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QUARTERLY MONITORING AND
REMEDIATION SYSTEM INSTALLATION REPORT
JANUARY - JULY 1993
BARELAS BRIDGE GWPA SITE
800 BRIDGE BLVD., S.W.
ALBUQUERQUE, NEW MEXICO

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#### **EXECUTIVE SUMMARY**

Groundwater Technology, Inc. (Groundwater Technology) installed an air sparge/soil vapor extraction remediation system and performed compliance monitoring for the period January through August 1993 for the system located at the Barelas Bridge Groundwater Protection Act (GWPA) site located at 800 Bridge Boulevard S.W., in Albuquerque, New Mexico. Quarterly site monitoring, including fluid-level measurements and air and groundwater sampling, was conducted in February, June, and July 1993. System installation and start-up, system operation and maintenance, and quarterly monitoring was conducted in accordance with the Reclamation Proposal prepared for the site (dated December 4, 1992). This quarterly report has been prepared in accordance with the New Mexico Environmental Improvement Board Underground Storage Tank Regulations (NMEIB/USTR) Part XII, Section 1216.

The air sparge system consists of seven air sparge wells manifolded to a 7.5 horsepower (hp) liquid ring blower. The soil vapor extraction system (SVES) consists of nine vertical and two lateral vent wells manifolded to one 15-hp vacuum blower and a 500 standard cubic feet per minute (scfm) thermal oxidizer for offgas treatment of the extracted vapors. Construction of the remediation system at the Barelas Bridge site was performed during April-July 1993. The SVES was activated on June 29, 1993. The sparge system has not yet been activated and will be put into operation after remediation of the most volatile hydrocarbons in the subsurface by the SVES is complete and the risk of mobilizing hydrocarbons by sparging is thereby reduced.

The SVES operated under Air Quality Permit No. 310, which was issued February 8, 1993 in accordance with Albuquerque/Bernalillo County Air Quality Control (AQCR) Regulation 20, and limits maximum air emissions from the thermal oxidizer to 0.5 pounds per hour (lbs/hr) total non-methane hydrocarbons, including 0.01 lbs/hr benzene, 0.0016 lbs/hr toluene, and 0.002 lbs/hr xylenes. Influent and effluent emissions were measured weekly using a flame-or photolonization detector (FID/PID) and a LEL meter, and air samples were collected on July 13, 1993 for laboratory analysis. Air emissions from the thermal oxidizer were 0.114 lbs/hr total non-methane hydrocarbons. Based on field FID/PID measurements, air sample laboratory analytical data, and air flow rates, as of August 3, 1993, an estimated 2,300 pounds of hydrocarbons have been removed from the site, which is roughly equivalent to 383 gallons of gasoline. Calculations of the mass of hydrocarbon in soil and groundwater at the site estimate that approximately 5,374 pounds were present prior to remediation system activation. Based on this value, approximately 43 percent of the estimated total hydrocarbon mass has been recovered.



Fluid-level measurements and quarterly groundwater sampling were conducted on February 10 and June 16, 1993. Depth to groundwater at the site ranges from 8 to 9.5 feet below the land surface and groundwater flow is to the south-southeast. Approximately 1/4-inch (apparent thickness) of phase-separated hydrocarbons (PSH) were detected in one on-site monitor well (MW-8) during the monitoring period.

Groundwater samples were collected from eight monitor and three private wells on February 10, 1993, and from nine monitor, three SVES, and three private wells on June 16, 1993. For the February 10, 1993 sampling event, benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total petroleum hydrocarbons (TPH)-as-gasoline concentrations for on-site monitor wells ranged from 74 to 280 ug/l, 300 to 2,100 ug/l, and 210 to 12,000 ug/l, respectively. Dissolved hydrocarbon concentrations for off-site monitor wells ranged from non-detectable to 51 ug/l benzene, non-detectable to 65 ug/l BTEX, and non-detectable to 580 ug/l TPH-as-gasoline. For the June 16, 1993 sampling event, dissolved hydrocarbon concentrations for on-site monitor wells ranged from 82 to 280 ug/l benzene, 370 to 3,200 ug/l BTEX, and 8,000 to 24,000 TPH-as-gasoline. Off-site monitor wells contained from non-detectable to 110 ug/l benzene, non-detectable to 190 ug/l BTEX, and non-detectable to 2,700 ug/l TPH-as-gasoline.

Based on the June 16, 1993 sampling event, for the off-site wells, BTEX concentrations are in excess of New Mexico Water Quality Control Commission (NMWQCC), standards in one well, MW-3, which contained 110 ug/l benzene. No hydrocarbon concentrations have ever been detected in any of the private wells sampled to date.



#### 1.0 INTRODUCTION

Groundwater Technology, Inc. (Groundwater Technology) has performed compliance monitoring for the soil vapor extraction and treatment and air sparging systems at the Barelas Bridge Groundwater Protection Act (GWPA) site, located at 800 Bridge Boulevard, S.W., in Albuquerque, New Mexico (Figure 1). The report summarizes all activities conducted at the site from January through July 1993 and has been prepared in accordance with the Reclamation Proposal (dated December 4, 1992) and New Mexico Environmental Improvement Board Underground Storage Tank Regulations (NMEIB-USTR) Part XII, Section 1216.

The soil vapor extraction system (SVES) was started up on June 29, 1993 and put into continuous operation on July 13, 1993. The report describes all start-up, optimization, and maintenance and monitoring procedures performed on the corrective action system during this quarter. Two quarterly groundwater sampling events were conducted on February 10 and June 16, 1993 and the results are included in this report. The location of all monitor wells and remediation equipment at the site are shown in Figures 1 and 2.

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#### 2.0 REMEDIATION SYSTEM INSTALLATION

The remediation system at the Barelas Bridge site consists of a SVES with air emissions treated by a thermal oxidation unit, and an air sparge system. Figure 1 presents a schematic of the remediation system. All remediation equipment is located within a fenced equipment compound located in the southwestern corner of the property. Detailed descriptions of the soil vapor extraction and treatment and air sparging systems, including equipment specifications, are presented in Sections 3.0 and 4.0., respectively. As-Built Diagrams for the system are provided in Appendix A.

#### 2.1 Drilling and Well Installation

Groundwater Technology installed six additional vapor extraction wells (VP-2 through VP-7) and six additional air sparge wells (AS-2 through AS-7) at the site on April 12-15, 1993 for use in the SVES and air sparging remediation system and to obtain additional data on the lateral extent of subsurface hydrocarbons. The wells were installed around the perimeter of the station building in areas suspected of elevated hydrocarbon concentrations (Figure 1).

Drilling was performed using a CME-75 drilling rig and nominal eight- and eleven-inch diameter hollowstem augers. All downhole drilling and completion equipment was steam-cleaned prior to drilling each boring, and soil sampling devices were decontaminated with non-phosphatic soap and distilled water between each sample.

Soil samples were collected continuously to the water table during the installation of the VP wells for lithologic identification and field and laboratory analysis using a 2-foot long split-spoon sampler. Detailed geologic logs based on the samples were recorded by an experienced Groundwater Technology geologist during drilling and are presented in Appendix B. The soil samples were field-screened during drilling for relative concentrations of volatile organic compounds using a flame ionization detector (FID) calibrated to 100 parts per million (ppm) and 9,800 ppm methane gas. Soil samples for FID screening were placed in mason jars, sealed with aluminum foil, and allowed to equilibrate for 5 to 10 minutes prior to analyzing. The FID results are included on the geologic logs in Appendix B. The soil sample from each VP boring with the highest FID reading was retained for laboratory analysis. The soil samples were secured in 250-ml glass jars with teflon septa, sealed, labeled, placed on ice in an insulated shipping cooler, and sent to GTEL Environmental Laboratories in Torrance, California via overnight courier. The samples were analyzed for benzene, toluene,



ethylbenzene, and total xylene (BTEX) and total petroleum hydrocarbons (TPH)-as-gasoline in accordance with EPA modified methods 5030/8015/8020. Laboratory Certificates of Analysis and Chain-of-Custody documentation are included in Appendix C.

Vapor extraction wells VP-2 through VP-7 were drilled to total depths of 14 feet below grade. The wells were completed with 5 feet of 0.020-inch factory-slotted 2-inch diameter well screen below the water table, 5 feet of 0.040-inch slotted well screen above the water table, and 4 feet of blank casing to the surface. The bottom of the well was fitted with a threaded PVC cap. The annular space of the well was backfilled with 10-20 silica sand to 9 feet below the surface, followed by 8-12 silica sand to 3 feet. A 2-feet thick bentonite seal was placed above the sand, and the remainder of the annulus was left open for future plumbing into the SVES.

Air sparge wells AS-2 through AS-7 were drilled to 17 feet below the ground surface using the hollow-stem augers. The wells were then driven to total depths of approximately 24 feet using the drill rig hammer. The wells are constructed of 2-inch diameter galvanized steel blank casing and 2-inch diameter, 0.020-inch slotted stainless steel screen installed approximately 10 feet below the water table from approximately 19 to 21 feet. The bottom of the wells are fitted with steel drive points. The annular space above the driven portion of the wells was backfilled with a bentonite seal from 15 to 17 feet followed by a cement/bentonite grout to 3 feet below grade.

All wells were temporarily completed with locking plugs and keyed-alike padlocks in bolt-down, traffic-rated, steel road boxes prior to plumbing them into the remediation system. Well completion details and well completion logs are included in Appendix B. Drill cuttings from the soil borings were placed in 55-gallon steel, DOT-approved drums, labeled, and stored on site pending laboratory analysis and off-site disposal.

Subsequent to well installation, the VP wells were developed using well-dedicated 1-inch diameter PVC bailers until water removed from the wells was relatively free of sediment. The bailers were decontaminated prior to use in each well using a non-phosphatic detergent and distilled water. Purge water removed from the wells was placed in a 55-gallon steel drum, labeled, and stored on site pending laboratory analysis and off-site disposal. Following receipt of analytical results, the drums containing drill (soil) cuttings and purge water were transported by Rhino Environmental Services, Inc. (Rhino) to their state-licensed landfill in Hobbs, New Mexico for final disposal on April 28, 1993. Waste manifests are included in Appendix D.



#### 2.1.1 Soil Analytical Results

Soil samples were field-screened with a Foxboro FID and a charcoal filter during drilling of the VP wells for relative concentrations of non-methane volatile organic compounds. Field readings for soil samples collected from all borings ranged from 0 ppm to 450 ppm. Laboratory results for soil samples collected during drilling are presented in Table 1. Total BTEX concentrations for all borings samples ranged from non-detectable to 4.9 milligrams per kilogram (mg/kg), with maximum concentrations detected in the soil sample collected from VP-4 from a depth of 8 feet. TPH-as-gasoline concentrations for all soil samples ranged from non-detectable to 470 mg/kg, with maximum levels recorded in the soil sample from VP-4 at 8 feet. Also included in Table 1 are soil analytical results for wells installed at the site in August 1992, and the distribution of adsorbed-phase hydrocarbons is illustrated in Figure 3.

#### 2.1.2 Groundwater Sampling/Analysis

Subsequent to development and purging, groundwater samples were collected on April 12, 1993 from wells VP-6 and VP-7 using well-dedicated disposable polyethylene bailers and nylon sampling twine. Samples from each well were placed in two 40-milliliter (ml) volatile organic analysis (VOA) vials with zero headspace and dilute hydrochloric (HCL) acid, placed on ice in an insulated shipping cooler, and sent to GTEL in Torrance, California, via overnight courier.

The groundwater samples were analyzed for BTEX and TPH-as-gasoline per EPA modified methods 8015/8020. Benzene concentrations were 18 micrograms per liter (ug/l) (VP-6) and 100 ug/l (VP-7), total BTEX concentrations were 48 ug/l (VP-6) and 240 ug/l (VP-7), and 4,000 ug/l and 16,000 ug/l TPH-as-gasoline was detected in VP-6 and VP-7, respectively. Laboratory results are included in Table 6. Laboratory Certificates of Analysis and Chain-of-Custody documentation are included in Appendix E.

#### 2.2 Remediation System Construction

Construction of the remediation system at the Barelas Bridge site was performed during April-July, 1993 and consisted of the following tasks:

Trenching and laying of all subgrade PVC vapor and steel air sparge lines, followed by reburial, compaction, and asphalt resurfacing (April 26 - April 30, 1993);



- Subgrade piping connections to all vapor extraction and air sparge wells (April 26 - April 30, 1993);
- Completion of all vapor extraction and air sparge wellheads with bolt-down, traffic-rated manholes and sloping reinforced concrete well pads, and well manifolds at equipment compound (May 3 - May 11, 1993);
- Installation of a 8-foot high chain-link fence with razor ribbon, panel weave, and a 20-foot double-drive gate around the equipment compound (May 28-June 2, 1993);
- Transport of remediation equipment and off-loading in compound at site. Final piping connections and plumbing made to equipment (June 1-14, 1993);
- Installation of 3-phase electric power supply at the site and 5 psi natural gas service. Final utility connections made to equipment. Utility service heated (June 7-21, 1993);
- ORS conducted four days equipment start-up, adjustments, and training (June 29-July 2, 1993);
- Disposal of approximately 96 tons of contaminated soil from line trenches to Rhino landfill in Hobbs, New Mexico (May 28-June 2, 1993);
- Professional survey of all trench locations and vapor extraction, air sparge, and monitor wells (including off-site wells) (July 20 and August 6, 1993); and
- Soundproofing of SVES blowers July 5 13, 1993.

Waste manifests for the trench soil disposal are included in Appendix D. A copy of the site survey is provided in Appendix A.



#### 3.0 SOIL VAPOR EXTRACTION/TREATMENT SYSTEM

#### 3.1 Remediation System Description

The SVES consists of nine vertical vapor extraction wells (VP-1 through VP-7, MW-4, and MW-9), and two horizontal vent wells (Figure 1 and Appendix A) manifolded to a Paxton Model #HZ87, 15-horsepower (HP), explosion-proof positive displacement vacuum blower at the equipment compound. The blower operates at a maximum rate of 500 cubic feet per minute (cfm) and 60 inches of water vacuum. Each of the vertical vent wells are constructed of 2-inch diameter schedule 40 PVC well casing and screen, with screened intervals from 4 feet to 14 feet (total depth). The vertical vent wells are completed in 16-inch diameter manholes with locking well plugs and traffic-rated steel, bolt-down well covers. The horizontal vent wells include one well which roughly parallels the southern and eastern property boundaries and consists of 4-inch diameter 0.040-inch slotted PVC screen installed at approximately 2 to 4 feet below grade. A second horizontal well consists of horizontal PVC slotted piping located in the existing UST area.

The SVES wells are connected into four main trunk lines which lead back to the equipment compound (Figure 1 and Appendix A):

- Line 1: Lateral vent well on the southern and eastern perimeter of the property; and
- Line 2: Wells MW-9, VP-1, MW-4, VP-2, and VP-3;
- Line 3: Horizontal tank pit wells.
- Line 4: Wells VP-4 through VP-7;

At the compound, the four main trunk lines stub-up above grade and are each fitted with a butterfly valve for controlling individual air streams, a 1/4-inch diameter PVC labcock sampling port, and a pressure port for measuring air velocity readings. The lines are then manifolded together, reduced down to one line, and connected to one steel moisture separator after blower intake. An automatic dilution valve with lower explosive limit (LEL) controller for diluting the influent air stream is located after the moisture separator and a manual dilution valve is located prior to the separator. Extracted vapors are then routed to an ORS Thermo-Scavenger Thermal Oxidizer system for treatment prior to atmospheric discharge. Sampling ports are located before and after the thermal oxidation unit to sample air influent and effluent discharge.



The thermal oxidation unit is a skid-mounted, Epcon Industrial Systems, Inc., Model # E-DF-500-H-T natural-gas fired unit that operates at a maximum capacity of 500 scfm. The skid-mounted unit has dimensions of approximately 6.5 feet (height) x 13.75 feet (length) x 6 feet (width) and the exhaust stack is 11 feet high. The thermal oxidation unit is equipped with a catalytic module for future installation after LEL levels have consistently dropped below approximately 20%. The unit is also equipped with a chart recorder and an automated dilution system with LEL controller.

#### 3.2 Start-up Operations

The SVES was delivered to the 800 Barelas Bridge Blvd., S.W. site on June 1, 1993. During the month of June 1993, electrical, natural gas, and final PVC piping connections were made to the SVES. Natural gas and electrical service for the equipment were also activated by the public utility companies. From June 29 through July 2, 1993, ORS was on site to conduct initial start-up of the SVES. From July 2 through July 22, 1993, the SVES operated intermittently as various adjustments were made for system shake-down and the operating parameters of the equipment were fine-tuned and adjusted. The SVES was off for approximately one week (July 5-13, 1993) while a sound-proofing chamber was installed around the process and purge SVES blowers. The SVES has been in constant (uninterrupted) operation from July 22, 1993 through August 15, 1993.

#### 3.3 System Monitoring and Maintenance

In addition to a visual inspection of all lines and SVES components, the following data were collected on a weekly basis during the monitoring period in accordance with the Reclamation Proposal for the site, and to ensure optimum operating conditions and performance:

- LEL and photoionization and/or flameionization detector (PID/FID) levels of influent (pretreatment) and effluent (post-treatment) vapor;
- Thermal oxidation unit operating temperature;
- Pre-blower air velocity readings:
- Manual dilution valve setting (percent open);
- Automatic dilution valve setting (percent open);
- Temperature of vapor influent;
- Electric and natural gas meter readings;
- Vacuum, air velocity, and PID/FID readings at the four vapor extraction piping legs; and



Ball valve settings (percent open) for the four vapor extraction piping legs and for the individual vapor extraction wells.

All monitoring data collected for the SVES over the period June 29, 1993 through August 3, 1993 are included in Appendix F, and average monthly summaries are presented in Table 2. Following start-up, the four vent lines (Lines 1-4) were each opened 100% using the butterfly valves at the compound and the ball valves at each individual vent well were opened 100%. The automatic dilution valve remained closed while the manual dilution valve was opened 50 to 100% to allow for dilution of the influent vapor stream with fresh air. Dilution of the air stream was necessary during the first few weeks of operation to keep the LEL of the influent vapor stream below the alarm condition setting of approximately 55% LEL. On July 27, 1993, Vent Line 3 was closed 100%, and the dilution valve settings were progressively adjusted (closed) over time to allow for less by-pass air as the percent LEL of the influent vapor stream decreased with active venting. The dilution valves are currently 100% closed.

Vacuum in Vent Lines 1-4 was measured with a Dwyer Magnahelic gauge with a range of 0 to 100 inches of water. Vacuum readings ranged from 4.6 to 22 inches of water. Air velocity readings were obtained with a Dwyer Instruments Model 470 Thermal Anemometer for each of the Vent Lines 1-4 and for total flow from all wells and converted to cubic feet per minute (cfm). Total flow from the wells ranged from 216 cfm (as measured prior to 50% manual dilution air) on July 13, 1993, to 510 cfm on July 27, 1993 with no dilution air.

Organic vapor concentrations were measured weekly using a PID calibrated with 100 ppm isobutylene gas. PID readings for Vent Lines 1-4 ranged from 485 ppm (Line 3) to 1,175 ppm (Line 1) on July 13, 1993, and from 460 ppm (Line 1) to 1,660 ppm (Line 4) on July 27, 1993. Total influent vapor PID readings ranged from 2,222 ppm to 1,080 ppm, with maximum PID readings obtained during the first few weeks of start-up and decreasing thereafter. Effluent vapor readings ranged from 0 to 42 ppm. Total influent FID readings were approximately 10,000+ ppm (including 50% manual dilution air) following the first few weeks of start-up, with approximately 2,750 ppm of this total reported as methane, as measured on July 13, 1993.

Influent and effluent vapor LEL measurements were collected weekly with a Mine Safety Appliance (MSA) Model 261 Combustible Gas and Oxygen Indicator. The influent vapor LEL ranged from approximately 52% (following system start-up) to 8% over the monitoring period and generally decreased with time as active venting progressed. The effluent vapor LEL was 0% over the monitoring period.



#### 3.4 Air Sampling and Analysis

Start-up air samples of influent (pre-thermal oxidation treatment) and effluent (post-thermal oxidation treatment) were collected on July 13, 1993, in accordance with Air Quality Permit No. 310 for the site. Samples were collected in Tedlar bags and analyzed for BTEX and total fuel (non-methane hydrocarbons) in accordance with EPA method TO-14. Total BTEX and total fuel influent concentrations were 108,700 micrograms per cubic meter (ug/m³) (27,280 ppbv) and 14,000,000 ug/m³ (4,000,000 ppbv), respectively. Effluent concentrations included 430 ug/m³ total BTEX (110 ppbv) and 47,000 ug/m³ (13,000 ppbv) total fuel. A comparison of the influent and effluent total fuel concentrations indicates a 99.9% destruction efficiency for the thermal oxidation unit. Analytical results are summarized in Table 3 and Laboratory Certificates of Analysis and Chaln-of-Custody documentation are provided in Appendix G.

Atmospheric emissions by the SVES at the 800 Bridge Blvd., S.W., site were calculated for start-up using the air analytical data collected on July 13, 1993 and were submitted to the Albuquerque Environmental Health Department (AEHD) Air Pollution Control Division (APCD) in accordance with Air Quality Permit No. 310. The calculations are provided in Appendix H and a summary of both effluent and influent emissions is provided in Table 4. The air analytical data indicate that effluent emissions at the site were less than 0.00016 pounds per hour (lb/hr) benzene, 0.00044 lb/hr toluene, 0.00061 lb/hr xylenes, and 0.114 lb/hr total fuel (non-methane hydrocarbons). These emission concentrations are below the permit limits specified in Air Quality Permit No. 310 for the site.



#### 4.0 AIR SPARGE SYSTEM

#### 4.1 Remediation System Description

The air sparge system consists of seven air sparge wells (AS-1 through AS-7) manifolded to a 3-phase, 7.5 HP Atlantic Fluidics Model A-75 liquid ring blower. The blower is rated for continuous operation at 75 cfm and 20 inches of water column pressure. Each of the sparge wells are constructed of 2-inch diameter galvanized steel and stainless steel well screens, with screened intervals from 19 to 21 feet. The sparge wells are completed in 18-inch diameter traffic-rated steel bolt-down well covers. Each sparge point is fitted with a pressure regulator at the wellhead for controlling injection pressure and fittings for monitoring air flow rates.

The air sparge wells are connected into three main trunk lines which lead back to the equipment compound (Figure 1 and Appendix A):

Line 1:

AS-1, AS-2, and AS-3;

Line 2:

AS-6 and AS-7; and

Line 3:

AS-4 and AS-5.

At the compound, the three main trunk lines stub-up above grade and are each fitted with a butterfly valve for controlling individual air streams. The lines are then manifolded together, reduced down to one line, and connected to the sparge blower.

