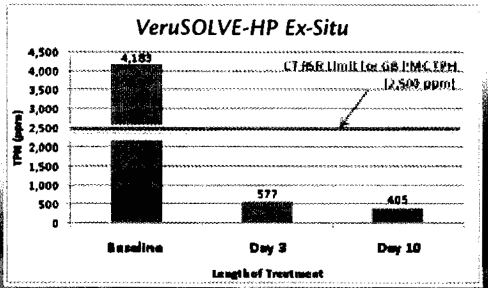
Typical Site set up.

Monitoring?

Monitoring is conducted before, during, and after VeruSOLVE-HP™ injections. Using laboratory and low flow sampling equipment, groundwater quality parameters such as pH, ORP, conductivity, head, temperature, persulfate concentration (if used), and IFT are measured from groundwater and the injection system flow. The monitoring is also conducted periodically for several months following injections.



Typical Monitoring Equipment IFT Meter

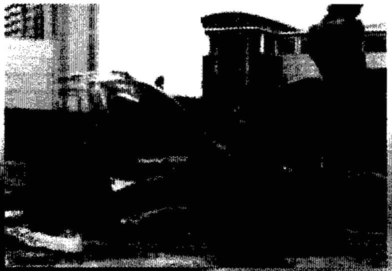


VeruSOLVE-HP Ex-Situ application successfully treats contaminant concen[illegible]

For more information please call: (860) 242-9800

Optimizing your Ex-situ application

Ex-situ can be an extremely quick and economical solution for on-site treatment, and is often used to treat fuel spills and hydrocarbons in soils. The key is to increase contact of the contaminant with VeruSOLVE-HP™, and this can reliably be done by minimizing the soil particle size (increasing exposed surface area) in a pug mill or power grader. Tumbler bars or screens may also be added to aid in mixing as the wetted soil leaves the equipment.



VeruSOLVE™

MATERIAL SAFETY DATA SHEET

Section 1: PRODUCT AND COMPANY IDENTIFICATION

Manufacturer: VeruTEK Technologies, Inc.
Address: 65 West Dudley Town Road, Suite 100, Bloomfield, CT 06002
Phone Number: (860) 242-9800

Product Name: VeruSOLVE™
Issue Date: January 2010

Section 2: HAZARDS IDENTIFICATION

Emergency Overview

Appearance/Odor: Clear liquid with mild citrus odor.

Stability: Product is stable under normal conditions, but is very sensitive to contamination. Decomposition yields oxygen gas that supports combustion of organic matter and can cause over pressure if confined.

Slippery when spilled.

Potential Health Effects: See Section 11 for more information.

Likely Routes of Exposure: Eye contact, skin contact, inhalation.

Eye:	Causes moderate to severe irritation.
Skin:	May cause slight redness. Prolonged or repeated exposure may cause drying of the skin.
Inhalation:	May cause nose, throat, and respiratory tract irritation, coughing, headache.
Ingestion:	Not likely to be toxic, but may cause vomiting, headache, or other medical problems.

Medical Conditions Aggravated By Exposure: May irritate the skin of people with pre-existing skin conditions.

This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC, or NTP.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

	Percent	TLV	Carcinogenic (OSHA,TP,IARC)
Hydrogen Peroxide	< 4		No
VeruSOL® 3	1 – 5		No
Water	91-95		No

Section 4: FIRST AID MEASURES

Eye Contact:
Flush with water for at least 15 minutes. If irritation persists, seek medical attention.

Skin Contact:
Wash affected area with copious amounts of soap and water for at least 15 minutes. Remove contaminated clothing. If irritation develops, seek medical attention.

Inhalation:
Move to fresh air immediately. If breathing is difficult or discomfort persists, seek medical attention.

Ingestion:
Seek medical attention.

Section 5: FIRE FIGHTING MEASURES

Flash Point (Method): N/A **Explosion Limits**: Upper: N/A Lower: N/A

Suitable Extinguishing Media:
Flood area with water. Product is not combustible but during decomposition will produce oxygen gas which may intensify a fire.

.

Protection of Firefighters:
Vapors may be irritating to eyes, skin and respiratory tract. Firefighters should wear self-contained breathing apparatus (SCBA) and full fire-fighting turnout gear.

Section 6: ACCIDENTAL RELEASE MEASURES

Methods for Accidental Release:
Combustible materials exposed to product should be immediately submerged or rinsed with water to ensure that all hydrogen peroxide is removed. Residual peroxide that may be left after evaporation may cause certain materials to ignite and result in a fire.

Dike spill area and cap leaking containers as necessary to prevent further spreading of spilled material. Absorb small spills with suitable material and put into approved containers.
Larger spills should be contained by blocking nearby sewers, drains, or bodies of water. Dilute with large amounts of water and hold in a dike for disposal or until all hydrogen peroxide has decomposed.

Waste Disposal:
Manage in accordance with applicable local, State, and Federal solid/hazardous waste regulations. Material is not a listed waste.