#### 4.2 Start-up Operations

The air sparge system has not yet been activated at the site. The current remedial strategy is to operate only the SVES to remove the highest, most volatile hydrocarbons from the subsurface. Once influent vapor concentrations have significantly decreased and the risk of mobilizing hydrocarbons off-site is reduced, the sparge system will be turned on. Based on current SVES LEL influent levels of 10-15%, Groundwater Technology will tentatively activate select lines of the sparge system in September 1993. Once activated, the sparge system will only be operated in conjunction with the SVES to contain vapors generated as a result of air sparging. The system will also be closely monitored for groundwater mounding and possible offsite mobilization of dissolved hydrocarbons.

### 5.0 MASS BALANCE CALCULATIONS AND HYDROCARBON RECOVERY SUMMARY

#### 5.1 Estimate of Hydrocarbon Mass in Soil and Groundwater

Mass balance calculations were performed to determine the mass of hydrocarbons in the subsurface and the time required to remove them using soil venting technology. Typically, chemical analyses of soil and groundwater are used to estimate hydrocarbon mass present in the subsurface when the quantity of hydrocarbons lost is unknown. However, during several of the investigations previously conducted at the site, soil samples were not collected from some of the wells for laboratory analysis and in other cases, the amount of data is limited and several assumptions must be made. Therefore, it is not possible to make an accurate estimate of the hydrocarbon mass present in the subsurface. Consequently, the following calculations are provided as estimates only. Complete hydrocarbon mass and mass removal rate calculations are provided in Appendix H.

#### 5.1.1 Dissolved-Phase Hydrocarbon Mass Calculations

Based on groundwater analytical data collected at the site, the following assumptions were made to estimate the hydrocarbon mass present in the saturated zone:

- Porosity of saturated zone is 0.30;
- The total area of hydrocarbons with dissolved TPH-as-gasoline concentrations is divided into three parts at the site (Appendix H):
  - -Area 1 is 12,000 ft2
  - -Area 2 (A+B) is 6,060 ft<sup>2</sup>
  - -Area 3 is 2,025 ft2
- The average concentration of TPH-as-gasoline in the saturated zone is calculated using groundwater sample analyses for February and June 1993. The average concentration for each area is calculated by averaging TPH-as-gasoline concentrations of all wells within each area. The average concentrations for Areas 1, 2, and 3, are thus 16 mg/l (VP-4, VP-3, MW-8, MW-4, VP-1, and MW-9), 15 mg/l (VP-5, VP-6, and VP-7), and 17 mg/l (VP-2; VP-2 not sampled so average of adjacent wells VP-3, MW-8, and VP-4 used); and
- Thickness of aquifer assumed to be impacted by dissolved hydrocarbons is 10 feet.



Using the above data and incorporating the stated assumptions, the dissolved hydrocarbon mass for each area was calculated. Area 1 was found to contain 36 pounds of hydrocarbons, 17 pounds of hydrocarbons were estimated for Area 2, and 6 pound of hydrocarbons were calculated for Area 3. This results in a total approximate mass of 59 pounds of dissolved hydrocarbons in the saturated zone beneath the site.

#### 5.1.2 Adsorbed-Phase Hydrocarbon Mass Calculations

Based on the site assessments previously conducted at the site, the following assumptions were made to estimate the hydrocarbon mass present in the soil beneath the site:

- The density of soil is 100 lbs/ft³;
- The total area of hydrocarbons containing TPH-as-gasoline concentrations is divided into three parts at the site:
  - -Area 1 is 12,000 ft2
  - -Area 2B is 2,700 ft<sup>2</sup> (Area 2A had non-detectable TPH-as-gas concentrations)
  - -Area 3 is 2,025 ft2
- The average concentration of volatile hydrocarbons in the soil for each area is calculated by averaging or taking the highest TPH-as-gasoline concentrations for soil samples collected during installation of all wells within each area. The concentrations for Areas 1, 2, and 3, are thus 546 mg/kg (VP-4, VP-3, AH-4, MW-8, PR-3, VP-1, and MW-9), 55 mg/kg (VP-5), and 17 mg/kg (VP-2); and
- Vertical extent of soil affected by hydrocarbons for each of the three areas are based on available PID readings and soil laboratory data for the wells and are 8 feet for Area 1, 4 feet for Area 2, and 4 feet for Area 3.

Using the above data and incorporating the stated assumptions, the hydrocarbon mass in soil for each area was calculated. Area 1 was found to contain 5,242 pounds of hydrocarbons, 59 pounds of hydrocarbons were estimated for Area 2, and 14 pounds of hydrocarbons were calculated for Area 3. This results in a total approximate mass of 5,315 pounds of hydrocarbons in the unsaturated soils beneath the site. Because PSH has been observed in wells at the site, it is likely that the actual mass of hydrocarbons is greater than this estimate.

#### 5.2 Estimated Hydrocarbon Recovery

Based on the total days of operation, vapor flow rates, influent PID field measurements, and the July 13, 1993 air analytical data, the cumulative mass of hydrocarbons removed from the subsurface by the SVES during the monitoring period was estimated and is included in Table 2 and Appendix H. The cumulative mass of hydrocarbons recovered over the period June 29, 1993 through August 3, 1993 is estimated to be approximately 2,300 pounds. Assuming that liquid gasoline has a density of approximately 6 lbs/gallon, an estimated 383 gallons of gasoline have been recovered by the SVES through the life of the project since start-up on June 29, 1993. Compared to the estimated mass of hydrocarbons in the subsurface of about 5,374 lbs, the remediation of soil is estimated to be 43 percent complete. Note that the percentage completion estimate is not meant to indicate remediation time, but only mass recovered. Mass recovery rate is expected to decrease as remediation time increases.



#### 6.0 GROUNDWATER MONITORING

#### 6.1 Fluid-Level Measurements

Fluid-level measurements were obtained in all on and off-site monitor wells (MW-3 through MW-13) on February 10, 1993, and in all monitor wells plus the vapor extraction wells on June 16, 1993 using an Oil Recovery Systems (ORS) electronic interface probe (IP). The IP directly indicates depth to phase-separated hydrocarbons (PSH) and water to an accuracy of <u>+</u> 0.01 foot. The IP was cleaned with distilled water and a non-phosphatic detergent prior to gauging each well.

Depth to groundwater beneath the site and adjacent property is approximately 8 to 9.5 feet below the land surface. As illustrated in a groundwater contour map generated from fluid-level measurements obtained on June 16, 1993 (Figure 4), groundwater flow direction beneath the site is generally from north-northwest to south-southeast under an approximate hydraulic gradient of 0.003 foot/foot. Measurable PSH was not detected in any of the monitor wells with the IP during the monitoring events. However, heavy PSH sheens and/or hydrocarbon odors were noted in wells MW-4, MW-8, MW-9, and VP-2 through VP-5. Well MW-8 contained 1/4-inch of PSH as measured in a 1-inch diameter bailer on February 10, 1993.

Historical fluid-level measurements and groundwater elevation calculations for all monitor wells (1992 through the present) are included in Appendix I. As illustrated in hydrographs prepared for select monitor wells (Appendix J), the groundwater elevation increased by approximately 0.5 to 1 foot from February to June 1993 in some wells (MW-1 through MW-3, MW-6), and decreased slightly (0.05 to 0.1 foot) in other wells (MW-4, MW-5, MW-8).

#### 6.2 Quarterly Groundwater Sampling

#### 6.2.1 Well Purging

Subsequent to collecting fluid-level measurements on February 10 and June 16, 1993, select monitor and/or vapor extraction wells not containing measurable PSH were purged of three casing volumes or until the wells purged dry, and were allowed to recharge. The wells were purged using 1-inch diameter PVC or polyethylene disposable bailers and well-dedicated polyvinyl rope. The 1-inch diameter PVC



bailers were steam-cleaned prior to purging and bailers used to purge more than one well were decontaminated between wells using a triple-rinse of distilled water and a non-phosphatic detergent.

During purging, field measurements of pH, temperature, and conductivity were obtained for the purge water using a Cole-Parmer Model 5985-80 pH meter and a YSI Model 33 S-C-T meter. A summary of well purging data is provided in Appendix E.

Purge water generated from monitor well sampling (approximately 110 gallons total from both events) was placed in 55-gallon steel, DOT-approved drums and stored in the equipment compound located in the northwest corner of the site. The drums were labeled as waste material pending analytical results.

#### 6.2.2 Sample Collection and Shipment

Groundwater samples were collected from the following wells using well-dedicated disposable polyethylene bailers and nylon sampling twine. Sample collection personnel donned new latex gloves prior to sampling each well:

- MW-1 through MW-7, MW-9, and private wells PW-140, PW-152, and PW-153 on February 10, 1993; and
- MW-1 through MW-9, VP-3 through VP-5, PW-140, PW-152, and PW-153 on June 16, 1993

Samples were collected from each of the wells for laboratory analysis as follows:

Two 40-ml VOA glass vials with teflon septa, acidified with dilute HCL acid to pH less than 2 for BTEX and TPH-as-gasoline analysis per EPA modified methods 8015/8020. Samples were placed in the 40-ml vials such that no air was trapped inside.

All samples were immediately labeled and placed on ice in an insulated shipping cooler for delivery to GTEL Environmental Laboratories in Torrance, California via overnight courier.

#### 6.2.3 Analytical Results

Analytical results for the February 10 and June 16, 1993 sampling events are included in Tables 5 and 6, respectively, and the Laboratory Certificates of Analysis, Chain-of-Custody documentation, and QA/QC data are provided in Appendix E.

For the February 10, 1993 sampling event, maximum dissolved BTEX concentrations (300 to 2,100 ug/l) were detected in on-site monitor wells MW-9 and MW-4 respectively, while MW-8 contained PSH. Benzene concentrations in these same wells ranged from 74 to 280 ug/l, while TPH-as-gasoline concentrations ranged from 210 to 12,000 ug/l. Benzene and BTEX concentrations in monitor wells MW-5 through MW-7, located off-site to the south of the station, were non-detectable to 51 ug/l (benzene) and non-detectable to 65 ug/l (BTEX), respectively. The southernmost, downgradient wells, MW-1 through MW-3, contained from non-detectable to 4.6 ug/l benzene and from non-detectable to 6.9 ug/l total BTEX. TPH-as-gasoline concentrations in wells MW-1 through MW-3 ranged from non-detectable (detection limit 100 ug/l) to 290 ug/l. No BTEX or TPH-as-gasoline concentrations were detected in any of the three private wells sampled. Approximately 1/4-inch of PSH (in a 1-inch diameter bailer) was detected in MW-8. Hydrocarbon sheens and/or odors were noted during purging in wells MW-4, MW-5, MW-6, MW-8, and MW-9.

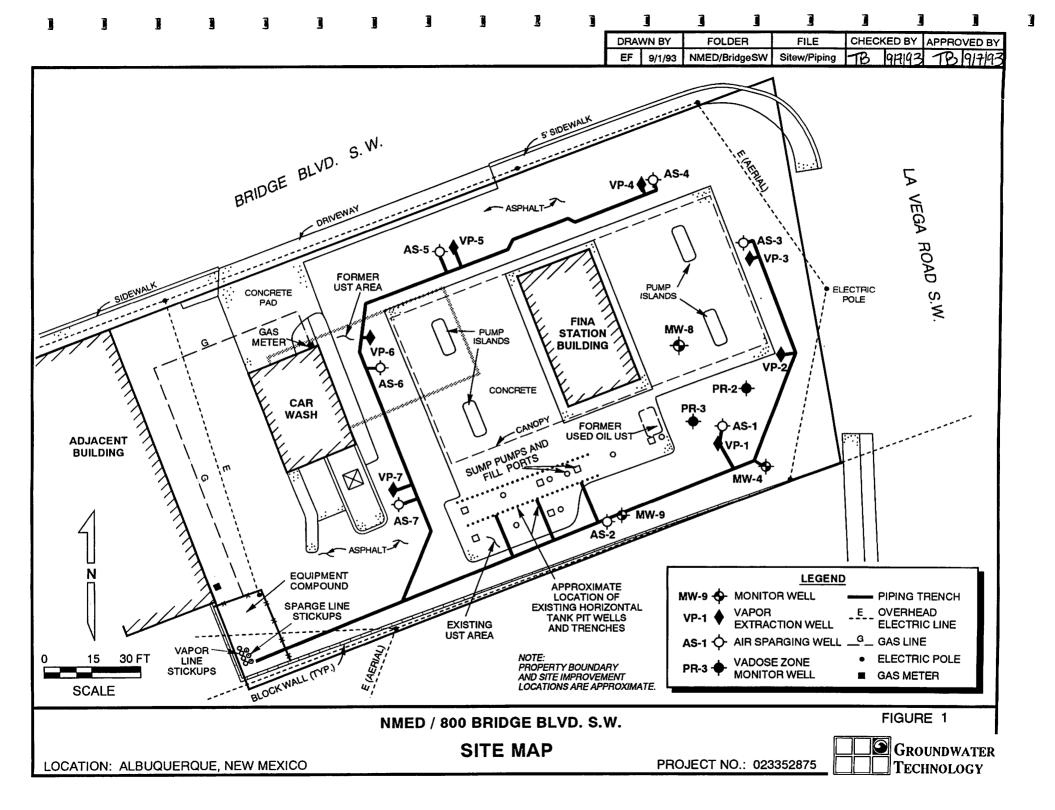
For the April 12 and June 16, 1993 sampling events, maximum dissolved BTEX concentrations (48 to 4,000 ug/l) were detected in monitor wells MW-4, MW-8, MW-9, and VP-3 through VP-7 at the service station. Benzene concentrations in these same wells ranged from 18 to 670 ug/l, while TPH-as-gasoline concentrations ranged from 4,000 to 25,000 ug/l. Benzene and BTEX concentrations in monitor wells MW-5 through MW-7, located off-site to the south of the station, were non-detectable (benzene) and non-detectable to 190 ug/l (BTEX), respectively. TPH-as-gasoline concentrations ranging from non-detectable to 2,700 ug/l were detected in wells MW-5 through MW-7. The southernmost, downgradient wells, MW-1 through MW-3, contained from non-detectable to 110 ug/l (MW-3) benzene and from 4.1 to 120 ug/l total BTEX. TPH-as-gasoline concentrations in wells MW-1 through MW-3 ranged from non-detectable to 580 ug/l. No BTEX or TPH-as-gasoline concentrations were detected in any of the three private wells sampled. No measurable phase separated hydrocarbon (PSH) was detected in the wells at the site, though hydrocarbon sheens were observed during purging in all on-site wells sampled, and all wells (except for the private wells) contained a hydrocarbon odor.

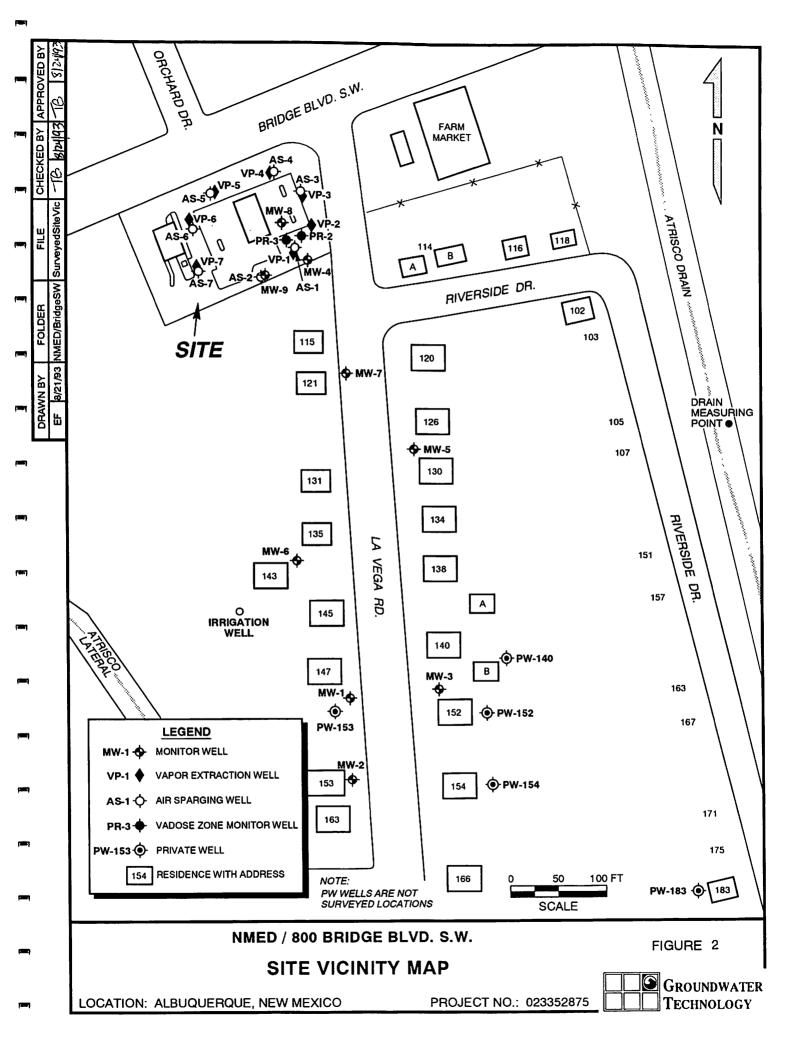
The current lateral distribution of dissolved-phase hydrocarbons, based on the baseline sampling event conducted on June 16, 1993 prior to SVES start-up on June 29, 1993, is illustrated in Figures 5 and 6.

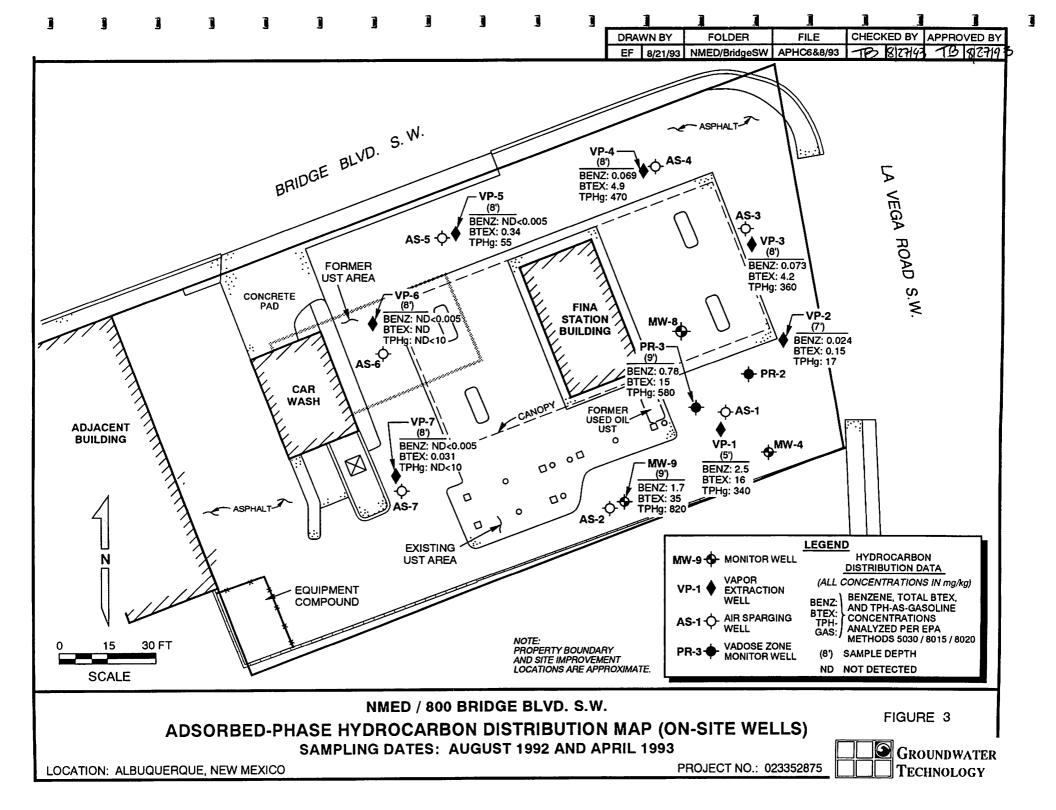


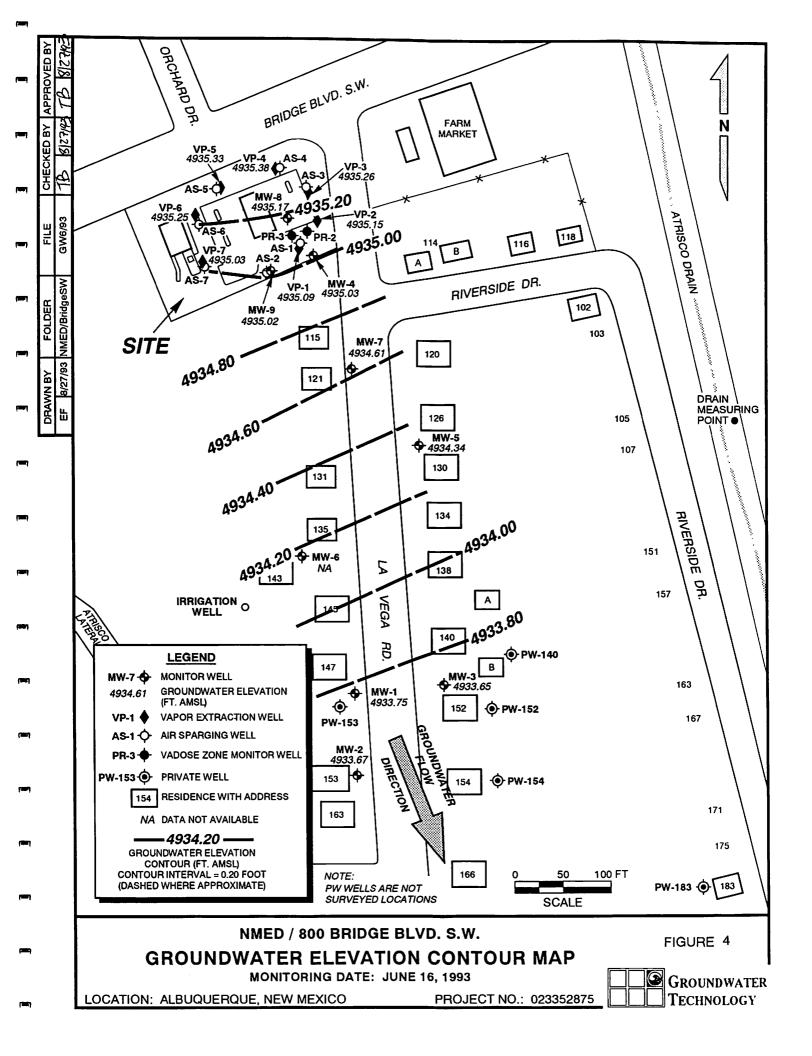
Graphs of dissolved benzene, total BTEX, and TPH-as-gasoline concentrations versus time were plotted for select monitor wells (Appendix K). Table 7 also lists historical analytical data for all wells at the site for the period 1989 to the present. Of the two on-site wells sampled during both the February and June 1993 events (MW-4 and MW-9), benzene levels remained the same in MW-4 while total BTEX and TPH-as-gasoline concentrations decreased in MW-4 (from 2,100 ug/l to 1,300 ug/l BTEX and from 12,000 ug/l to 9,600 ug/l TPH-as-gasoline). Concentrations of these same constituents increased in MW-9 (from 74 ug/l to 140 ug/l benzene, 300 ug/l to 1,600 ug/l total BTEX, and from 210 ug/l to 8,000 ug/l TPH-as-gasoline).

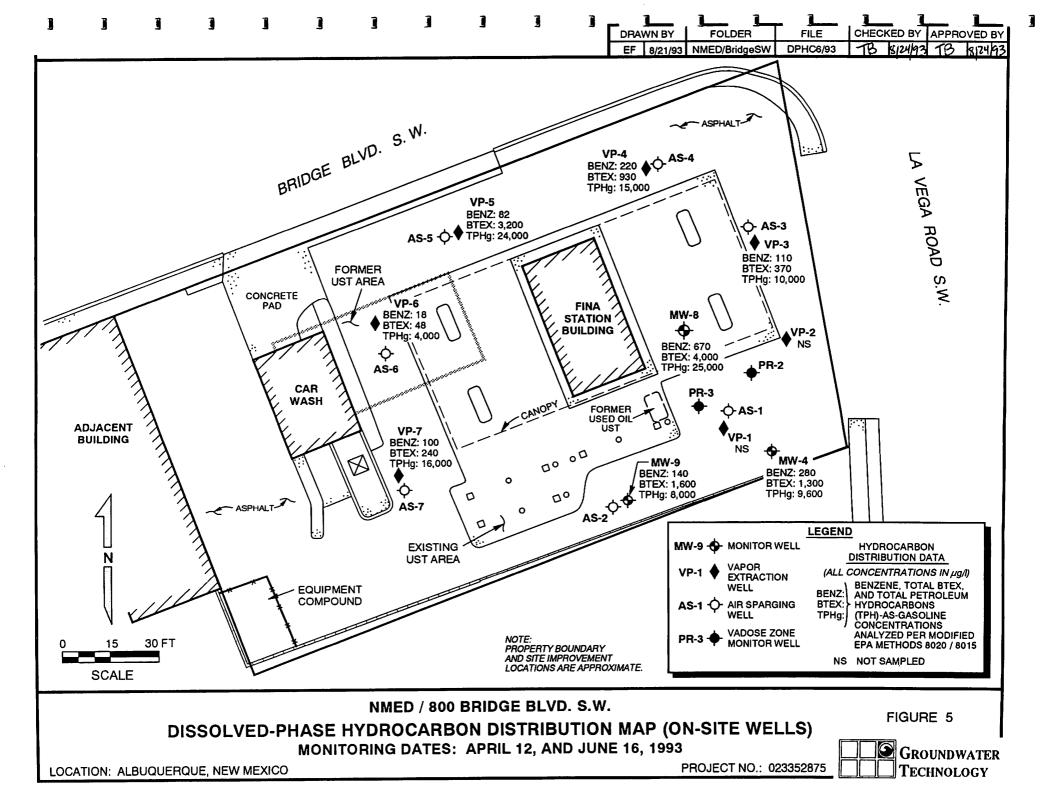
For the off-site wells, benzene concentrations decreased or remained the same in wells MW-1, MW-2, and MW-5 through MW-7 between the February and June 1993 sampling events. Benzene concentrations increased in MW-3 from non-detectable to 110 ug/l. TPH-as-gasoline concentrations also increased in off-site wells MW-1 (from 290 ug/l to 580 ug/l), MW-3 (non-detectable to 540 ug/l), MW-6 (non-detectable to 1,300 ug/l), and MW-7 (580 to 2,700 ug/l). As of the June 16, 1993 sampling event, for the off-site monitor wells, BTEX concentrations are in excess of New Mexico Water Quality Control Commission (NMWQCC) standards in one well, MW-3, which contained 110 ug/l benzene. No hydrocarbon concentrations have ever been detected in any of the private wells sampled to date.

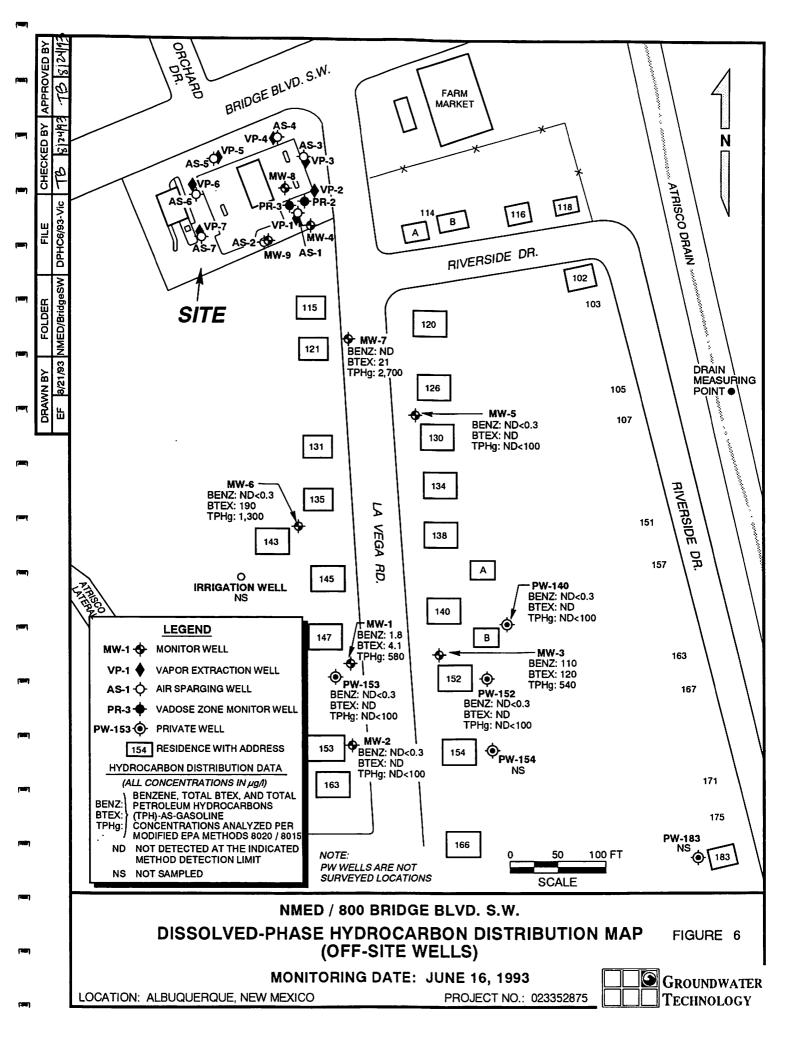












### SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS<sup>(1)</sup> BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W. ALBUQUERQUE, NEW MEXICO

**AUGUST 18 - 20, 1992 AND APRIL 12-14, 1993** 

SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (ft.)	PID READING (ppm)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL- BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)	TOTAL BTEX (mg/kg)	TPH-AS- GASOLINE (mg/kg)
PR3-9	8/18/92	9	2,298	0.78	1.4	5.1	7.6	15	580
VP1-5	8/19/92	5	1,829	2.5	1.0	5.2	7.4	16	340
MW-9-9	8/20/92	9	2,553	1.7	2.2	7.6	23	35	820
VP-2-7	4/14/93	6	80	0.024	0.006	0.067	0.054	0.15	17
VP-3-8	4/14/93	8	450	0.073	0.58	2.0	1.5	4.2	360
VP-4-8	4/12/93	8	200	0.069	0.90	1.7	2.2	4.9	470
VP-5-8	4/12/93	8	65	ND <sup>(2)</sup>	ND	0.099	0.24	0.34	55
VP-6-8	4/12/93	8	60	ND	ND	ND	ND		ND
VP-7-8	4/12/93	8	110	ND	ND	0.013	0.018	0.031	ND
MDL <sup>(2)</sup>		-	-	0.005	0.005	0.005	0.015		10

Soil samples analyzed for BTEX and TPH-as-gasoline in accordance with EPA modified methods 8020/8015.

ND - Not detected at the indicated method detection limit (MDL).

TABLE 2

MONTHLY SUMMARY OF SVES OPERATING PARAMETERS
BARELAS BRIDGE GWPA SITE
800 BRIDGE BLVD., S.W.,
ALBUQUERQUE, NEW MEXICO

PARAMETER	JUNE 1993 (06/29/93- 08/03/93)
AVER. OPERATING (INFLUENT) TEMP (°F)	1,467
AVER. FLOW RATE (CFM)	491
INFLUENT RANGE (% LEL-Controller)	8-52
APPROX. ACTUAL HRS OF OPERATION	328
POSSIBLE HRS OF OPERATION	840
HYDROCARBONS REMOVED IN MONTH (APPROX. LBS.) (based on 7/13/93 air sample and PID (ppmv))	2,301
TOTAL HYDROCARBONS REMOVED LIFE OF PROJECT (APPROX. LBS.)	2,301
EST. GALLONS REMOVED IN MONTH	383
EST. GALLONS REMOVED LIFE OF PROJECT	383
NATURAL GAS USAGE FOR THIS MONTH (ccf)	54,430
TOTAL NATURAL GAS USAGE TO DATE (ccf)	54,430
ELECTRICAL USAGE FOR THIS MONTH (KW-HRS)	2,686
TOTAL ELECTRICAL USAGE TO DATE (KW-HRS)	2,686



# SUMMARY OF SVES AIR SAMPLE INFLUENT/EFFLUENT ANALYTICAL RESULTS(1) BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W., ALBUQUERQUE, NEW MEXICO JULY 13, 1993

	INFLUENT (INF)	EFFLUENT (EFF)
BENZENE (ppbv)	8,800	ND<20 <sup>(2)</sup>
TOLUENE (ppbv)	980	50
ETHYLBENZENE (ppbv)	6,500	ND<20
XYLENES (ppbv)	11,000	60
EDC (ppbv)	ND<20	ND<20
EDB (ppbv)	ND<10	ND<10
TOTAL FUEL (ppbv)	4,000,000	13,000
CARBON DIOXIDE (%)	3.4	NA <sup>(2)</sup>
OXYGEN (%)	19	NA
METHANE (%)	0.3	NA

Samples analyzed for BTEX, EDC, EDB, and Total Fuel (non-methane hydrocarbons) in accordance with EPA method TO-14 and for fixed gases by method GC-TD.

ND - Not detected at the indicated method detection limit; NA - Not analyzed for this compound.

### SUMMARY OF SVES MASS EXTRACTION, MASS EMISSION, AND DESTRUCTION EFFICIENCY BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W., ALBUQUERQUE, NEW MEXICO

#### **JULY 13, 1993**

	Total Non-Methane Hydrocarbons	Benzene	Xylenes	Toluen <b>e</b>
Influent Concentration (mg/m³ or µg/L)	14,000	28	49	3.7
Effluent Concentration (mg/m³ or µg/L)	47	ND<0.064	0.25	0.18
Mass Extraction Rate or Influent to Thermal Oxidizer (lbs/hr)	26.2	0.052	0.092	0.0069
Mass Emission Rate or Effluent from Thermal Oxidizer (lbs/hr)	0.114	<0.00016	0.00061	0.00044
Emission Limits as per Permit #310 (lbs/hr)	0.50	0.01	0.002	0.0016
Mass Destruction Efficiency (%)	99.6	>99.7	99.3	93.6

# SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS<sup>(1)</sup> BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W. ALBUQUERQUE, NEW MEXICO FEBRUARY 10, 1993

SAMPLE (WELL) ID	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYL- BENZENE (ug/l)	TOTAL XYLENES (ug/l)	TOTAL BTEX (ug/l)	TPH-AS- GASOLINE (ug/l)
MW-1	ND <sup>(2)</sup>	ND	ND	ND	ND	290
MW-2	4.6	1.4	0.9	ND	6.9	ND
MW-3	ND	ND	ND	ND	ND	ND
MW-4	280	21	530	1,300	2,100	12,000
MW-5	ND	ND	ND	ND	ND	ND
MW-6	ND	ND	0.8	3.1	3.9	ND
MW-7	51	6.6	4.7	2.3	65	580
MW-9	74	15	52	160	300	210
PW-140	ND	ND	ND	ND	ND	ND
PW-152	ND	ND	ND	ND	ND	ND
PW-153	ND	ND	ND	ND	ND	ND
MDL	0.3	0.3	0.3	0.6	_	100

Water samples analyzed for BTEX and TPH-as-gasoline per EPA modified methods 8015/8020.

ND - Not detected at the indicated method detection limit (MDL).

# SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS(1) BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W. ALBUQUERQUE, NEW MEXICO APRIL 12 AND JUNE 16, 1993

SAMPLE (WELL) ID	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYL- BENZENE (ug/l)	TOTAL XYLENES (ug/l)	TOTAL BTEX (ug/l)	TPH-AS- GASOLINE (ug/l)
MW-1	ND <sup>(2)</sup>	1.8	1.0	1.3	4.1	580
MW-2	ND	ND	ND	ND	ND	ND
MW-3	110	0.6	9.1	1.5	120	540
MW-4	280	16	260	710	1,300	9,600
MW-5	ND	ND	ND	ND		ND
MW-6	ND	46	35	110	190	1,300
MW-7_	ND	3.5	6.1	11	21	2,700
MW-8	670	100	1,200	2,000	4,000	25,000
MW-9	140	78	280	1,100	1,600	8,000
VP-3	110	7.3	180	74	370	10,000
VP-4	220	28	320	360	930	15,000
VP-5	82	9.8	1,700	1,400	3,200	24,000
VP-6 <sup>(3)</sup>	18	7.0	9.5	14	48	4,000
VP-7 <sup>(3)</sup>	100	9.0	98	29	240	16,000
PW-140	ND	ND	ND	ND	ND	ND
PW-152	ND	ND	ND	ND	ND	ND
PW-153	ND	ND	ND	ND	ND	ND
MDL	0.3	0.3	0.3	0.6		100

Water samples analyzed for BTEX and TPH-as-gasoline per EPA modified methods 8015/8020.

ND - Not detected at the indicated method detection limit (MDL).

Sample collected on April 12, 1993.

## TABLE 7 CUMULATIVE SUMMARY OF GROUNDWATER ANALYTICAL RESULTS BARELAS BRIDGE GWPA SITE

3

800 BRIDGE BLVD., S.W. ALBUQUERQUE, NEW MEXICO 1989 - 1993

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MONITOR WELL	DATE SAMPLED	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYL- BENZENE (ug/l)	TOTAL XYLENES (ug/l)	TOTAL BTEX (ug/l)	TPHG (ug/l)	COMMENTS
MW-1	02/19/90	4.8	7.2	ND	ND	12	ND	
	10/30/90	2.6	0.5	ND ·	1.7	4.8	ND<500	
	03/5/91	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND		
	08/20/92	1.6	ND<0.3	ND<0.3	ND<0.6	1.6	ND<100	4
	02/10/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	290	
	06/16/93	ND<0.3	1.8	1.0	1.3	4.1	580	
MW-2	02/19/90	5.7	7.2	ND	ND	12.9		
	10/30/90	ND<2	0.2	ND<2	1.0	1.2	ND<500	
	11/28/90	ND<0.5	1.1	ND<0.5	0.6	1.7	700	
	08/20/92	4.1	1.6	6.7	1.4	14	270	
	02/10/93	4.6	1.4	0.9	ND<0.6	6.9	ND<100	
	06/16/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	
MW-3	02/19/90	ND	2.6	ND	ND	2.6		
	10/30/90	ND<2	0.4	ND<2	1.3	1.7	ND<500	
	03/5/91	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND		
	06/24/92	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND	46	
	08/20/92	2.0	1.3	0.5	8.0	4.6	370	
	02/10/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	
	06/16/93	110	0.6	9.1	1.5	121	540	
MW-4	02/19/90	190	25	280	865	1,360		
10100-3	10/30/90	590	35.3	518.4	1871.1	3,014	5,000	
	11/29/90	49	1.0	8.4	14	72	900	
	06/24/92	230	7	200	420	860	3,100	
	02/10/93	280	21	530	1,300	2,100	12,000	
	06/16/93	280	16	260	710	1,300	9,600	
MW-5	10/30/90	ND<2	0.5	ND<2	1.5	2.0	ND<500	
11111-0	06/24/92	4	ND<0.3	0.5	0.7	5	170	
	02/10/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	•
	06/16/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	

NMED/BB/conc.

GROUNDWATER
TECHNOLOGY

# TABLE 7 (Cont.) CUMULATIVE SUMMARY OF GROUNDWATER ANALYTICAL RESULTS BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W. ALBUQUERQUE, NEW MEXICO 1989 - 1993

MONITOR WELL	DATE SAMPLED	BENZENE (ug/l)	TOLUENE (ug/l)	ETHYL- BENZENE (ug/l)	TOTAL XYLENES (ug/l)	TOTAL BTEX (ug/l)	TPHG (ug/l)	COMMENTS
MW-6	10/30/90	10.7	23.2	32.7	175.5	242.1	4,000	
	06/24/92	24	50	44	140	260	1,700	
	02/10/93	ND<0.3	ND<0.3	0.8	3.1	3.9	ND<100	
	06/16/93	ND<0.3	46 -	35	110	190	1,300	
MW-7	10/30/90	9.8	3	20.8	4.9	38.5	1,000	
	06/24/92	30	0.3	8	15	53	550	
	02/10/93	51	6.6	4.7	2.3	65	580	
	06/16/93	ND<0.3	3.5	6.1	11	21	2,700	
MW-8	10/30/90	220	120	960	1,140	2,440	9,000	
	06/24/92	420	82	720	580	1,800	9,400	
	02/10/93	NS	NS	NS	NS	NS	NS	0.25" PSH (bailer)
	06/16/93	670	100	1,200	2,000	4,000	25,000	
MW-9	06/24/92	620	510	740	2,600	4,500	17,000	
	02/10/93	74	15	52	160	300	210	
	06/16/93	140	78	280	1,100	1,600	8,000	
VP-1	08/24/92	880	54	310	300	1,500	11,000	
	08/25/92	1,600	220	800	590	3,200	15,000	
VP-3	06/16/93	110	7.3	180	74	370	10,000	
VP-4	06/16/93	220	28	320	360	930	15,000	
VP-5	06/16/93	82	9.8	1,700	1,400	3,200	24,000	
VP-6	04/12/93	18	7.0	9.5	14	48	4,000	
VP-7	04/12/93	100	9.0	98	29	240	16,000	
PW-140	10/5/90	ND<4	ND<4	ND<4	ND	ND	ND<100	
	06/24/92	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND	ND<10	
	02/10/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	
	06/16/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	
	-, -, -							



# TABLE 7 (Cont.) CUMULATIVE SUMMARY OF GROUNDWATER ANALYTICAL RESULTS BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W. ALBUQUERQUE, NEW MEXICO 1989 - 1993

MONITOR	DATE	BENZENE	TOLUENE	ETHYL-	TOTAL	TOTAL	TPHG	
WELL	SAMPLED	(ug/l)	(ug/l)	BENZENE	XYLENES	BTEX	(ug/l)	COMMENTS
V0000000000000000000000000000000000000				(ug/l)	(ug/l)	(ug/l)		~~~
PW-152	10/4/89	ND	ND	ND	ND	ND		
	10/5/90	ND<4	ND<4	ND<4	ND	ND	ND<100	
	06/24/92	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND	ND<10	
	02/10/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	
	06/16/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	
PW-153	10/4/89	ND	ND	ND	ND	ND		
	10/31/90	ND<2	0.6 (0.7)	ND<2	2.0 (1.5)	2.6 (2.2)	ND<500	Trip blank shown in ()
	11/21/91	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND		
	06/24/92	ND<0.3	ND<0.3	ND<0.3	ND<0.5	ND	ND<10	
	02/10/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	
	06/16/93	ND<0.3	ND<0.3	ND<0.3	ND<0.6	ND	ND<100	

: 1989 data by AEHD; 1990 data by LBG, Inc. (EPA methods 8020/8015 and 8240); 1991 data by NMEID (EPA methods 601/602); 1992-present by GTI, Inc. (EPA methods 8020/8015)



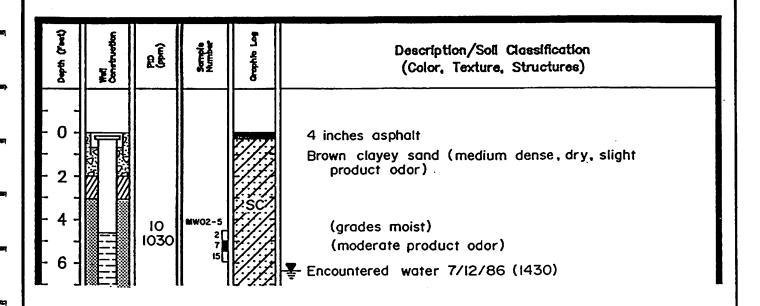
## APPENDIX B

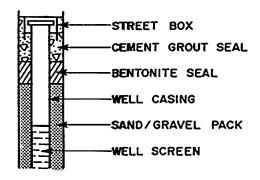
**WELL COMPLETION AND LITHOLOGIC LOGS** 

NMED/Bereles disk 2 1&2Qtr93.rpt



#### KEY TO BORING LOG





ORGANIC VAPOR CONCENTRATION DETERMINED BY PHOTO IONIZATION DETECTOR (P.I.D.) IN PARTS PER MILLION (ppm) FROM SOIL SAMPLES (TIME COLLECTED)

MW02-5 SAMPLE IDENTIFICATION (TEST HOLE - SAMPLE DEPTH)

BLOW COUNTS TO DRIVE A SPLIT BARREL SAMPLER USING A 140 Ib. HAMMER FALLING 30 INCHES. COUNTS ARE FOR EACH 6 INCH INCREMENT THE SAMPLER IS DRIVEN.