Other Information: Follow local, State and Federal release reporting requirements

Section 7: HANDLING AND STORAGE

Handling
Wear chemical splash goggles and full face shield, impervious clothing, gloves, and shoes. Avoid cotton, wool, and leather. Avoid excessive heat and contamination. Contamination may cause decomposition and generation of oxygen gas which could results in high pressures and possible container rupture. Never return unused material to the original container. Empty drums should be triple rinsed with water before discarding. Utensils used for handling should be made of glass, stainless steel, aluminum, or plastic. Do not allow this material to come in contact with eyes. Avoid prolonged contact with skin. Use in well ventilated areas. Do not breathe vapors. Thoroughly wash hands with soap and water after handling this material.

Storage
Store containers in well-ventilated area, out of direct sun-light, and away from combustibles. Keep away from incompatible materials and heat, sparks, and flame. Open container slowly to release pressure caused by temperature variations. Product may be packaged in phenolic-lined, steel containers, or fluorinated plastic containers. Storage temperature should not exceed 110°F (43°C) for extended periods of time. Keep container closed when not in use.

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

VeruSOLVE™	N/E	(N/E – Not Established)

Engineering Controls:
Provide ventilation to minimize the release of vapors and mist into the work environment. Spills should be minimized or confined to prevent release from work area. Remove contaminated clothing immediately and wash before reuse. Keep away from sparks and flames.

Eye/Face Protection:
Wear chemical splash-type safety glasses or goggles. Use full face mask if severe splashing is expected during use.

Skin Protection:
Wear chemically resistant clothing, gloves and boots as recommended by the manufacturer.

Respiratory Protection:
If required, use NIOSH approved respiratory protection

Protective Clothing:
Wear impervious clothing as recommended by the manufacturer. (avoid cotton, leather, and wool). Completely submerge any clothing that becomes contaminated with the product in water, before drying. Residual peroxide left to dry on a material such as fabrics, paper, leather, wool, cotton, wood, or other combustible material may cause ignition and result in a fire.

General Hygiene Considerations:
As with any chemical, wash hands thoroughly after handling. Have eyewash facilities immediately available.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Color:	Clear	**Odor:**	Citrus odor.
Physical State:	Liquid	**Boiling Point:**	212°F (100°C)
Specific Gravity:	1.0 @ 77°F (25°C)	**Vapor Pressure**:	N/A
Flash Point:	>120 °F	**Solubility in Water:**	Soluble.

Volatile Organic Compound (VOC) Content: 1-5% by volume.

Note: These specifications represent a typical sample of this product, but actual values may vary. Certificates of Analysis and Specification Sheets are available upon request.

Section 10: STABILITY AND REACTIVITY

Stability: Contamination may cause decomposition and production of oxygen gas.

Conditions to Avoid: Keep away from heat, sparks, flames, and contamination.

Incompatible Materials: Strong reducing agents, iron and other heavy metals, galvanized iron, copper alloys and caustics

Hazardous Decomposition Products: Possible hazardous decomposition products formed under fire conditions – Nature of products is unknown.

Possibility of Hazardous Reactions: Possible under extreme conditions or in presence of incompatible material.

Section 11: TOXICOLOGICAL INFORMATION

Acute Effects
May cause irritation to eyes, nose, and throat.

Chronic Effects
N/A

Section 12: ECOLOGICAL INFORMATION

Ecotoxicity: N/A

Persistence/Degradability: This product is subject to reduction or oxidation process and decomposes in to water and oxygen.

Bioaccumulation/Accumulation: N/A

Mobility in Environment: N/A

Section 13: DISPOSAL CONSIDERATIONS

Disposal:

Dispose of in accordance with applicable local , State, and Federal regulations. Material is not a listed hazardous waste.

Section 14: TRANSPORT INFORMATION

US DOT Shipping Classification
Hazard Class: Not regulated
Identification No.: Not applicable
Packing Group: Not applicable
Label/Placard: Not applicable

TDG Status:
Not regulated

IMO Status:
Not regulated

IATA Status:
Not regulated

Section 15: REGULATORY INFORMATION

Global Inventories
The components of this product are included in the following inventories:
USA (TSCA)
Canada (DSL)
Australia (AICS)
Korea (KECL)
Philippines (PICCS)

Proposition 65: California Safe Drinking Water and Toxic Enforcement Act of 1986
This product is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

Section 16: OTHER INFORMATION

NFPA 704: National Fire Protection Association
Health – 0 (minimal hazard) Fire – 0 (minimal hazard) Reactivity – 0 (minimal hazard)

Legend
OSHA – United States Occupational Health and Safety Administration
IARC – International Agency for Research on Cancer
NTP – National Toxicology Program
NIOSH – National Institute for Occupational Safety and Health
EPA – United States Environmental Protection Agency

Caution: The user should conduct his/her own experiments and establish proper procedures and control before attempting use on critical parts.