INTERVAL SAMPLED
SAMPLE INCREMENT RETAINED FOR LABORATORY ANALYSES

SOIL CLASSIFICATION GRAPHIC/SYMBOL (SEE UNIFIED SOIL CLASSIFICATION SYSTEM)

DEPTH TO WATER, DATE, TIME





	Project No	Owner <u>NMED</u> 5. <u>023352875</u> Date drilled <u>04/15/93</u> 6 Diameter <u>II in.</u>	See Site Map For Boring Location	
Top of Casing Vat Screen: Dia 2 in Len Casing: Dia 2 in Len Filter Pack Material Native Sc Drilling Company Rodgers & C Driller Harvey Reichert Checked By X 13/9				
Depth (ft.) Well Completion (PD)	Sample ID Blow Count/ % Recovery Graphic Log USCS Class.	Descript (Color, Texture, S Trace < 10%, Little 10% to 20%, Some	ion Structure)	
2- 0	ASF	Gray-stained soils (fine poorly grad feet)  Groundwater encountered at 8.5 feet  Soils in saturated zone dark gray-st poorly-graded SAND  End of boring at 17 feet (1140 hrs)  Drove well to 24.25 feet  Installed air sparge well screened fr 4/15/93	ed SAND encountered at 7  t on 4/15/93  ained fine-medium	



	_						
Project A	IMED/Bare	elas		•	0	wner <u>NMED</u>	See Site Map
						023352875 Date drilled 04/15/93	For Boring Location
Surface E		To	otal Hole [	epth .	17 ft.	Diameter <u>II in.</u>	COMMENTS:
Top of Ca	esing	Wa	ater Level	Initial	8.75	f. ft. Static	COMMENTO.
Screen: D	)ia <i>2 in.</i>	Le	ngth 2 ft	•		Type/Size Stainless Steel 0.020 in.	Start at 1400 hrs.
Casing: D	ia <i>2 in.</i>	Le	ngth <u>17.7</u>	<u>5/3 ft.</u>		Type <i>Galv. Steel</i>	
						ig/Core Type <u>CME-75/NA</u>	
						Hollow Stem Auger Permit #	
Driller <u>Ha</u>	rvey Reic	hert	2-		_ L	og By <i>Jerry May</i>	
Checked	Ву	5 8/1 <i>3/</i> 5	15	_ Lice	nse M	No	
Depth (ft.)	Well Completion	FID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	JSCS Class.	Descript (Color, Texture, 1 Trace < 10%, Little 10% to 20%, Some	Structure)
					ر		
2 -							
1 1							
						0-2" Asphalt pavement	
					ASP/	0 2 Asphalt pavement	
						See Vapor Extraction Well VP-3 for I	ithology
<b>-</b> 2 -	{						,
					Ì		
	74 74						
F 4 7	74 F4						
<b>├</b> -	[<]						
<b>-</b> 6 <b>-</b>	\ \ \						
1	74 74						
- 8 <del>-</del>	<b> </b>	,					
<u> </u>	[<]				ľ	Foundwater encountered at 8.75 fe	et in well VP-3 on 4/14/93
- 10 -	ראן הא						
	ከ4 ከ4						
<b>†</b> †	<b>1</b> 54 <b>1</b> 54						
- 12 -	[<] [<]						
	\'\						
1	ስሳ ኮላ						
- 14 -	h3 h3						
<b>├</b>	<b>É</b>						
<u> </u> 16							
				<b></b>	L	End of boring at 17 feet (1430 hrs)	
[ _ ]			<u>[</u> ]			_	
- 18 -						Drove well to 24.25 feet	
<b>-</b>							
20 –							
	=						
† †							
- 22 -							
1 _						Installed air sparge well screened fr	om 19.25 to 21.25 feet on
- 24 -						4/15/93	



Location: Surface Top of Screen Casing: Filter P Drilling Driller	c Elev Casing Dia 2 in. Dia 2 in. Company R. Harvey Reick Dia By Dia By Company R.	que, NM To Wa Le Le Le Native S odgers &	otal Hole C ater Level ength 2 ft ength 17.7 Sand Co.	Projection of Projection of Projection of Project Proj	t No. 7 ft. 8.5  ft.  R od F	wner NMED  O23352875 Date drilled O4/13/93  Diameter II in.  ft. Static  Type/Size Stainless Steel 0.020 in.  Type Galv. Steel  ig/Core Type CME-75/NA  Hollow Stem Auger Permit #  Og By Jerry May	
Depth (ft.)	Well Completion	FID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class,	Descript (Color, Texture, S Trace < 10%, Little 10% to 20%, Some	_
2 - 0 - 2 - 4 - 6 - 8 - 10 - 12 - 14					ASP	0-2" Asphalt pavement  See Vapor Extraction Well VP-4 for	lithology
- 16 - 18 - 20 - 22						End of boring at 17 feet (1145 hrs)  Drove well 17 to 24.5 feet  Installed air sparge well screened fr 4/13/93	om 19.25 to 21.25 feet on





						wner <u>NMED</u>	See Site Map For Boring Location
				•		. <u>023352875</u> Date drilled <u>04/15/93</u>	
				epth 17 ft. Diameter 11 in.			COMMENTS:
						Static	Start at 0045 to
Screen: E	)ia <u>z 1/1.</u> 	Le	ngth <u>277</u>	E /2 #1		Type/Size Stainless Steel 0.020 in.	Start at 0845 hrs.
Casing: Dia <u>2 in.</u> Length <u>17.75/3 ft.</u>							
Filter Pack Material <u>Native Sand</u> Rig/Core Typ Drilling Company <u>Rodgers &amp; Co.</u> Method <u>Hollow Stem</u>							
						og By Jerry May	
Checked	ву	8 13	13	Licer	nse h	No	
Depth (ft.)	Well	FID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	S Class.	Descripti (Color, Texture, S	Structure)
	Cor		ω Ω× ω ο α	ဖ	nsc	Trace < 10%, Little 10% to 20%, Some	
2-							
- 0 -					\ASP/	0-2" Asphalt pavement	
-						Soo Voper Entraction Mall VD G for I	ithology
- 2 -			:			See Vapor Extraction Well VP-6 for li	ittiology
}	片						
- 4 -	7 \ 7						
+ +	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \						
6 -	, , , , , , , , , , , , , , , , , , ,						
┟┊╡	7			,		7	
- 8 -	77 77					F Groundwater encountered at 8 feet	in well VP-6 on 4/12/93
	77 77						
- 10 -							
1,0							
- 12 -							•
14 -							
" ]							
- 16 -							
					lacksquare	End of boring at 17 feet (1435 hrs)	
- 18 -						Drove well to 24.25 feet	
- 20 -						Installed air sparge well screened fr	om 19.25 to 21.25 feet on
-						4/15/93	
- 22 -							
ļ _							
- 24 -							



						wner <u>NMED</u> . <u>023352875</u> Date drilled <u>04/14/93</u>	See Site Map For Boring Location
Surface Elev Total Hole   Top of Casing Water Leve Screen: Dia <u>2 in.</u> Length <u>2 f.</u> Casing: Dia <u>2 in.</u> Length <u>17.7</u> Filter Pack Material <u>Native Sand</u> Drilling Company <u>Rodgers &amp; Co.</u>			Depth _ Initial 5/3 ft Meth	17 ft. 8 ft. R	Diameter <u># in.</u>	COMMENTS: Start at 0930 hrs.	
Depth (ft.)	Well Completion	FID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Descripti (Color, Texture, S Trace < 10%, Little 10% to 20%, Some	Structure)
2 - - 0 - - 2 - - 4 - - 6 - - 8 - - 10 - - 12 - - 14 -	<u>\\\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>				ASP	0-3" Asphalt pavement  See Vapor Extraction Well VP-7 for li  Groundwater encountered at 8 feet	
- 16 - - 18 - - 20 - - 22 - - 24 -				•		End of boring at 17 feet (1000 hrs)  Drove well to 24.25 feet  Installed air sparge well screened fro 4/14/93	om 19.25 to 21.25 feet on



	•						
						wner <u>NMED</u>	See Site Map   For Boring Location
						. <u>023352875</u> Date drilled <u>04/12/93</u>	
Surface Elev Total Hole Depth <u>14 ft.</u> Diameter <u>8 in.</u> Top of Casing Water Level Initial <u>8.75 ft.</u> Static							COMMENTS:
Top of C	asing	Wá	ater Level	Initial	<u>8.75</u>	ott. Static	
Screen: [	)ia <u>2 in.</u> 	Le	ength <u>5/5</u>	It.		Type/Size <u>PVC/0.020"/0.040 in.</u> Type <u>PVC</u>	Start at 1330 hrs.
Casing: D	ia <u>///.</u>	Le	ength <u>4 //</u>	Silica		Type	FID readings taken with charcoal filter to screen methane
						ig/Core Type <u>CME-75/2' SS</u> Hollow Stem Auger Permit #	
						og By Jerry May	
Checked	ву ТВ	8117	193	. Lice	 1se 1	Vo	
	Well	· · · · · ·	Sample ID Blow Count/ X Recovery	0	ss.	****	
Depth (ft.)	ee	FID (ppm)	90% 80%	Graphic Log	Clas	Descripti	
	≯ E	гô	Se Se	era L	SO	(Color, Texture, S Trace < 10%, Little 10% to 20%, Some	Structure)
	ŏ		NΨ×		ŝ	11 due > 10%, Little 10% to 20%, Some	20% to 35%, And 35% to 50%
2 -							
1 -							
-0-				7 17	(ASP/	0-2" Asphalt pavement	
1 -	2000 2000				SM	2"-2": Gray-stained fine silty/clayey	SAND (moist)
- 2 -					SC	2'-3': Gray-stained fine siity/clayey	SAND (IIIOIST)
-					CL	2 3. ordy stailed siky ozar	
1, 1			3 F		C.	Tan/gray-stained silty/clayey SAND	(moist, loose)
4			VP-2 4 1 -5 3 1		SM SC		
<b> </b>		15	4 7		ML	Brown/gray-stained micaceous SILT	(moist, medium dense)
6		80	VP-2 6		SP	Gray fine poorly-graded SAND (mois	t, loose)
			7 3 H		<u> </u>	Tan fine-coarse poorly-graded SAN	D (moist loose)
8 -		65	VP-2 3 -8 2	<b></b>		Groundwater encountered at 8.75 fe	
<b>├</b> ┤			~ ~ ~ ~ ~			· · · · · · · · · · · · · · · · · · ·	51 OH 4/14/3J
- 10 -					SP	Drill cuttings noted as gray—stained	and same as above
<b>├</b> ┤					"		
- 12 -				<b>[:::::</b>	1		
<u> </u>							
- 14 -				<u> </u>	-	End of boring at 14 feet (1415 hrs).	Installed vapor extraction well
ļ .						screened from 4 to 14 feet on 4/14/5	93.
<b>-</b> 16 <b>-</b>							
- 18 -							
[ 20 ]			1				
- 20 -							
- 22 -							
} -							
- 24 -							



Location Surface I Top of C Screen: I Casing: D Filter Pac Drilling Co Driller Ha Checked	Elev	Tue, NM	otal Hole C ater Level ength 5/5 ength 4 ft 6 8/12 Co. Co.	Project Depth _ Initial ft. Silica Meth Licel	t No 14 ft 8.75 R	Owner NMED  . 023352875 Date drilled 04/14/93  . Diameter 8 in.  5 ft. Static  Type/Size PVC/0.020"/0.040 in.  Type PVC  Idg/Core Type CME-75/2' SS  Hollow Stem Auger Permit #  og By Jerry May  No.	FID readings taken with charcoal tilter to screen methane
Depth (ft.)	Well Completion	FID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	S CI	Descript (Color, Texture, 17 Trace < 10%, Little 10% to 20%, Some	Structure)
2		60 250 450	3   VP-3 4   -5 4   VP-3 4   -7 5   VP-3 4   -8 3   VP-3 4   -8 3   VP-3 4   -8 3   VP-3 4   -8   VP		別MC CL M CJL)	O-2" Asphalt pavement Hand dug 2"-1' Dark gray-stained fine poorly-grade Dark gray-stained silty CLAY (moist Brown fine poorly-graded silty SANE Brown silty CLAY (moist, low plasticit Brown/gray-stained SILT (moist, sti Tan fine-coarse poorly-graded SAN Grades to fine-medium Groundwater encountered at 8.75 fe Drill cuttings noted as gray-stained  End of boring at 14 feet. Installed with from 4 to 14 feet on 4/14/93.	) (moist, loose)  sy, medium stiff)  ff)  ID (moist, loose)  et on 4/14/93  and same as above



				Owner <u>NMED</u> 0. <u>023352875</u> Date drilled <u>04/12/93</u>	See Site Map For Boring Location
Surface Elev Top of Casing Screen: Dia 2 in. Casing: Dia 2 in. Filter Pack Material 10/20 Drilling Company Rodgers Driller Harvey Reichert Checked By 18 813	COMMENTS:  Start at 1510 hrs.  FID readings taken with charcoal filter to screen methane				
Depth (ft.) Well Completion FID (Ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Descript (Color, Texture, S Trace < 10%, Little 10% to 20%, Some	Structure)
2- - 0 - 125 - 6 - 18 - 16 - 18 - 18 - 20 - 24 - 24 - 24 - 24 - 24 - 24 - 24	24 VP-4 4 -5 6 -7 6 -7 6 VP-4 4 -8 4		SM CL SM SP	Tan/black-stained silty CLAY (moist Gray-stained fine poorly-graded SA Tan/gray-stained fine poorly-grade  Groundwater encountered at 8.5 fee  Same as above noted in drill cuttings	feet t, medium plasticity, medium stiff) (moist, loose) , high plasticity, medium stiff) (MD (moist, loose) ed SAND (moist-wet, loose) et on 4/12/93



TECHNOLOGI							
Project <u>NMED/Barelas</u>				wner <u>NMED</u>	See Site Map For Boring Location		
Location Albuquerque,				023352875 Date drilled 04/12/93	L. Doring Location		
				Diameter 8 in.	COMMENTS:		
Top of Casing	COMMENTO.						
				Type/Size PVC/0.020"/0.040 in.	Start at 1405 hrs.		
				Type <u>PVC</u>	FID readings taken with		
Filter Pack Material 10	1/20 & 8/12 Co.	Silica	R	ig/Core Type CME-75/2' SS	charcoal filter to screen methane		
Drilling Company Rodge	ers & Co.	. Meth	od £	Hollow Stem Auger Permit #			
Driller Harvey Reicher	t		_ L	og By <i>Jerry May</i>			
Checked ByTB_	Driller Harvey Reichert Log By Jerry May  Checked By TB 8/17/93 License No.						
Depth (ft.) Well Completion	Sample ID Blow Count/	Graphic Log	uscs Class.	Descripti (Color, Texture, S Trace < 10%, Little 10% to 20%, Some			
2 - - 0 - - 2 - - 4 - - 6 - - 3	4 4 4 4 4 7 7 8 7 8 7 8 7 8 7 8 8 9 9 9 9 9 9 9 9		n	O-2" Asphalt pavement Hand dug 2" to 1' Brown fine-coarse poorly-graded sil  Tan fine poorly-graded silty SAND (  Brown silty CLAY (moist, medium plas Brown/gray-stained micaceous SILT	ty/clayey SAND (moist)  moist, medium dense)  ticity, stiff) (moist, stiff) (D (moist, medium dense) n 4/12/93 t-wet, loose)  Installed vapor extraction well		



Location . Surface E Top of Ca Screen: D Casing: Di Filter Pac Drilling Co Driller <u>Ha</u>	Albuquero Elev asing tia 2 in. tia 2 in. tik Material mpany Ro privey Reick	que, NM To Wa Le Le Le Le a 10/20 & adgers & hert	otal Hole C ater Level ength <u>5/5</u> ength <u>4 ft</u> 5 8/12 Co. Co.	Project Depth _ Initial ft. Silica _ Meth	# No ### 14   ####   ####   ####   ####   ####   ####   ####   ####   ####   #####   ####   ######	owner NMED  O23352875  Date drilled 04/12/93  Static  Type/Size PVC/0.020"/0.040 in.  Type PVC  ig/Core Type CME-75/2' SS  Hollow Stem Auger  og By Jerry May  No.  Descripti	
2	COMPANY OF THE PROPERTY OF THE	3 1 60	222133251 SOIN 222133255 FO S S S S S S S S S S S S S S S S S S S		SOSO	(Color, Texture, Some  Trace < 10%, Little 10% to 20%, Some  0-2" Asphalt pavement Hand dug 3" to 1' Brown fine poorly-graded silty/claye  Same as above, gray-stained 3.75 to  Brown silty CLAY with shells and root medium stiff).  Groundwater encountered at 8 feet of the transparent of the transpar	ey SAND (moist)  of feet (very loose)  s (moist, medium plasticity,  on 4/12/93 d SAND (moist-wet, loose)



					wner <u>NMED</u> . <u>023352875</u> Date drilled <u>04/12/93</u>	See Site Map For Boring Location
Top of Casing Screen: Dia 2 in. Casing: Dia 2 in. Filter Pack Material Drilling Company Roo Driller Harvey Reich Checked By	Wa Le Le 	ater Level ength <u>5/5</u> ength <u>4 ft</u> 6 8/12 Co. Co.	Initial  ft.  Silica  Meth	8 ft  R od 4  L nse N	Diameter 8 in.  Static Static Type/Size PVC/0.020"/0.040 in.  Type PVC Sig/Core Type CME-75/2' SS Permit # og By Jerry May No Permit # Sig/Core Sig/Core Permit # Sig/Core Sig/Core Sig/Core Sig/Core Permit # Sig/Core Sig/Core Sig/Core Sig/Core Sig/Core Sig/Core Sig/Core Sig/Core Sig/Core	COMMENTS:  Start at 0930 hrs.  Sample VP-7-8 FID - screened with charcoal filter (15 ppm methane detected without filter)
Depth (ft.) Well Completion	FID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Descripti (Color, Texture, S Trace < 10%, Little 10% to 20%, Some	Structure)
2- 0- 2- 4- 10- 12- 14- 16- 18- 20- 22- 24-	0 16 110	35   VP-7 5   VP-7 6   VP-7 3   VP-7 3		නී ශී්ගිය <u>ම</u> ශී්ගිය ම	O-2" Asphalt pavement Hand dug 3" to 2' Brown fine poorly-graded silty SAND Same as above, loose  Brown-gray-stained fine poorly-gradloose) Brown silty clay (moist, high plasticity Groundwater encountered at 8 feet of Brown fine poorly-graded silty SAND Tan fine-coarse poorly-graded SANI Same as above noted in drill cuttings  End of boring at 14 feet (1045 hrs), screened from 4 to 14 feet on 4/12/5	ded silty/clayey SAND (moist, y, stiff) on 4/2/93) (wet, loose) D (wet, loose) Installed vapor extraction well

#### **APPENDIX C**

SOIL SAMPLE CERTIFICATES OF ANALYSIS, CHAIN-OF-CUSTODY DOCUMENTATION, AND QA/QC DATA, APRIL 12 - 14, 1993

NMED/Barclas disk 2 1&2Qtr93.rpt





RECEIVED

APR 3 0 1993

GTI, NM

GTEL Client Number: 023352875.050309

Project I.D.: Bridge/ALBQ NM

Work Order Number: T304148

Southwest Region

20000 / 300 Mariner Drive Torrance, CA 90503 (310) 371-1044 (800) 727-GTEL Fax (310) 371-8720

April 28, 1993

Ms. Terry Bennett Groundwater Technology, Inc. 2501 Yale Blvd. S.E., Suite 204 Albuquerque, NM 87106

Dear Ms. Bennett,

Enclosed please find the analytical results for the samples received by GTEL Environmentel Laboratories, Inc. on 4-15-93 under chain-of-custody record 76-6842.

A formal Quality Assurance/Quality Control (QA/QC) program, which is designed to meet or exceed the EPA requirements, is maintained by GTEL. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the following; the State of California under Certification #1123, the State of Arizona under Certification #AZ0357, the State of Kansas under Certification E-182 and the State of Washington under Certification #C060.

If you have any questions concerning this analysis or if we can be of further assistance, please call one of our Customer Service Representatives.

Sincerely,

GTEL Environmental Laboratories, Inc.

Jøan Greenwood Labøratory Director

GTEL Client Number: 023352875.050309 Project I.D.: Bridge/ALBQ NM Work Order Number: T304148

#### **ANALYTICAL RESULTS**

# Volatile Organics in Soil EPA Methods Modified 8020 and Modified 8015<sup>a</sup>

GTEL	Sample Number	04148-1	04148-2	04148-3	04148-4
Cli	ent Identification	VP-7-8	VP-6-8	VP-5-8	VP-4-8
	Date Sampled	4-12-93	4-12-93	4-12-93	4-12-93
	Date Extracted	4-16-93	4-16-93	4-16-93	4-16-93
	Date Analyzed	4-17-93	4-17-93	4-17-93	4-17-93
A <b>n</b> alyte	Concentration, mg/kg				
Benzene	0.005	<0.005	<0.005	<0.005	0.069
Toluene	0.005	< 0.005	< 0.005	< 0.005	0.90
Ethylbenzene	0.005	0.013	<0.005	0.099	1.7
Xylene, total	0.015	0.018	<0.015	0.24	2.2
BTEX, total		0.031		0.34	4.9
TPH as Gasoline	10	<10	<10	55	470
Dilution Multiplier <sup>b</sup>	Dilution Multiplier <sup>b</sup>			1	1
Percent solids, %	Percent solids, %				93.6
TFT surrogate <sup>C</sup> , % recovery		83.6	87.4	85.4	112

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures. Results are calculated on a wet weight basis.



Indicates the adjustments made for sample dilution. b.

TFT surrogate recovery acceptability limits of 72.8-123% are derived from the 99% confidence interval of all samples during the previous C. quarter. Expected surrogate value is 1.07 mg/kg.

GTEL Client Number: 023352875.050309 Project I.D.: Bridge/ALBQ NM Work Order Number: T304148

#### **ANALYTICAL RESULTS**

# Volatile Organics in Soil EPA Methods Modified 8020 and Modified 8015<sup>a</sup>

GTEL S	Sample Number	04148-5	04148-6		
Clie	ent Identification	VP-2-7	VP-3-8		
	Date Sampled	4-14-93	4-14-93		
	Date Extracted	4-16-93	4-16-93		
	Date Analyzed	4-17-93	4-17-93		
Analyte	Concentration, mg/kg				
Benzene	0.005	0.024	0.073		
Toluene	0.005	0.006	0.58		
Ethylbenzene	0.005	0.067	2.0		
Xylene, total	0.015	0.054	1.5		
BTEX, total		0.15	4.2		
TPH as Gasoline	10	17	360		
Dilution Multiplier <sup>b</sup>	1	1			
Percent solids, %	78.0	83.4			
TFT surrogate <sup>C</sup> , % recovery		83.4	107		

- Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures. Results are calculated on a wet weight basis.
- b. Indicates the adjustments made for sample dilution.
- TFT surrogate recovery acceptability limits of 72.8-123% are derived from the 99% confidence interval of all samples during the previous quarter. Expected surrogate value is 1.07 mg/kg.



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#### **APPENDIX D**

WASTE MANIFESTS AND SOIL CERTIFICATES OF ANALYSIS AND CHAIN-OF-CUSTODY DOCUMENTATION

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#### RHINO ENVIRONMENTAL SERVICES, INC. LANDFARM FACILITY DP-619 CONTAMINATED SOIL DOCUMENTATION SUMMARY

SHIPPING FACILITY

OWNER OF FACILITY (IF DIFFERENT)

Bralaes Bridge GWAPA

NMED

ADDRESS: 800 Bridge

Albuquerque, NM

Albuquerque, NM

TRANSPORTER

NAME:

Rhino Environmental Services, Inc.

ADDRESS:

PO Box 2327

Hobbs, NM 88240 505-392-4498

RHINO SOIL ID: GTI-0493

DATE DELIVERED: 04/28/93

LOCATION ON DP-619: Section 3

TOTAL VOLUME OF SOIL FROM SITE: 16 - 55 gallon drums

TYPE OF CONTAMINANT: gasoline

NUMBER OF LOADS: 1

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Southwest Region 20000 / 300 Mariner Drive Torrance, CA 90503 (310) 371-1044 (800) 727-GTEL Fax (310) 371-8720 GTEL Client Number: 023352875/050309

Project I.D.: Bridge

Albuquerque, NM

Work Order Number: T304147

RECEIVED

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GTI, NM

April 21, 1993

Ms. Teresa Bennett Groundwater Technology, Inc. 2501 Yale Blvd. SE, Suite 204 Albuquerque, NM 87106

Dear Ms. Bennett,

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 4-15-93 under chain-of-custody record 76-6842.

A formal Quality Assurance/Quality Control (QA/QC) program, which is designed to meet or exceed the EPA requirements, is maintained by GTEL. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the following; the State of California under Certification #1123, the State of Arizona under Certification #AZ0357, the State of Kansas under Certification E-182 and the State of Washington under Certification #C060.

If you have any questions concerning this analysis or if we can be of further assistance, please call one of our Customer Service Representatives.

Sincerely,

GTEL Environmental Laboratories, Inc.

Joan Greenwood Laboratory Director

GTEL Client Number: 023352875/050309 Project I.D.: Bridge Albuquerque, NM Work Order Number: T304147

#### **ANALYTICAL RESULTS**

## Volatile Organics in Soil EPA Method Modified 8020<sup>a</sup>

Gì	TEL Sample Number	04147-1			
	Client Identification				
	Date Sampled	4-14-93			
	Date Extracted				
	Date Analyzed				
Analyte	Concentration, mg/kg				
Benzene	0.005	<0.025*			
Toluene	0.005	<0.025*			
Ethylbenzene	0.005	8.5			
Xylene, total	0.015	6.4			
BTEX, total	15				
Dilution Multiplier <sup>b</sup>	5				
Percent solids, %		87.4			

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Results are calculated on a wet weight basis.



b. Indicates the adjustments made for sample dilution.

Reporting limit raised due to dilution.

GTEL Client Number: 023352875/050309 Project I.D.: Bridge

Albuquerque, NM

Work Order Number: T304147

#### **ANALYTICAL RESULTS**

#### Metals in TCLP Leachatea

	GTEL S	ample Number	04147-1			
	Clie	nt Identification	493DC			
		Date Sampled	4-14-93			
		Date Leached	2-15-93			
		Extraction Fluid	#1			
	Date Analyzed	(Method 7420)	4-19-93			
Analyte	Method <sup>C</sup>		Concentra	ation, mg/L		
Lead	7420	0.50	<0.5			

- TCLP performed as per 40 CFR, Part 261, Appendix II Method 1311. These data are presented in accordance with the Federal Register, 57, p.55114, November 24, 1992.
- b. The dilution multiplier indicates the adjustments made for dilutions.
- C. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986; Digestion by Method 3010 for Method 6010 analytes and Method 7470 for mercury.



GTEL Client Number: 023352875/050309 Project I.D.: Bridge Albuquerque, NM Work Order Number: T304147

#### **ANALYTICAL RESULTS**

# Total Recoverable Petroleum Hydrocarbons in Soil EPA 418.1/Standard Methods 503E<sup>a</sup>

Sample Identification		Date Sampled	Date Extracted	Date Analyzed	Reporting Limit, mg/kg	Concentration, mg/kg	Percent Solids, %
GTEL No.	Client ID						
04147-1	493DC	4-14-93	4-16-93	4-16-93	5	720	87.4

EPA 600/4-79-020, March 1983 revision. Extraction by EPA Method 3550. Results are calculated on a wet weight basis.



GTEL Client Number: 023352875/050309 Project I.D.: Bridge Albuquerque, NM Work Order Number: T304147

#### **ANALYTICAL RESULTS**

# Flash Point of Soil Modified EPA Method 1010<sup>a</sup>

Sample Identification		Date Sampled	Date Analyzed	Flash Point <sup>b</sup> , F	Percent Solids, %
GTEL No.	Client ID	]			
04147-1	493DC	4-14-93	4-16-93	95	87.4

- Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modified to allow determinations on soil.
- b
- < 75 indicates a flash point of less than 75 F;
  > 160 indicates that the test termination point of 160 F was reached without ignition.



Project Number 0. Sold association   Project N									菜		:	*							
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# RHINO ENVIRONMENTAL SERVICES, INC. LANDFARM FACILITY DP-619 CONTAMINATED SOIL DOCUMENTATION SUMMARY

#### SHIPPING FACILITY

OWNER OF FACILITY (IF DIFFERENT)

NAME:

Fina Bridge GWAPA Site

NMED

ADDRESS: 800 Bridege

Santa Fe, NM

Albuquerque, NM

#### TRANSPORTER

NAME:

Rhino Environmental Services, Inc.

ADDRESS: PO Box 2327

Hobbs, NM 88240 505-392-4498

RHINO SOIL ID: GTI-Bridge-0693

DATE DELIVERED:

05/28/93 thru 06/02/93

LOCATION ON DP-619: Section 4

TOTAL VOLUME OF SOIL FROM SITE: 93.41 tons

TYPE OF CONTAMINANT:

gasoline

NUMBER OF LOADS: 4

-	 Not Negot	- – – – – – – iable	Str	aight Bill of Lading-Sh	10	rt Form		Shippe	er's No
Phus	a En	w Ser	In						ers No. <u>520 - 3</u>
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_ <b>№</b> 08263		
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FINA TRUCK PLAZA	DATE 6/1/2	2
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Albuquerque, NM 87107	BUYER KAMIN	
Lic. #065	ADDRESS	_
		_
NM D. A. Approved	CITYSTATEZIP	
5 - 80		
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	I certify above entries are true and correct.	
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FINA TRUCK PLAZA  1915 Menaul Blvd. NE Ibuquerque, NM 87107  ic. #065  ADDRESS  NM D. A. Approved  5 - 80  WEIGHED ON MURPHY—CARDINAL SCALES  I certify above entries are true and contest.  Different signature  13:56 06/02/93 66760 LB bibs. GROSS  - 21,7000 bibs. TARE  REMARKS (Commodity Weighed)  TRUCK NO. DRIVER ON OFF, WEIGHED BY  DIGITAL WEIGHT INDICATOR & PRINTER  DATE 2/93  WEIGHED ON MURPHY—CARDINAL SCALES  1 certify above entries are true and contest.  Different signature  13:56 06/02/93 66760 LB bibs. GROSS  - 21,7000 bibs. NET  OFF, WEIGHED BY  DIGITAL WEIGHT INDICATOR & PRINTER  DIGITAL WEIGHT INDICATOR & PRINTER  DATE 2/93  DIGITAL WEIGHT INDICATOR & PRINTER  DATE 2/193  DIGITAL WEIGHT INDICATOR & PRINTER  DATE 2/193  DIGITAL WEIGHT INDICATOR & PRINTER	_Nº 083	326			1/1/2-
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## **CERTIFIED** AUTOMATED RUCK SCALE

CAT SCALE COMPANY P.O. BOX 630 WALCOTT, IA 52773 (319) 284-6263

( est sules and equiptions) 11500 LOCATION:

reverse side of ticket for

PUBLIC WEIGHMASTER'S CERTIFICATE OF WEIGHT & MEASURE

SCALE

IMPRINT SEAL HERE (IF APPLICABLE)

1724794

CONTEST TICKET NUMBER

#### THE CAT SCALE GUARANTEE

The CAT Scale Company quarantees that our scales will give an accurate weight. What makes us different from other scale companies is that we back up our guarantee with cash.

#### "WEIGH WHAT WE SAY OR WE PAY"

If you get an overweight fine from the state after one of our CAT Scales showed a legal weight, we will immediately check our scale and we will:

(1) Reimburse you for the cost of the overweight fine if our scale is wrong, OR

(2) A representative of CAT Scale Company will appear in court WITH the driver as an expert witness if we believe our scale was correct.

## IF YOU SHOULD GET AN OVERWEIGHT FINE, YOU SHOULD DO THE FOLLOWING TO GET THE PROBLEM RESOLVED:

1) Post bond and request a court date.

Call the CAT Scale location where you got the weigh ticket in question and inform them of the fine, or call CAT Scale Company direct during normal business hours.

IMMEDIATELY send a copy of the citation, CAT Scale Ticket, your name, company, address, and phone number to

\* The four weights shown below are separate weights. The GROSS WEIGHT is the CERTIFIED WEIGHT and was weighed on a full length platform scale.

STEER AXLE 11420 16 05/28/93 DATE:

> 30960 16 DRIVE AXLE

TRAILER AXLE 33660 1 b

140 AND EXIT 277 SANTA ROSA NM

GROSS WEIGHT 76 040 16

This is to certify that the following described merchandise was weighed, counted, or measured by a public or deputy weighmaster, and when properly signed and sealed shall be prima facia evidence of the accuracy of the weight shown as prescribed by law.

ENTRANTS NAME: George Goifs

ADDRESS: 1107 PONDEROSA

LIVESTOCK, PRODUCE, PROPERTY, COMMODITY, OR ARTICLE WEIGHED \_

\_\_\_\_\_ TRACTOR # 94(FRAILER # 107

WEIGHMASTER OR WEIGHER SIGNATURE

DRIVER IN TRUCK UNLESS CHECKED HERE: \_

GTI TOOB

76,040 -31,300 = (22,37 +ons)

Original-Not Negotiable	Straight Bill of Lading-Sh	ort Form			er's No
Atua Cow Der.	(Name of Carrier)			Carri	ers No. 520-2
5-29	ffs in effect on the date of the issue of the Bill of Lading.  — 1993 From Funci. S	to Bride &	ļ. <i>j</i>	1104	. NW
ntract as meaning any person or corporation in possession of rurally agreed, as to each carrier of all or any of said property of the terms and conditions of the Uniform Domestic Straight Bill of motor carrier shipment.  Shipper hereby certifies that he is familiar with all the said terms and conditions are haveby agreed to by the shipper hereby carriers.  Onsigned to	oled (contents and condition of contents of packages unknown), marked, consigned an he property under the contract) agrees to carry to its usual place of delivery at said of all or any portion of said route to destination, and as to each party at any time interest ading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is terms and conditions of the said bill of lading, including those on the back therefore and accepted for himself and his assigns.  State M Zip\$340 County Le	ostination, if on its rouse, otherwised in all or any of said property is a rail or a rail-water shipment, of, set forth in the classification	ise to deliver to , that every serv or (2) in the app n or tartff which street address Y	anothelice to be p licable mo governs	arrier on the route to said destination. It reformed hereunder shall be subject to otor carrier classification or tariff if this is
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SHIPPERS CERTIFICATION: This is to certify that the a materials are properly classified, described, packaged, abeled, and are in proper condition for transportation a	narked and SIGNATURE	TITLE		_	Charges advanced:
plicable regulations of the Department of Transportat If the shipment moves between two ports by a carrier Shipper's Imprints In Ileu of stamp; not a part of E Note-Where the rate is dependent on value, shippers a	on.  by water, the law requires that the bill of lading shall state whether it is "car lill of Lading approved by the Interstate Commerce Commission.  e required to state specifically in writing the agreed or declared value of the papeoffically stated by the shipper to be not exceeding	rier's or shipper's weight." e property.			C.O.D. SHIPMENT
THIS SHIPMENT IS CORRECTLY DESCRIBED.  ORRECT WEIGHT IS	** The fibre boxes used for this shipment conform to the specifications set forth in the box makers certificate thereon, and all other requirements of the Consolidated Freight Classification.	Per		Shipper	Collection Fee Total Charges
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ermanent post office address of shipper		= 1			

GTI- Zaidge

	<b>№</b> 08199	_	C 20 9-
	FINA TRUCK PLAZA	SELLER .	DATE 5-29-93
	1915 Menaul Blvd. NE Albuquerque, NM 87107	BUYER AINTO	
_	Lic. #065	ADDRESS	
	NM D. A. Approved 5 - 80	CITY STATE	ZIP
<b>≠</b> 1	CEBTIFIED COS	WEIGHED ON MURPHY—CARDIN I certify above entries are true and corre	IAL SCALES  ONCLOSION  Discrete Standard
		14:45 05/29/93 90080	LB bs. GROSS
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	TRUCK NO. 520 DRIVE	ER ON OFF WEIGHED BY	Hartands Object



Southwest Region 20000 / 300 Mariner Drive Torrance, CA 90503 (310) 371-1044 (800) 727-GTEL Fax (310) 371-8720 GTEL Client Number: 023352875

Project I.D.: NMED/800 Bridge

Albuquerque, NM

Work Order Number: T305187

RECEIVED

MAY 2 7 1993

GTI, NM

May 24, 1993

Ms. Teresa Bennett Groundwater Technology, Inc. 2501 Yale Blvd. SE, Suite 204 Albuquerque, NM 87106

Dear Ms. Bennett,

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 5-21-93 under chain-of-custody record 76-6846.

A formal Quality Assurance/Quality Control (QA/QC) program, which is designed to meet or exceed the EPA requirements, is maintained by GTEL. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the following; the State of California under Certification #1123, the State of Arizona under Certification #AZ0357, the State of Kansas under Certification E-182 and the State of Washington under Certification #C060.

If you have any questions concerning this analysis or if we can be of further assistance, please call one of our Customer Service Representatives.

Sincerely,

GTEL Environmental Laboratories, Inc.

Joan Greenwood Laboratory Director

GTEL Client Number: 023352875

Project I.D.: NMED/800 Bridge
Albuquerque, NM
Work Order Number: T305187

#### **ANALYTICAL RESULTS**

## Volatile Organics in Soil EPA Method Modified 8020<sup>a</sup>

	GTEL Sample Number	05187-1*	05187-2*	05187-3*	05187-4*	
	Client Identification	XS1	XS2	XS3	XS4	
	Date Sampled	5-20-93	5-20-93	5-20-93	5-20-93	
	Date Extracted	5-21-93	5-21-93	5-21-93	5-21-93	
	Date Analyzed	5-22-93	5-22-93	5-22-93	5-22-93	
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg				
Benzene	0.005	<0.025	< 0.025	< 0.025	< 0.025	
Toluene	0.005	<0.025	<0.025	< 0.025	< 0.025	
Ethylbenzene	0.005	0.11	< 0.025	< 0.025	< 0.025	
Xylene, total	0.015	0.49	< 0.075	< 0.075	< 0.075	
BTEX, total		0.60				
Dilution Multiplier <sup>b</sup>		5	5	5	5	
Percent solids, %						

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Results are calculated on a wet weight basis.



b. Indicates the adjustments made for sample dilution.

Reporting limits raised due to matrix effect (foaming).

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**Southwest Region** 20000 / 300 Mariner Drive Torrance, CA 90503 (310) 371-1044 (800) 727-GTEL Fax (310) 371-8720

GTEL Client Number: 023352875/050309

Project I.D.: NMED/BB

800 Bridge

Work Order Number: T305120

Albuquerque, NM

RECEIVED

Mal 2 .

GTI, NM

May 18, 1993

Ms. Theresa Bennett Groundwater Technology, Inc. 2501 Yale Blvd. SE, Suite 204 Albuquerque, NM 87106

Dear Ms. Bennett,

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 5-14-93 under chain-of-custody record 76-6826.

A formal Quality Assurance/Quality Control (QA/QC) program, which is designed to meet or exceed the EPA requirements, is maintained by GTEL. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the following; the State of California under Certification #1123, the State of Arizona under Certification #AZ0357, the State of Kansas under Certification E-182 and the State of Washington under Certification #C060.

If you have any questions concerning this analysis or if we can be of further assistance, please call one of our Customer Service Representatives.

Sincerely,

GTEL Environmental Laboratories, Inc.

Joan Greenwood Laboratory Director

GTEL Client Number: 023352875/050309
Project I.D.: NMED/BB
800 Bridge
Albuquerque, NM
Work Order Number: T305120

### **ANALYTICAL RESULTS**

## Volatile Organics in Soil EPA Method Modified 8020<sup>a</sup>

GTEL S	Sample Number	05120-1A*			
Clie	ent Identification	XSP			
	Date Sampled	5-13-93			
	Date Extracted	5-14-93			
	Date Analyzed	5-17-93			
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg			
Benzene	0.005	<0.025			
Toluene	0.005	< 0.025			
Ethylbenzene	0.005	< 0.025			
Xylene, total	0.015	< 0.075			
BTEX, total					
Dilution Multiplier <sup>b</sup>		5			
Percent solids, %		94.9			

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Results are calculated on a wet weight basis.



Indicates the adjustments made for sample dilution. b.

Reporting limit raised due to matrix effect (foaming).

GTEL Client Number: 023352875/050309 Project I.D.: NMED/BB 800 Bridge

Albuquerque, NM Work Order Number: T305120

## **ANALYTICAL RESULTS**

## Total Recoverable Petroleum Hydrocarbons in Soil EPA 418.1/Standard Methods 503E<sup>a</sup>

11	nple ication	Date Sampled	Date Extracted	Date Analyzed	Reporting Limit, mg/kg	Concentration, mg/kg	Percent Solids, %
GTEL No.	Client ID						
05120-1	XSP	5-13-93	5-17-93	5-17-93	5	1200	

EPA 600/4-79-020, March 1983 revision. Extraction by EPA Method 3550. Results are calculated on a wet weight basis.



GTEL Client Number: 023352875/050309 Project I.D.: NMED/BB 800 Bridge

Albuquerque, NM Work Order Number: T305120

#### **ANALYTICAL RESULTS**

#### Metals in TCLP Leachatea

	GTEL S	Sample Number	05120-1			
	Clie	nt Identification	XSP			
		Date Sampled	5-13-93			
		Date Leached	5-18-93			
	1	Extraction Fluid	# 1			
	Date Analyzed	(Method 7420)	5-18-93			
Analyte		Concentra	ition, mg/L			
Lead	7420	0.50	<0.50			

- TCLP performed as per 40 CFR, Part 261, Appendix II Method 1311. These data are presented in accordance with the Federal Register, 57, p.55114, November 24, 1992.
- Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986; Digestion by Method 3010 for Method 6010 analytes and Method 7470 for mercury.



SPECIAL HANDLING  24 HOURS  EXPEDITED 48 Hours  SEVEN DAY  OTHER						XSP FRANKED 2 X	Manager:  Manage	
SPECIAL DETECTION LIMITS (Specify)  SPECIAL REPORTING REQUIREMENTS (Specify)						X8:11, XX 8X	TIME Sampling	ionsi ionsi
						X	BTEX 602	زهین نمین
se Only							EPA 602	(252)
Storage Location Work Order #:						X	TCLP Metals   VOA   Semi VOA	اهدا اعدا
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Relinquished by:		Date	1/9	7	ime	5	Received by:  Received by:  Received by Laboratory:  Way bill # FEI - X  343.767920	er Issai

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SENDEB'S COPY

#### APPENDIX E

GROUNDWATER SAMPLE CERTIFICATES OF ANALYSIS, CHAIN-OF-CUSTODY DOCUMENTATION, QA/QC DATA, AND FIELD PURGING DATA, FEBRUARY 10, APRIL 12, AND JUNE 16, 1993

NMED/Bareles disk 2 1&2Qtr93.rpt



## GROUNDWATER TECHNOLOGY PH/CONDUCTIVITY PURGING RECORD

JOB NAME: NMED/Barelas Bridge

LOCATION: 800 Bridge Blvd., S.W., Albuquerque, NM

**DATE:** <u>February 10, 1993</u>

SAMPLER: C. Briscoe

WELL	GALLONS PURGED	pН	CONDUCTIVITY (umhos)	TEMPERATURE (°C)	COMMENTS (WATER QUALITY, ODOR ETC.)
MW-1	5	7.44	550	14.5	CLOUDY, GREY, SLIGHT SEWAGE ODOR
MW-2	5	7.32	500	15	CLOUDY, GREY, SLIGHT SEWAGE ODOR
MW-3	5	7.24	350	13	CLOUDY, GREY, SLIGHT SEWAGE ODOR
MW-4	7	7.50	600	15	CLOUDY, GREY, SLIGHT SHEEN, HEAVY HC ODOR
MW-5	7	7.8	350	13	CLOUDY, BROWN, SLIGHT HC ODOR
MW-6	7	7.38	450	13.5	CLOUDY, GREY/BROWN, SEWAGE/HC ODOR
MW-7	7	7.40	450	13	GREYISH BROWN, NO ODOR
MW-8	2	7.21	400	13.5	HEAVY HC SHEEN, STRONG HC ODOR, 1/4" PSH IN BAILER - DID NOT SAMPLE
MW-9	5	7.27	500	14	CLOUDY, GREY, SLIGHT HC ODOR

## GROUNDWATER TECHNOLOGY PH/CONDUCTIVITY PURGING RECORD

JOB NAME: NMED/Barelas Bridge

LOCATION: 800 Bridge Blvd., S.W., Albuquerque, NM

DATE:

June 16, 1993

SAMPLER: C. Briscoe, J. May

WELL ID	GALLONS PURGED	pH	CONDUCTIVITY (umhos)	TEMPERATURE (° C)	COMMENTS (WATER QUALITY, ODOR ETC.)
MW-1	4	7.41	500	15	CLEAR, CLOUDY, ODOR
MW-2	6	7.26	500	16	CLEAR, CLOUDY, ODOR
мw-з	6	7.64	400	16	CLEAR, CLOUDY, ODOR
MW-4	7	NA	NA	NA	CLOUDY, MEDIUM GREY, PSH SHEEN, ODOR
MW-5	6.5	7.51	350	17	CLOUDY, ODOR
MW-6	7	7.43	450	16	CLOUDY, ODOR
MW-7	7	7.29	400	16	CLOUDY, ODOR
MW-8	2	NA	NA	NA	CLOUDY, DARK GREY, PSH SHEEN, ODOR
MW-9	5	NA	NA	NA	CLOUDY, DARK GREY, PSH SHEEN, ODOR
VP-3	3	NA	NA	NA	CLOUDY, DARK GREY, PSH SHEEN, ODOR
VP-4	3	NA	NA	NA	CLOUDY, DARK GREY, PSH SHEEN, ODOR
VP-5	3	NA	NA	NA	CLOUDY, DARK GREY, PSH SHEEN, ODOR



Southwest Region 20000 / 300 Mariner Drive Torrance, CA 90503 (310) 371-1044 (800) 727-GTEL Fax (310) 371-8720 GTEL Client Number: 023352875.051043

Project I.D.: NMED/800 Bridge

SW/ALBQ NM

Work Order Number: T302127

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GTI, NM

February 25, 1993

Ms. Teresa Bennett Groundwater Technology, Inc. 2501 Yale Blvd. SE, Suite 204 Albuquerque, NM 87106

Dear Ms. Bennett,

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 2-1-93 under chain-of-custody record 76-6831.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the state of California under Certification #E723.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Minsoon Song Laboratory Director

GTEL Client Number: 023352875.051043 Project I.D.: NMED/800 Bridge SW/ALBQ NM

Work Order Number: T302127

#### **ANALYTICAL RESULTS**

GTEL S	Sample Number	02127-1	02127-2	02127-3	02127-4
Clie	ent Identification	PW-153	PW-152	PW-140	MW-1
-	Date Sampled	2-10-93	2-10-93	2-10-93	2-10-93
	Date Analyzed	2-16-93	2-16-93	2-16-93	2-16-93
Analyte	Reporting Limit, ug/L		Concentra	ation, ug/L	
Benzene	0.3	<0.3	<0.3	<0.3	<0.3
Toluene	0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene	0.3	<0.3	<0.3	<0.3	<0.3
Xylene, total	0.6	<0.6	<0.6	<0.6	<0.6
BTEX, total					
TPH as Gasoline	100	<100	<100	<100	290
Dilution Multiplier <sup>b</sup>		1	1	1	1

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures.



Indicates the adjustments made for sample dilution.

GTEL Client Number: 023352875.051043 Project I.D.: NMED/800 Bridge SW/ALBQ NM

Work Order Number: T302127

#### **ANALYTICAL RESULTS**

Gì	EL Sample Number	02127-5	02127-6	02127-7	02127-8
	Client Identification	MW-2	MW-3	MW-4	MW-5
	Date Sampled	2-10-93	2-10-93	2-10-93	2-10-93
	Date Analyzed	2-17-93	2-16-93	2-13-93	2-16-93
Analyte	Reporting Limit, ug/L		Concentr	ation, ug/L	
Benzene	0.3	4.6	<0.3	280	<0.3
Toluene	0.3	1.4	<0.3	21	<0.3
Ethylbenzene	0.3	0.9	<0.3	530	<0.3
Xylene, total	0.6	<0.6	<0.6	1300	<0.6
BTEX, total		6.9		2100	
TPH as Gasoline	100	<100	<100	12000	<100
Dilution Multiplier <sup>b</sup>	-	· 1	1	1	1

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures.



Indicates the adjustments made for sample dilution.

GTEL Client Number: 023352875.051043 Project I.D.: NMED/800 Bridge SW/ALBQ NM

Work Order Number: T302127

#### **ANALYTICAL RESULTS**

GTEL	Sample Number	02127-9	02127-10	02127-12	
Clic	ent Identification	MW-6	MW-7	MW-9	
	Date Sampled	2-10-93	2-10-93	2-10-93	
	Date Analyzed	2-16-93	2-16-93	2-13-93	
Analyte	Reporting Limit, ug/L		Concentra	ation, ug/L	
Benzene	0.3	<0.3	51	74	
Toluene	0.3	<0.3	6.6	15	
Ethylbenzene	0.3	8.0	4.7	52	
Xylene, total	0.6	3.1	2.3	160	
BTEX, total		3.9	65	300	
TPH as Gasoline	100	<100	580	210	
Dilution Multiplier <sup>b</sup>		1	1	1	

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures.



Indicates the adjustments made for sample dilution.

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SENDER'S COPY GROUNDHATTERS TECHNOLOGY INC 2501 YAVE HAVO SE STE 204

DEOP OFF YOUR PACKAGE AND SAVE SENDER'S COPY



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APR 3 0 1993

GTI, NM

GTEL Client Number: 023352875.050309 Project I.D.: Bridge/ALBQ NM

Work Order Number: T304148

Southwest Region

20000 / 300 Mariner Drive Torrance, CA 90503 (310) 371-1044 (800) 727-GTEL Fax (310) 371-8720

April 28, 1993

Ms. Terry Bennett Groundwater Technology, Inc. 2501 Yale Blvd. S.E., Suite 204 Albuquerque, NM 87106

Dear Ms. Bennett,

Enclosed please find the analytical results for the samples received by GTEL Environmentel Laboratories, Inc. on 4-15-93 under chain-of-custody record 76-6842.

A formal Quality Assurance/Quality Control (QA/QC) program, which is designed to meet or exceed the EPA requirements, is maintained by GTEL. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the following; the State of California under Certification #1123, the State of Arizona under Certification #AZ0357, the State of Kansas under Certification E-182 and the State of Washington under Certification #C060.

If you have any questions concerning this analysis or if we can be of further assistance, please call one of our Customer Service Representatives.

Sincerely,

GTEL Environmental Laboratories, Inc.

Jøan Greenwood

Laboratory Director

GTEL Client Number: 023352875.050309 Project I.D.: Bridge/ALBQ NM Work Order Number: T304148

#### **ANALYTICAL RESULTS**

GTEL S	Sample Number	04148-7	04148-8		
Clie	ent Identification	VP-7	VP-6		
	Date Sampled	4-12-93	4-12-93		
	Date Analyzed	4-17-93	4-17-93		
Analyte	Reporting Limit, ug/L		Concentra	ation, ug/L	
Benzene	0.3	100	18		
Toluene	0.3	9.0	7.0		
Ethylbenzene	0.3	98	9.5		
Xylene, total	0.6	29	14		
BTEX, total	-	240	48		
TPH as Gasoline	100	16000	4000		
Dilution Multiplier <sup>b</sup>		1	1		
TFT surrogate <sup>C</sup> , % recovery		96.1	117		

- Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Modification for TPH as gasoline a. as per California State Water Resources Board LUFT Manual procedures.
- Indicates the adjustments made for sample dilution. b.
- TFT surrogate recovery acceptability limits of 72.8-123% are derived from the 99% confidence interval of all samples during the previous quarter. Expected surrogate value is 100 ug/L.



NP-5-8, VP-7-8 Sample ID of these samples. l attest that the proper field sampling procedures were used during the collection 10-3-8 1p-6-8 Address: \*\* / Lov/fuctor 0 Project Number. Project Manager. Field FAX 🗆 QAYQC SEVEN DAY ONCY
OTHER であるか、つれから、 24 HOURS OTHER Standard GAXS and01140 Sample Source となり SPECIAL HANDLING \* CLP Level 3 (#) BUSINESS DAYS Lab# GTEL Lab use 20000 Mariner Dr., Suite #300 Torrance, CA 90503 747 Blue Level 1 1 # CONTAINERS WATER SOIL Matrix AIR Such SLUDGE OTHER Stuck Side Sampler Name (Print): Site location: FAX#: S Phone #: Project Name: ルル: HCI ירינה ישמי Preserved SPECIAL REPORTING REQUIREMENTS HNO (Specify) SPECIAL DETECTION LIMITS (Specify) Method H<sub>2</sub>SO<sub>4</sub> ICE NONE خ. 213-371-1044 800-727-GTEL 7 OTHER 4/14/4 13 /020 Sampling 01:07:3 DATE ζ. Σ 060 正必 13.6 1500 1510 TIME BTEX 602 0 8020 with MTBE 0
BTEXTPH Gas. 602/8015 0 8020/8015 0 MTBE 0 AND ANALYSIS REQUEST CHAIN-OF-CUSTODY RECORD TPH as Gas Diesel Det Fuel Product I.D. by GC (SIMDIS) [] Total Petroleum Hydrocarbons: 418.1 503E □ REMARKS: Lot #: Lab Use Only EPA 601 D 8010 D DCA only ANALYSIS REQUEST END EX No. 6343767356 EPA 602 

8020 EPA 608 D 8080 D PCBs only [] SUIGHT SHEEN EPA 610 D 8310 D EPA 624 D 8240 D NBS +15 🗆 EPA 625 🗆 8270 🗆 NBS +25 D Work Order #: Storage Location EPTOX: Metals D Pesticides D Herbicides D ス Semi VOA TCLP Metals D VOA D EPA Priority Pollutant Metals တု LEAD 7420 0 7421 0 239.2 0 6010 0 Org. Lead 0 CAM Metals D STLC O TTLC ത Corrosivity Flashpoint Reactivity [  $\infty$ 4 N Date Relinquished by Sampler. Time **CUSTODY RECORD** Regeived by 18-00 Relinquished by: Date Time Received by: Relinquished by: Date Time Received by Laboratory: Way bill #

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Southwest Region 20000 / 300 Mariner Drive Torrance, CA 90503 (310) 371-1044 (800) 727-GTEL Fax (310) 371-8720 GTEL Client Number: 023352875.051043

Project I.D.: NMED

800 Bridge SW

Albq, NM

Work Order Number: T306201

BECEIVED

JUL - 5 1993

GTI, NM

July 1, 1993

Ms. Terry Bennett Groundwater Technology, Inc. 2501 Yale Blvd., Suite 204 Albuquerque, NM 87106

Dear Ms. Bennett,

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 6-17-93 under chain-of-custody record 76-6848 and 76-6884.

A formal Quality Assurance/Quality Control (QA/QC) program, which is designed to meet or exceed the EPA requirements, is maintained by GTEL. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the following; the State of California under Certification #1123, the State of Arizona under Certification #AZ0357, the State of Kansas under Certification E-182 and the State of Washington under Certification #C060.

If you have any questions concerning this analysis or if we can be of further assistance, please call one of our Customer Service Representatives.

Sincerely,

GTEL Environmental Laboratories, Inc.

Joan Greenwood Laboratory Director

GTEL Client Number: 023352875.051043

Project I.D.: NMED 800 Bridge SW Albq, NM Work Order Number: T306201

### **ANALYTICAL RESULTS**

GTEL S	Sample Number	06201-1	06201-2	06201-3	06201-4
Clie	ent Identification	MW-1	MW-2	PW-152	MW-3
	Date Sampled	6-16-93	6-16-93	6-16-93	6-16-93
	Date Analyzed	6-26-93	6-26-93	6-26-93	6-24-93
Analyte	Reporting Limit, ug/L		Concentra	ation, ug/L	
Benzene	0.3	<0.3	<0.3	<0.3	110
Toluene	0.3	1.8	<0.3	<0.3	0.6
Ethylbenzene	0.3	1.0	<0.3	<0.3	9.1
Xylene, total	0.6	1.3	<0.6	<0.6	1.5
BTEX, total		4.1		••	120
TPH as Gasoline	100	580	<100	<100	540
Dilution Multiplier <sup>b</sup>		1	1	1	1

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 1, US EPA November 1990. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures.



b. Indicates the adjustments made for sample dilution.

GTEL Client Number: 023352875.051043 Project I.D.: NMED

800 Bridge SW Albq, NM Work Order Number: T306201

#### **ANALYTICAL RESULTS**

	GTEL Sample Number	06201-5	06201-6	06201-7	06201-8
	Client Identification	PW-140	PW-153	MW-5	MW-6
	Date Sampled	6-16-93	6-16-93	6-16-93	6-16-93
	Date Analyzed	6-24-93	6-24-93	6-24-93	6-24-93
Analyte	Reporting Limit, ug/L		Concentra	ation, ug/L	
Benzene	0.3	<0.3	<0.3	<0.3	<0.3
Toluene	0.3	<0.3	<0.3	<0.3	46
Ethylbenzene	0.3	<0.3	<0.3	<0.3	35
Xylene, total	0.6	<0.6	<0.6	<0.6	110
BTEX, total					190
TPH as Gasoline	100	<100	<100	<100	1300
Dilution Multiplier <sup>b</sup>		1	1	1	1

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 1, US EPA November 1990. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures.



b. Indicates the adjustments made for sample dilution.

GTEL Client Number: 023352875.051043

Project I.D.: NMED 800 Bridge SW Albq, NM Work Order Number: T306201

## **ANALYTICAL RESULTS**

GTEL S	Sample Number	06201-9	06201-10	06201-11	06201-12
Clie	ent Identification	MW-7	MW-4	MW-8	MW-9
	Date Sampled	6-16-93	6-16-93	6-16-93	6-16-93
	Date Analyzed	6-24-93	6-24-93	6-29-93	6-30-93
Analyte	Reporting Limit, ug/L		Concentra	ation, ug/L	
Benzene	0.3	<0.3	280	670	140
Toluene	0.3	3.5	16	100	78
Ethylbenzene	0.3	6.1	260	1200	280
Xylene, total	0.6	11	710	2000	1100
BTEX, total		21	1300	4000	1600
TPH as Gasoline	100	2700	9600	25000	8000
Dilution Multiplier <sup>b</sup>		1	5	25	25

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 1, US EPA November 1990. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures.



Indicates the adjustments made for sample dilution. b.

GTEL Client Number: 023352875.051043

Project I.D.: NMED

800 Bridge SW

Albq, NM Work Order Number: T306201

#### **ANALYTICAL RESULTS**

GTEL	Sample Number	06201-13	06201-14	06201-15	
Cli	ent Identification	VP-5	VP-4	VP-3	
	Date Sampled	6-16-93	6-16-93	6-16-93	
	Date Analyzed	6-30-93	6-30-93	6-29-93	
Analyte	Reporting Limit, ug/L		Concentra	ation, ug/L	_
Benzene	0.3	82	220	110	
Toluene	0.3	9.8	28	7.3	
Ethylbenzene	0.3	1700	320	180	
Xylene, total	0.6	1400	360	74	
BTEX, total		3200	930	370	
TPH as Gasoline	100	24000	15000	10000	
Dilution Multiplier <sup>b</sup>		25	25	25	

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 1, US EPA November 1990. Modification for TPH as gasoline as per California State Water Resources Board LUFT Manual procedures.



Indicates the adjustments made for sample dilution. b.

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### APPENDIX F

**SVES MONITORING AND MAINTENANCE LOGS** 

400mm/2000 5F

NMED/Barclas disk 2 1&2Qtr93.rpt





### ORS Environmental Equipment 32 Mill Street Greenville, New Hampshire 03048

Phone:

603-878-2500

Fax: 603-878-3866

Date: July 6, 1993

800-228-2310

FAX COVER SHEET

TO:

NAME

Chuck Briscoe

COMPANY

Groundwater Technology, Inc. ADDRESS 2501 Yale Blvd. S.E. Suite 204

Albuquerque, NM 87106

PHONE

(505) 242-3113

FAX #

(505) 242-1103

FROM:

NICK ALINO, Regional Technical Service Manager

NUMBER OF PAGES INCLUDING THIS COVER SHEET: 3

SUBJECT:

Summary Of 500 CFM Thermoscavenger Start-up Visit To Bridge Street Site

Tuesday June 29, 1993, I arrived on site to complete shipping damage repairs and to start-up a 500 CFM Thermoscavenger incinerator unit. I inspected the unit and found that the rubber isolation coupling between the Paxton soil vent blower and the steel influent piping to the incinerator box was crushed. Also a pressure switch air line was missing and the MSA LEL influent line was disconnected. The actual damage to the unit was minimal and caused by lack of support on the steel influent line on the unit. I observed the Paxton blower had no vibration foot mounts. The motorized valve actuators were not air purged along with the control panel. I attemped to operate the unit, but found the control panel timers were all set at maximum which is incorrect for burner ignition. My list of part requirements was made and C. Briscoe arrived on site from El Paso. We went to Rogers plumbing supply for piping supplies. Upon return to the site we mounted the purge compressor to the power pole.

6/30/93:4 completed the purge compressor installation and installed all of the associated nylon tubing from the compressor to the control cabinet. The actuators were plumbed for purging with tubing from the control cabinet. The pressure switch interlock on the sparge blower was installed and tested. I set the control panel timers to 10 seconds for the pilot, 3 minutes for the purge and 3 minutes for the panel. These timers must be set in this configuration for the burner to have time to ignite. I searched all over Albuquerque to find the replacement coupling on the Paxton blower and found the turbo hose at Sandia Fleet Supply on Girard. This task took most of the afternoon. I operated the incinerator and found the Honeywell LEL modulating/block and purge valve was not operating correctly. I found the valve to be functional, but parameters in the chart recorder PID controller were incorrect preventing the valve to function as designed.

7/1232 I studied the program menu and eventually figured out which parameters had to be changed. Once this was accomplished, the unit and all of the motorized valves operated correctly. C. Briscoe and I installed rubber pads under the Paxton blower to dampen vibration. I operated the unit with soil vapors and made the unit go into high temperature limit alarm to check all safety features.

7.993. I installed a new safety relief valve and C. Briscoe plumbed the exit piping of the sparge blower tank to the intake muffler of the pump. I modified exhaust fittings on the purge compressor to reduce back pressure and heat build up. Training was conducted on the unit and I had C. Briscoe start and stop the unit. Soil vapor concentration was measured at 52% LEL and process temperature was approximately 1550 F with the process high set point at 1600 F and the stack high limit at 1600 F.

#### THERMOSCAVENGER START UP PROCEDURE

- 1. Open all gas valves.
- Turn power disconnect switch to "on".
- 3. Flip "on/off" switch to "on".
- 4. Pull combustion blower button.
- 5. Pull process blower (soil vent) button.
- 6. Walt for purging light (amber) to illuminate and go out, then green purge light to illuminate.
- 7. Pull blue Ignition button and blue light will illuminate.
- 8. Make sure all vent well valves are closed and manual dilution air valve is open.
- 9. Reduce air flow on actuator dilution intake until unit reaches 1380 F valve closure set point. Manually close down valve or too much dilution air will cool down unit.
- 10. Once unit achieves process set point of 1410 F, go into chart recorder PID controller and press "lower display" button and scroll to the lower read out which displays "SP". This is the modulating set point. The set point at start-up is set at 1 for the actuator to operate as a block and purge valve. Set this display to 50 to modulate 50% LEL. The display must be set back to 1 if the unit is shut down automatically or manually to restart. All other program set points in the PID must not be changed.
- 11. Open the vent well valves slowly to prevent high limit shut down. Eventually all four valves can be opened completely and the manual dilution valve can be slowly closed to achieve 50% LEL or approximately 1550 F process temperature.
- 12. To shut down the unit, reverse the start-up procedure, but do not shut off the combustion and process blowers until the process temperature is at least 200 300 F.

ORS Environmental Equipment would like to thank you for the opportunity to provide this rental unit and

service. If there are any questions please contact me at 800-228-2310.

Best Regards,

Nick Alino

Chris McHale File cc:

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AUG 0 5 -1993

4 Mill Street, Green HM NH 03048 (603) 878-2500 (800) 228-2310 Fax: (603) 878-3866

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## **SITE VISITATION REPORT**

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	TECHNICIAN: GTEG FILL	DATE: $\frac{\eta/27/93}{93} = \frac{\eta/23/93}{93}$
	CLIENT: GT ALBUQUE FOUT	ARRIVAL TIME:
	CONTACT ON SITE: TEERY BENINETT	DEPARTURE TIME:
<del></del> 1	CONTACT ON SITE: TETRY BENINETT  SITE LOCATION: BARELLAS SITE	
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nii) Silq	PURPOSE OF VISIT: DETERMINIE CAUSE OF TEMP. FL PAIR AUTO ADDITIONAL SERVICE(S) REQUESTED:	System NOT MAILITAIN DILUTION SYSTEM
<b>=</b>	DESCRIPTION OF SERVICES PERFORMED AND PARTS USED: ATT	TIVED ON' SITE WITH
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لمر	IT WAS VETY SLOW IN PEACH	INIG TEMP. GAS PIESSU
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i Del	5 CLOSED (ON GASTEAINI), TH	LE VALUE WAS STILL
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, <u>,</u>	POEDSING CONVINIENTS:	V >= 2111 S=0275
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PROJECT \_\_\_\_\_

SUBJECT	DATE
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ENGINEER NAME	REVIEWED BY:
STAET UP PROCEDULE	
1. WITH ALL WELLS	MANUAL DILUTION 15 FULLY
3. OPEN	MARIGAC BILLY (BR. 13 FOLLY)
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3. CLOSE MANUAL DI	LUTION VALUE.
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AFTER A PERI	DID OF TEME, UNIT DOES
NOT RETURN TO	D THE SP, INICEEASE THE
COMBUSTION'	TO ALLOW FOR COOLING.

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#### **APPENDIX G**

AIR SAMPLE CERTIFICATES OF ANALYSIS, CHAIN-OF-CUSTODY DOCUMENTATION, AND QA/QC DATA, JULY 13,1993

NMED/Barclas disk 2 1&2Qtr93.rpt

GROUNDWATER
TECHNOLOGY



San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA • Goleta, CA Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

SoCal Division (Camarillo Laboratory)
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353

FAX (805)389-1438

CLIENT: Terry Bennett

Groundwater Technology

2501 Yale Boulevard SE, Suite 204

Albuquerque, NM 87106

Lab Number : CJ-3094-1

Project

: 023352875.050309,NMED/800

Bridge/ALBQ, NM

Analyzed : 07/14/93

Analyzed by: YL Method : GC/TCD

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	11 , - <sub>12</sub>	MATRIX		SAMPLED BY	SAMP	LED DATE	RECEIVED
Influent		Air	1.5		07	/13/93	07/14/93
CONSTITUENT	9			(CAS RN)	*PQL PERCENT	RESULT PERCENT	
FIXED GASES AND METHANE					Te el	. 15	
Carbon Dioxide				(124389)	0.1	3.4	
Oxygen				(7782447)	0.01	19.	
Nitrogen				(7727379)	0.02	77.	
Methane				(74828)	0.005	0.3	
Carbon Monoxide				(630080)	0.1	ND	

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018' \*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

07/15/93 TCD/07149303 LRH/ge JG14TA

Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Laurence R. Hilpert, Ph.D.



San Luis Obispo, CA • Benicia, CA • Camarillo, CA • San Jose, CA • Goleta, CA Anaheim, CA • Tempe, AZ • Valparaiso, IN • Westbrook, ME • Indianapolis, IN

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CLIENT: Terry Bennett

Groundwater Technology

2501 Yale Boulevard SE, Suite 204

Albuquerque, NM 87106

Lab Number : CJ-3094-1

Project

: 023352875.050309,NMED/800

Bridge/ALBQ, NM

Analyzed

: 07/14/93

Analyzed by: YL

Method

: EPA TO-14

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	1.17%	SAMPLED BY	SP	MPLED DATE	RECEIVED
Influent	Air				07/13/93	07/14/93
CONSTITUENT			*PQL	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR					Charles 13	1
Benzene			20.	8800.	28000.	
Toluene			20.	980.	3700.	
Ethylbenzene			20.	6500.	28000.	
Xylenes			20.	11000.	49000.	
Ethylene Dichloride			20.	ND	ND	
Ethylene Dibromide			10.	ND	ND	
Total Fuel (non-methane hydrocarbon	ns)		1000.	4000000.	14000000	

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #101 \*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit) (1) Concentrations in ug/cu M reported at 760 mm Hg pressure and 298 deg. K.

07/15/93 MS2/2E23E LRH/ge MS2

Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.



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CLIENT: Terry Bennett

Groundwater Technology

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Lab Number : CJ-3094-2

Project

: 023352875.050309,NMED/800

Bridge/ALBQ, NM

Analyzed : 07/14/93

Analyzed by: YL

Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	1 1	MATRIX	SAMPLED B	y san	IPLED DATE	RECEIVED
Effluent		Air		C	7/13/93	07/14/93
CONSTITUENT	711		*PQL	RESULT ppbv	RESULT µg/cu M	NOTE
FUEL FINGERPRINT in AIR						1
Benzene			20.	ND	ND	
Toluene			20.	50.	180.	
Ethylbenzene			20.	ND	ND	
Xylenes			20.	60.	250.	
Ethylene Dichloride			20.	ND	ND	
Ethylene Dibromide			10.	ND	ND	
Total Fuel (non-methane	hydrocarbo	ns)	1000.	13000.	47000	

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018 \*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Concentrations in ug/cu M reported at 760 mm Hg pressure and 298 deg. K.

07/15/93 MS2/2E22E LRH/ge MS2

Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.



CLIENT: Terry Bennett

Groundwater Technology

Albuquerque, NM 87106

2501 Yale Boulevard SE, Suite 204

#### Air, Water & Hazardous Waste Sampling, Analysis & Consultation Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

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QC Batch ID: JG14TA CJ-3094-1

Project

: 023352875.050309,NMED/800

Bridge/ALBQ, NM

Analyzed : 07/14/93

Analyzed by: YL

Method

: GC/TCD

QC DUPLICATE

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION			MATRIX	SAMPLE	D BY	SAMPLED	DATE	RECEIVED
Influent			Air			07/13	/93	07/14/93
CONSTITUENT	12,537 14,537	a Th		(CAS RN)	*PQL PERCENT	RESULT PERCENT	%DIFF	NOTE
FIXED GASES AND MET	HANE					E.7 pu		7.71
Carbon Dioxide				(124389)	0.1	3.2	6.1	
Oxygen				(7782447)	0.01	19.	0.	
Nitrogen				(7727379)	0.02	77.	0.	
Methane				(74828)	0.005	0.4	29.	
Carbon Monoxide				(630080)	0.1	ND		

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018 \*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

07/15/93 TCD/07149304 LRH/ge CJ3094-1

Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D.

bearence R. Hilpert, Ph.D.



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FAX (805)389-1438

QC Batch ID: JG14TA

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 07/14/93

Analyzed by: YL

Method

: GC/TCD

QC SPIKE

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

	MATRIX	SAMPLED BY	<i>(</i>	SAMPLED DA	TE RECE	IVED
in the latest terms of the	Air					
N.Pay	199	*PQL PERCENT	SPIKE AMOUNT	RESULT PERCENT	%REC	NOTE
. 1777	7				5/150	
		0.1	15.	15.	100.	
		0.01	7.1	7.1	100.	
		0.02	66.	66.	100.	
		0.005	4.6	4.5	98.	
		0.1	7.1	7.	99.	
		Air	Air  *PQL PERCENT  0.1 0.01 0.02 0.005 0.1	*PQL SPIKE PERCENT AMOUNT  0.1 15. 0.01 7.1 0.02 66. 0.005 4.6 0.1 7.1	*PQL SPIKE RESULT PERCENT AMOUNT PERCENT  0.1 15. 15. 0.01 7.1 7.1 0.02 66. 66. 0.005 4.6 4.5	*PQL SPIKE RESULT %REC PERCENT AMOUNT PERCENT  0.1 15. 15. 100. 0.01 7.1 7.1 100. 0.02 66. 66. 100. 0.005 4.6 4.5 98. 0.1 7.1 7. 99.

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018 \*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

07/15/93 TCD/07149306 LRH/ge CJ3094-1

Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Group Leader

awrence R. Hilpert, Ph.D.



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CLIENT: Terry Bennett

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QC Batch ID: MS2 CJ-3094-1

Project

: 023352875.050309, NMED/800

Bridge/ALBQ, NM

Analyzed

: 07/14/93

Analyzed by: YL

Method : EPA TO-14

OC DUPLICATE

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAM	PLED BY	SAMPLED	DATE R	ECEIVED
Influent	Air		2-11-	07/13	/93 0	7/14/93
CONSTITUENT		*PQL	RESULT ppbv	RESULT µg/cu M	%DIFF	NOTE
FUEL FINGERPRINT in AIR						1
Benzene		20.	8200.	26000.	7.4	
Toluene		20.	930.	3500.	5.6	
Ethylbenzene		20.	6000.	26000.	7.4	
Xylenes		20.	11000.	46000.	6.3	
Ethylene Dichloride		20.	ND	ND		
Ethylene Dibromide		10.	ND	ND		*
Total Fuel (non-methane hydrocar	rbons)	1000.	3700000.	13000000	7.4	

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #101 \*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit) (1) Concentrations in ug/cu M reported at 760 mm Hg pressure and 298 deg. K.

07/15/93 MS2/2E24E LRH/ge CJ3094-1

Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Laurence R. Hilpert, Ph.D.



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CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed: 0

: 07/14/93

Analyzed by: YL Method : EPA

: EPA TO-14

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REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAM	PLED DATE	RECEIVED
INSTRUMENT BLANK	Air	2.00			The by
CONSTITUENT		(CAS RN)	*PQL μg/cu M	RESULT μg/cu M	NOTE
FUEL FINGERPRINT in AIR				3 - 5 6	1
Benzene		(71432)	50.	ND	
Toluene		(108883)	100.	ND	
Ethylbenzene		(100411)	100.	ND	
Xylenes			100.	ND	
Ethylene Dichloride		(107062)	100.	ND	
Ethylene Dibromide		(106934)	100.	ND	
Total Fuel (non-methane hydrocarbons	)		4000.	ND	

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; AZLA #0136-01; L.A.Co.CSD #1018' \*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Concentrations in ug/cu M reported at 760 mm Hg pressure and 298 deg. K.

07/15/93 MS2/2E21E LRH/ge CJ9307-14 Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.



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SoCal Division (Camarillo Laboratory)
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FAX (805)389-1438

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 07/14/93

Analyzed by: YL

Method : EPA TO-14

QC SPIKE

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

SAMPLE DESCRIPTION	1-2	MATRIX	SAMPLED B	Y	SAMPLED DAT	TE RECE	IVED
QC SPIKE		Air				e e	
CONSTITUENT			*PQL μg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
FUEL FINGERPRINT in AIR							1
Benzene			50.	7100.	5600.	79.	
Toluene			100.	28000.	21000.	75.	
Ethylbenzene			100.	3200.	2500.	78.	
Xylenes			100.	19000.	15000.	79.	
Ethylene Dichloride			100.	5500.	4400.	80.	
Ethylene Dibromide			100.	4100.	3100.	76.	
Total Fuel (non-methane	hydrocarbons)		4000.	230000.	200000	87.	

Lab Certifications: CAELAP #1783 & #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018/
\*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Concentrations in ug/cu M reported at 760 mm Hg pressure and 298 deg. K.

07/15/93 MS2/2E26E LRH/ge CJ9307-14 Respectfully submitted,

COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D. Group Leader

Laurence R. Hilpert, Ph.D.

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#### **APPENDIX H**

## AIR EMISSIONS AND HYDROCARBON MASS BALANCE CALCULATIONS

NMED/Barclas disk 2 1&2Qtr93.rpt



## AIR QUALITY PERMIT #310 SUMMARY OF SVES EFFLUENT EMISSIONS CALCULATIONS NMED/USTB BARELAS BRIDGE GWPA SITE 800 BRIDGE BOULEVARD, S.W., ALBUQUERQUE, NEW MEXICO JULY 13, 1993

Air sample influent and effluent analytical data were used to calculate maximum extraction and emission rates, respectively, for the SVES (analytical data attached).

$$M = Q \times C \times \frac{28.32 \ L}{R^3} \times \frac{10}{454 \times 10^8 \mu g} \times \frac{60 \text{min}}{hr}$$

Where:

M = Extraction or emission rate (lb/hr)

Q = Volumetric flow rate under standard temperature and pressure conditions (scfm)

C = Vapor concentration ( $\mu$ g/L) (1 mg/m<sup>3</sup> = 1  $\mu$ g/L)

and the final three terms are conversion factors

The total influent gas flow rate is assumed to be the maximum of 500 scfm.

The effluent flow rate is estimated to be the sum of the influent flow and combustion air flow. Combustion air flow is estimated at 150 scfm based on information from the manufacturer. Thus, the total maximum effluent flow is estimated to be 650 scfm.

# AIR QUALITY PERMIT #310 SUMMARY OF SVES EFFLUENT EMISSIONS CALCULATIONS NMED/USTB BARELAS BRIDGE GWPA SITE 800 BRIDGE BOULEVARD, S.W., ALBUQUERQUE, NEW MEXICO JULY 13, 1993 (cont.)

#### I. SVES Influent and Effluent Rate Calculations

Extraction rates in pounds per hour (lb/hr) were calculated in the following manner:

- A. <u>Total Fuel (non-methane hydrocarbons) Calculations</u>
  - 1. Sample INF (07/13/93)

(500 scfm) x (14,000 
$$\mu$$
g/L) x 3.74 x 10<sup>-\infty</sup>  $\frac{L-lb-min}{ft^3-\mu g-hr}$ 

- = 26.2 lb/hr Total Fuel
- 2. Sample EFF (07/13/93)

(650 scfm) x (47 
$$\mu g/L$$
) x 3.74 x 10<sup>-\infty</sup>  $\frac{L-lb-min}{ft^3-\mu g-hr}$ 

- = 0.114 lb/hr Total Fuel
- 3. Destruction Efficiency

$$\frac{(26.2 - 0.114)}{26.2}$$
 x 100

= 99.6 %

- B. <u>Benzene Calculations</u>
  - 1. Sample INF (07/13/93)

(500 scfm) x (28.0 
$$\mu g/L$$
) x 3.74 x 10<sup>-\infty</sup>  $\frac{L-lb-min}{ft^3-\mu g-hr}$ 

= 0.052 lb/hr Benzene

NMED/Barelas disk 2 1&2Qtr93.rpt



# AIR QUALITY PERMIT #310 SUMMARY OF SVES EFFLUENT EMISSIONS CALCULATIONS NMED/USTB BARELAS BRIDGE GWPA SITE 800 BRIDGE BOULEVARD, S.W., ALBUQUERQUE, NEW MEXICO JULY 13, 1993 (cont.)

- B. <u>Benzene Calculations (cont.)</u>
  - 2. Sample EFF (07/13/93)

(650 scfm) 
$$x (\le .064 \mu g/L) \times 3.74 \times 10^{-00} \frac{L-lb-min}{ft^3-\mu g-hr}$$

- = <0.00016 lb/hr Benzene
- 3. Destruction Efficiency

$$\frac{(0.052 - \le 0.00016)}{0.052} \times 100$$

= >99.7 %

- C. <u>Xylenes Calculations</u>
  - 1. Sample INF (07/13/93)

(500 scfm) x (49 
$$\mu$$
g/L) x 3.74 x 10<sup>-\infty</sup>  $\frac{L-lb-min}{tt^3-\mu g-hr}$ 

- = 0.092 lb/hr Xylenes
- 2. Sample EFF (07/13/93)

(650 scfm) x (0.25 
$$\mu g/L$$
) x 3.74 x 10<sup>-\infty</sup>  $\frac{L-lb-min}{ft^3-\mu g-hr}$ 

= 0.00061 lb/hr Xylenes

# AIR QUALITY PERMIT #310 SUMMARY OF SVES EFFLUENT EMISSIONS CALCULATIONS NMED/USTB BARELAS BRIDGE GWPA SITE 800 BRIDGE BOULEVARD, S.W., ALBUQUERQUE, NEW MEXICO JULY 13, 1993 (cont.)

- C. Xylenes Calculations (cont.)
  - 3. Destruction Efficiency

$$\frac{(0.092-0.00061)}{0.092}$$
 x 100

= 99.3 %

- D. <u>Toluene Calculations</u>
  - 1. Sample INF (07/13/93)

(500 scfm) x (3.7 
$$\mu$$
g/L) x 3.74 x 10<sup>-30</sup>  $\frac{L-lb-min}{ft^3-\mu g-hr}$ 

- = 0.0069 lb/hr Toluene
- 2. Sample EFF (07/13/93)

(650 scfm) x (0.18 
$$\mu g/L$$
) x 3.74 x 10<sup>-\infty</sup>  $\frac{L-lb-min}{ft^3-\mu g-hr}$ 

- = 0.00044 lb/hr Toluene
- 3. Destruction Efficiency

= 93.6 %

#### SOIL VAPOR EXTRACTION SYSTEM MASS BALANCE CALCULATIONS

#### A. Dissolved-Phase Hydrocarbons Mass Balance Calculations

The following assumptions were made for the mass balance calculations:

- 1. Porosity of saturated zone is 0.30;
- 2. The total area of hydrocarbons with dissolved TPH-as-gasoline concentrations is divided into 3 parts at the site:
  - Area 1 is 12,000 ft<sup>2</sup>
  - Area 2 (A+B) is 6,060 ft2
  - Area 3 is 2,025 ft<sup>2</sup>
- 3. The average concentration of TPH-as-gasoline in the saturated zone is calculated using groundwater sample analyses for February and June 1993. The average concentration for each area is calculated by averaging TPH-as-gasoline (TPHG) concentrations of all wells sampled within each area. The average concentrations for Areas 1, 2, and 3, are thus 16 mg/l (VP-4, VP-3, MW-8, MW-4, VP-1, and MW-9), 15 mg/l (VP-5, VP-6, and VP-7), and 17 mg/l (VP-2; VP-2 not sampled so average of adjacent wells VP-3, MW-8, and VP-1 used);
- 4. Thickness of aquifer assumed to be impacted by dissolved hydrocarbons is 10 feet.
- 5. The following conversion factors were used: 7.48 gallons = one cubic foot; 1,000 liters = 261.8 gallons; and 2.2 pounds = 10<sup>6</sup> milligrams.

#### Calculations:

I. Area 1

Hydrocarbon mass present in the dissolved state =  $12,000 \text{ ft}^2 \times 10 \text{ ft} \times 0.3 \times 7.48 \text{ gal/ft}^3 \times 1,000 \text{ l/261.8 gal} \times 2.2 \text{ lb/}10^6 \text{ mg} \times 16 \text{ mg/l} = 36 \text{ lbs. TPHG}$ 

II. Area 2

Hydrocarbon mass present in the dissolved state =  $6,060 \text{ ft}^2 \times 10 \text{ ft} \times 0.3 \times 7.48 \text{ gal/ft}^3 \times 1,000 \text{ l/261.8 gal} \times 2.2 \text{ lb/}10^6 \text{ mg} \times 15 \text{ mg/l} = 17 \text{ lbs. TPHG}$ 

III. Area 3

Hydrocarbon mass present in the dissolved state =  $2,025 \text{ ft}^2 \times 10 \text{ ft} \times 0.3 \times 7.48 \text{ gal/ft}^3 \times 1,000 \text{ l/261.8 gal} \times 2.2 \text{ lb/10}^6 \text{ mg} \times 17 \text{ mg/l} = 6 \text{ lbs. TPHG}$ 

Total Dissolved Hydrocarbon Mass (Areas 1 + Area 2 + Area 3) = 59 lbs. TPHG



#### B. Adsorbed-Phase Hydrocarbons Mass Calculations

Based on the site assessments previously conducted at the site, the following assumptions were made to estimate the hydrocarbon mass present in the soils beneath the site:

- 1. The density of soils is 100 lbs/ft<sup>3</sup>;
- 2. The total area of hydrocarbons containing volatile hydrocarbon concentrations is divided into 3 parts at the site:
  - Area 1 is 12,000 ft2
  - Area 2B is 2,700 ft<sup>2</sup> (Area 2A had non-detectable TPH-as-gas concentrations)
  - Area 3 is 2,025 ft2
- 3. The average concentration of volatile hydrocarbons in the soil for each area is calculated by averaging or taking the highest TPHg concentrations for soil samples collected during installation of all wells within each area. The concentrations for Areas 1, 2, and 3, are thus 546 mg/kg (VP-4, VP-3, AH-4, MW-8, PR-3, VP-1, and MW-9), 55 mg/kg (VP-5), and 17 mg/kg (VP-2); and
- 4. Vertical extent of soil affected by hydrocarbons for each of the three areas are based on available PID readings and soil laboratory data for the wells and are 8 feet for Area 1, 4 feet for Area 2, and 4 feet for Area 3.

#### Calculations:

I. Area 1

Mass of hydrocarbon-affected soil = 12,000 ft<sup>2</sup> x 8 ft x 100 lbs/ft<sup>3</sup> = 9,600,000 lbs

Hydrocarbon mass present in soil = 9,600,000 lbs x 546 lbs TPHg/10<sup>8</sup> lbs soil = 5,242 lbs TPHG

II. Area 2B

Mass of hydrocarbon-affected soil =  $2,700 \text{ ft}^2 \times 4 \text{ ft} \times 100 \text{ lbs/ft}^3 = 1,080,000 \text{ lbs}$ 

Hydrocarbon mass present in soil = 1,080,000 lbs x 55 lbs TPHg/ $10^6$  lbs soil = **59 lbs TPHG** 

NMED/Barcles disk 2 1&2Qtr93.rpt



III. Area 3

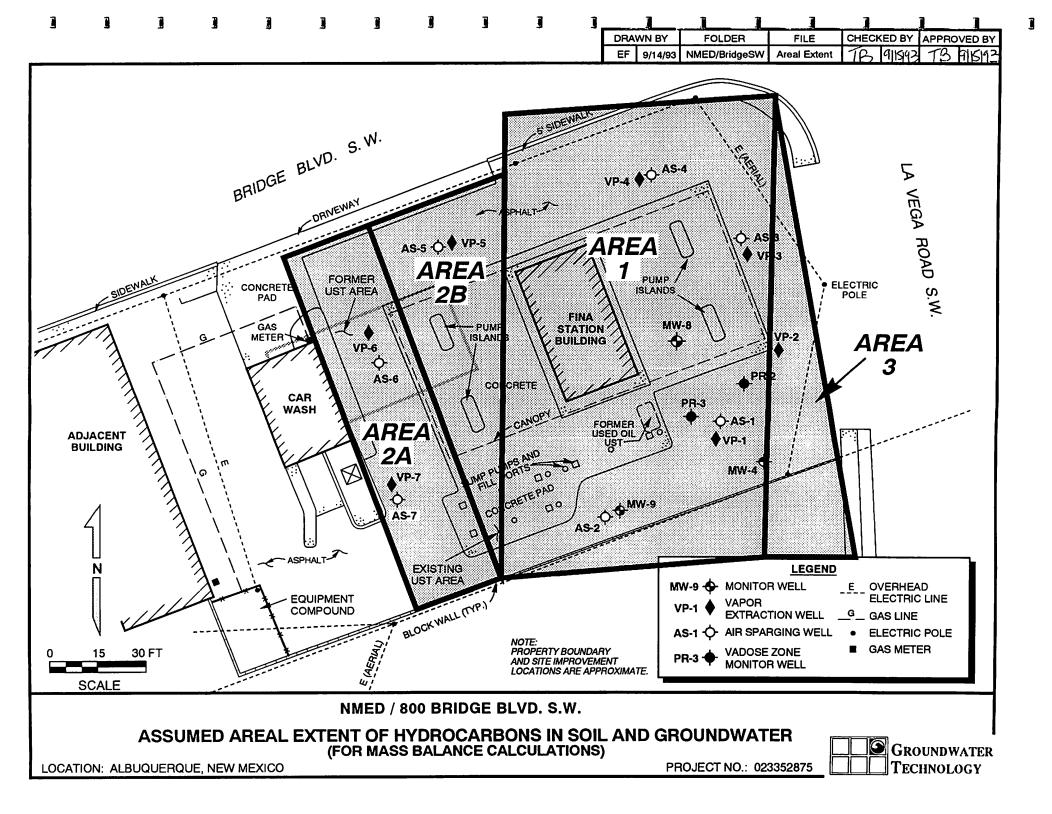
Mass of hydrocarbon-affected soil = 2,025 ft<sup>2</sup> x 4 ft x 100 lbs/ft<sup>3</sup> = 810,000 lbs

Hydrocarbon mass present in soil = 810,000 lbs x 17 lbs TPHg/10<sup>6</sup> lbs soil = 14 lbs TPHG

Total Adsorbed Hydrocarbon Mass (Areas 1 + Area 2 + Area 3) = 5,315 lbs.

NMED/Barclas disk 2 1&2Qtr93.rpt

GROUNDWATER
TECHNOLOGY



#### **APPENDIX I**

FLUID-LEVEL MEASUREMENTS
1992 - PRESENT AND WELL COMPLETION DATA

NMED/Barclas disk 2 1&2Qtr93.rpt



#### SUMMARY OF WELL COMPLETION INFORMATION BARELAS BRIDGE GWPA SITE 800 BRIDGE BLVD., S.W. ALBUQUERQUE, NEW MEXICO

WELL ID	DATE INSTALLED	TOC ELEV. (FTAMSL)	TOTAL DEPTH OF WELL (FT)	WELL DIAMETER/ CONSTRUCTION	SCREENED INTERVAL/SLOT SIZE	SCREEN LENGTH (FT)	STATUS/ COMMENTS
MW-1	02/07/90	4942.99	17	2" PVC	2'-17'/0.020"	15	Monitor well
MW-2	02/07/90	. 4942.47	23	2" PVC	3'-18'/0.020"	15	Monitor well
MW-3	02/07/90	4942.03	22.5	2" PVC	2.5'-17.5'/0.020"	15	Monitor well
MW-4	02/08/90	4943.23	23.5	2" PVC	3.5'-18.5'/0.020"	15	Converted to vapor extraction well
MW-5	10/16/90	4942.18	21.5	2" PVC	7'-22'/0.010"	15	Monitor well
MW-6	10/16/90	4943.21	22	2" PVC	7'-22'/0.010"	15	Monitor well
MW-7	10/18/90	4942.94	· 22	2" PVC	7'-22'/0.010"	15	Monitor well
MW-8	10/18/90	4944.59	13	2" STEEL	8'-13'/0.010"	5	Monitor well
MW-9	08/20/92	4943.98	20	2" PVC	5'-20'/0.020"	15	Converted to vapor extraction well
VP-1	08/19/92	4943.75	14.5	4" PVC	9.5'-14.5'/0.020" 4.5'-9.5'/0.040"	10	Vapor extraction well
AS-1	08/19/92	4944.32 (RIM)	22	2" PVC	20'-22'/0.010"	2	Air sparge.well
PR-2	08/18/92	4944.20 - S 4944.07 - D	9	2" PVC	3'-5'/0.020" 7'-9'/0.020"	2'/2'	Nested vadose monitor probe
PR-3	08/18/92	4944.27 - S 4944.22 - D	9	2" PVC	3'-5'/0.020" 7'-9'/0.020"	2'/2'	Nested vadose monitor probe
VP-2 thru VP-7	04/12-14/93	See fluid level tables or survey	14 each	2" PVC	4'-9'/0.040" 9-14'/0.020"	10	Vapor extraction wells
AS-1 thru AS-7	04/13-15/93	See survey for RIM elev.	24 each (drive point)	2" GALV. STEEL	19'-21'/0.020" stainless steel	2	Air sparge wells

Note: All elevations per Surv-Tek, Inc. survey, July 1993.



WELL ID			MW-1				
TOC ELEV (F	FTAMSL)		4942.99				
				<b></b>		· ·	E1 E1
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
					DTW	WATER	PSH
	0.44					4000.05	
24-Jun-92	9.14	ND	0.00	••		4933.85	
20-Aug-93	9.67	ND	0.00			4933.32	
10-Feb-93	9.83	ND	0.00	••		4933.16	
16-Jun-93	9.24	ND	0.00			4933.75	
WELL ID			MW-2				
TOC ELEV (F	FTAMSL)		4942.47				
						<u>_</u>	
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
					DTW	WATER	PSH
24-Jun-92	8.71	ND	0.00			4933.76	-
20-Aug-93	9.21	ND	0.00			4933.26	
10-Feb-93	9.38	ND	0.00			4933.09	
16-Jun-93	8.80	ND	0.00			4933.67	
WELL IS			5 M * 1 =				1
WELL ID	TARACI \		MW-3				
TOC ELEV (I	r ( AMSL)		4942.03	<del></del>			
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
D/ 11 L	J. 11	511	, ,	1 170.0	DTW	WATER	PSH
					<i>-</i> 111	TINIEIL	. 511
24-Jun-92	8.25	ND	0.00			4933.78	
20-Aug-93	8.80	ND	0.00			4933.23	
10-Feb-93	9.00	ND	0.00			4933.03	
16-Jun-93	8.38	ND	0.00			4933.65	
<del></del>							
WELL ID			MW-4				
TOC ELEV (	-TAMSL)		4943.86		4943.23*		
D.4.T.C	D77.41	DTD	<b>6</b> T	D=		<b>-</b>	
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
					DTW	WATER	PSH
24-Jun-92	8.68	ND	0.00			4935.18	
10-Feb-93	8.70	ND	0.00			4935.16 4935.16	
16-Jun-93	8.70 8.20	ND	0.00			4935.16	<b></b>
เด-งนเเ-ซอ	0.20	ND	0.00			4900.00	

<sup>\*</sup> TOC elevation modified 4/93; resurveyed 7/93.



WELL ID TOC ELEV (F	TAMSL)		MW-5 4942.18	-			
DATE	DTW	DTP	PT	PTx0.8	ADJ DTW	ELEV WATER	ELEV PSH
24-Jun-92	7.67	ND	0.00			4934.51	
10-Feb-93	7.81	ND	0.00			4934.37	
16-Jun-93	7.84	ND	0.00			4934.34	
WELL ID			MW-6				
TOC ELEV (F	-TAMSL)		4943.21				
DATE	DTW	DTP	PT	PTx0.8	ADJ DTW	ELEV WATER	ELEV PSH
24-Jun-92	9.00	ND	0.00		••	4934.21	
10-Feb-93	9.12	ND	0.00			4934.09	
16-Jun-93	8.10	ND	0.00			4935.11	
WELL ID		<del></del>	MW-7				
TOC ELEV (F	TARACIA		4040 04				
	TAMSL)		4942.94				
DATE	DTW	DTP	4942.94 PT	PTx0.8	ADJ DTW	ELEV WATER	ELEV PSH
<u> </u>		DTP		PTx0.8			
<u> </u>		DTP		PTx0.8			
DATE  24-Jun-92 10-Feb-93	DTW 8.20 8.38	ND ND	PT	PTx0.8 		WATER 4934.74 4934.56	
DATE 24-Jun-92	DTW 8.20	ND	PT 0.00	PTx0.8   		WATER 4934.74	
DATE  24-Jun-92 10-Feb-93	DTW 8.20 8.38	ND ND	PT 0.00 0.00	PTx0.8   		WATER 4934.74 4934.56	
DATE  24-Jun-92 10-Feb-93 16-Jun-93	8.20 8.38 8.33	ND ND	0.00 0.00 0.00 0.00	PTx0.8   		WATER 4934.74 4934.56	
DATE  24-Jun-92 10-Feb-93 16-Jun-93  WELL ID	8.20 8.38 8.33	ND ND	0.00 0.00 0.00 0.00	PTx0.8 PTx0.8		WATER 4934.74 4934.56	
DATE  24-Jun-92 10-Feb-93 16-Jun-93  WELL ID TOC ELEV (I	8.20 8.38 8.33	ND ND ND	0.00 0.00 0.00 0.00 MW-8 4944.59	  	   	4934.74 4934.56 4934.61 ELEV	PSH ELEV
DATE  24-Jun-92 10-Feb-93 16-Jun-93  WELL ID TOC ELEV (I	8.20 8.38 8.33	ND ND ND	0.00 0.00 0.00 0.00 MW-8 4944.59	  	   	4934.74 4934.56 4934.61 ELEV	PSH ELEV
DATE  24-Jun-92 10-Feb-93 16-Jun-93  WELL ID TOC ELEV (I	8.20 8.38 8.33 -TAMSL)	ND ND ND	0.00 0.00 0.00 0.00 MW-8 4944.59	  	   	WATER  4934.74 4934.56 4934.61  ELEV WATER	PSH ELEV



WELL ID			MW-9				1
TOC ELEV (FTAMSL)			4943.98				
100 2227 (1	17 41102/		1010.00	<del></del>	<del></del>		
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	<b>ELEV</b>
					DTW	WATER	PSH
20-Aug-92	9.33	ND	0.00			<b>*</b>	
10-Feb-93	9.40	ND	0.00			*	
16-Jun-93	8.96	ND	0.00			4935.02	
WELL ID			VP-1				
TOC ELEV (F	TAMSI)		4943.75				
.002227	17 41102/		10 10.70				
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	<b>ELEV</b>
					DTW	WATER	PSH
20-Aug-92	9.25	ND	0.00			*	
16-Jun-93	8.66	ND	0.00			4935.09	
IWELL ID			VDO				
WELL ID TOC ELEV (F	TAME!		VP-2				
TOC ELEV (F	- I AIVISL)		4943.73			<del></del>	<u> </u>
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
2,	_,,,	<b>.</b>	, ,		DTW	WATER	PSH
	•	***************************************	•••••	***************************************	***************************************	***************************************	
16-Jun-93	8.58	ND	0.00			4935.15	
14/51 1 15			\ <u> </u>				
WELL ID	TANACI \		VP-3				
TOC ELEV (F	-TAMSL)		4943.72			·	
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
DATE	D. 11		• •	1 120.0	DTW	WATER	PSH
					<b></b>		
	******************						
16-Jun-93	8.46	ND	0.00			4935.26	
WELL ID	<u> </u>		VP-4				
TOC ELEV (F	FTAMSL)		4943.53				
DATE	DTA:	DED	CT	DT. O.O.	AD !		
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV PSH
					DTW	WATER	roΠ
		•••••		***************************************	***************************************	•••••	
16-Jun-93	8.15	ND	0.00			4935.38	

<sup>\*</sup> TOC elevation modified 4/93; surveyed 7/93.



WELL ID			VP-5				
TOC ELEV (F	( ISMAT		4943.52				
100 ELEV (	TANVIOL		1010.02				
				<b>57.</b>		C. C.	
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
					DTW	WATER	PSH
***************************************			***************************************	•••••	***************************************	***************************************	
16-Jun-93	8.19	ND	0.00			4935.33	
10-2011-93	0.19	ND	0.00			4300.00	
WELL ID			VP-6				
TOC ELEV (F	FTAMSL)		4944.09				
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
DAIL	Divi	<b>D</b>	• •	1 120.0	DTW	WATER	PSH
					DIVV	WAIED	гоп
16-Jun-93	8.84	ND	0.00			4935.25	
WELL ID	-		VP-7	_			
TOC ELEV (I	TAME!		4944.22				
TOC ELEV (I	TAIVISL)		4944.22	·			
DATE	DTW	DTP	PT	PTx0.8	ADJ	ELEV	ELEV
					DTW	WATER	PSH
40.100	0.40	ND	0.00			4005.00	
16-Jun-93	9.19	ND	0.00			4935.03	



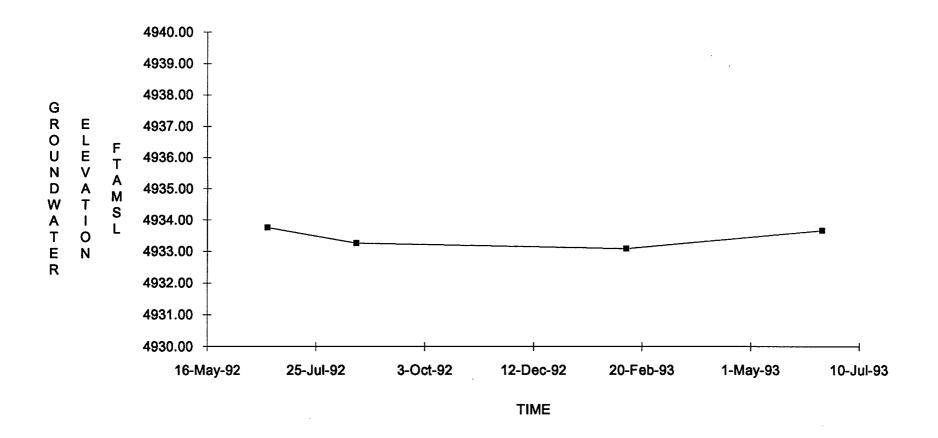
#### **APPENDIX J**

HYDROGRAPHS OF GROUNDWATER ELEVATION FOR SELECT MONITOR WELLS

NMED/Barclas disk 2 1&2Qtr93.rpt

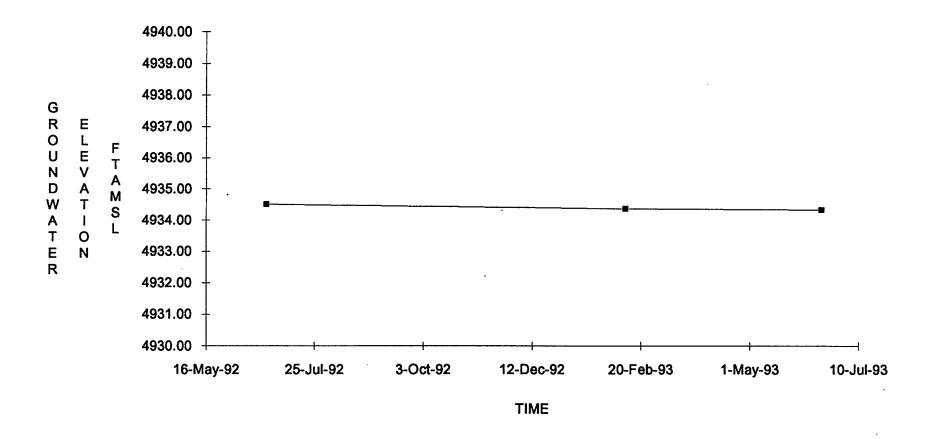


### **HYDROGRAPH: MONITOR WELL MW-2**



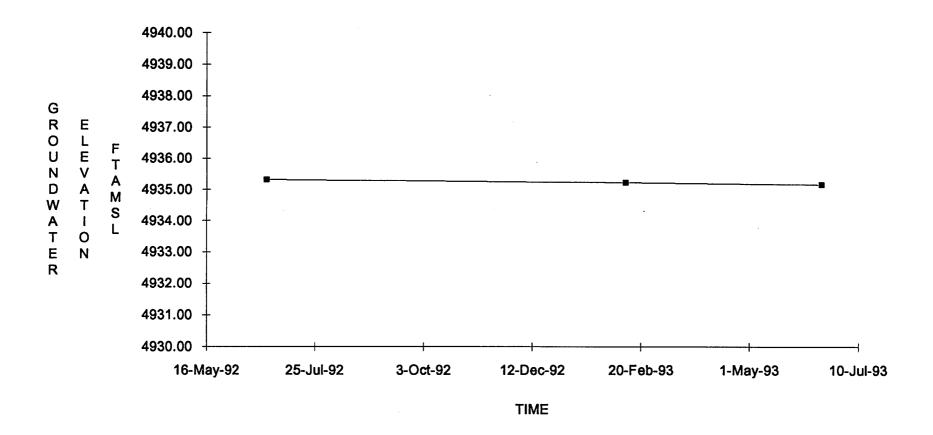


### **HYDROGRAPH: MONITOR WELL MW-5**





### **HYDROGRAPH: MONITOR WELL MW-8**





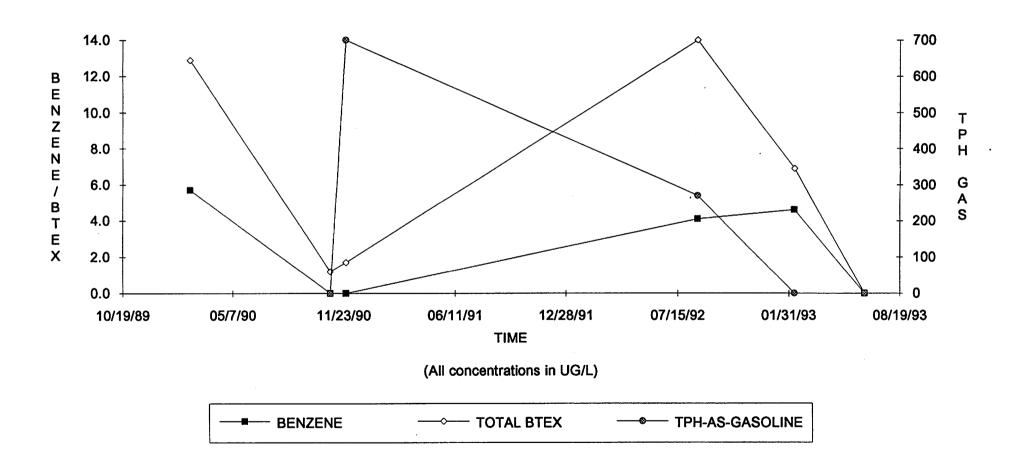
#### **APPENDIX K**

CONCENTRATION PLOTS OF BENZENE, BTEX, AND TPH-AS-GASOLINE CONCENTRATIONS VERSUS TIME FOR SELECT MONITOR WELLS

NMED/Barcles disk 2 1&2Qtr93.rpt

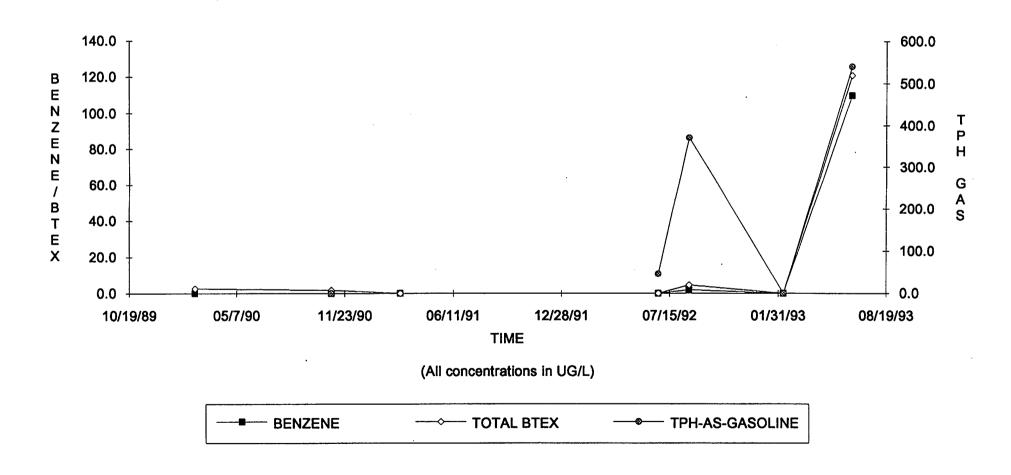


# MONITOR WELL MW-2 DISSOLVED BENZENE/BTEX AND TPH-AS-GAS CONCENTRATIONS -VS- TIME





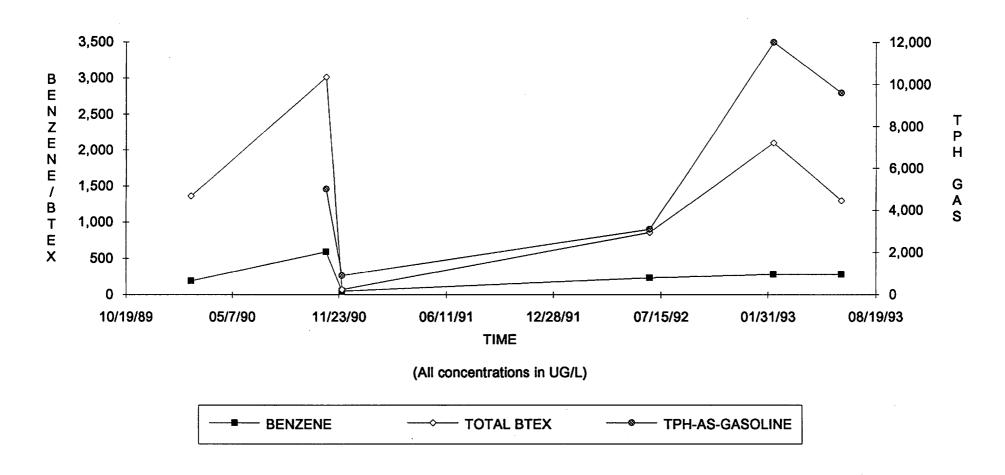
## MONITOR WELL MW-3 DISSOLVED BENZENE/BTEX AND TPH-AS-GAS CONCENTRATIONS -VS- TIME





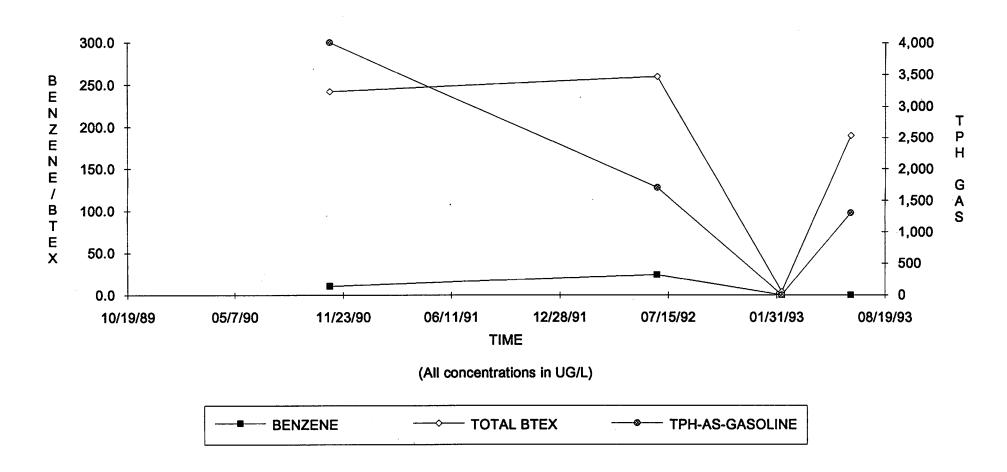
# MONITOR WELL MW-4 DISSOLVED BENZENE/BTEX AND TPH-AS-GAS CONCENTRATIONS -VS- TIME

]



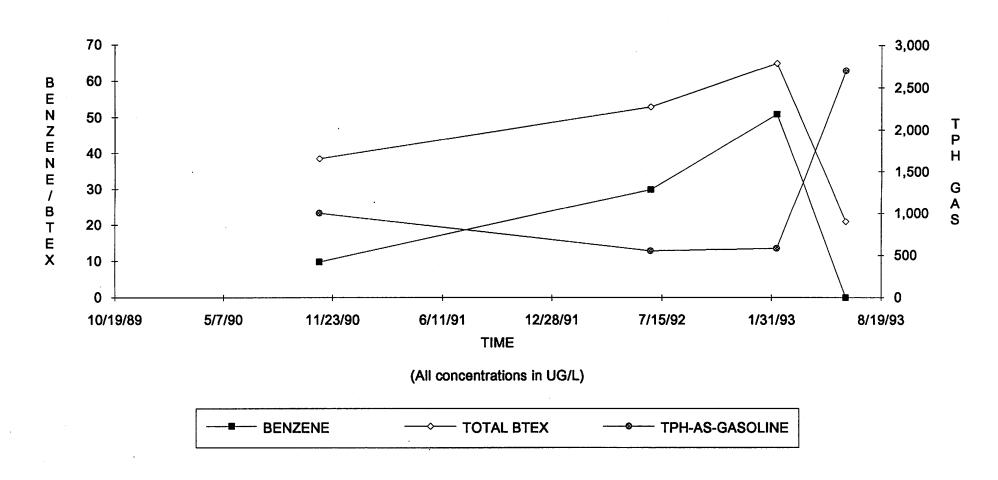


# MONITOR WELL MW-6 DISSOLVED BENZENE/BTEX AND TPH-AS-GAS CONCENTRATIONS -VS- TIME



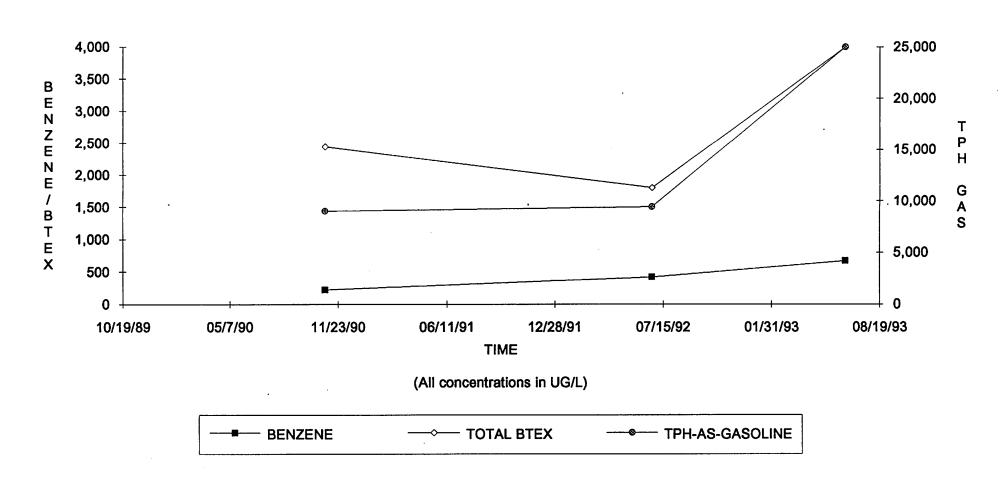


# MONITOR WELL MW-7 DISSOLVED BENZENE/BTEX AND TPH-AS-GAS CONCENTRATIONS -VS- TIME



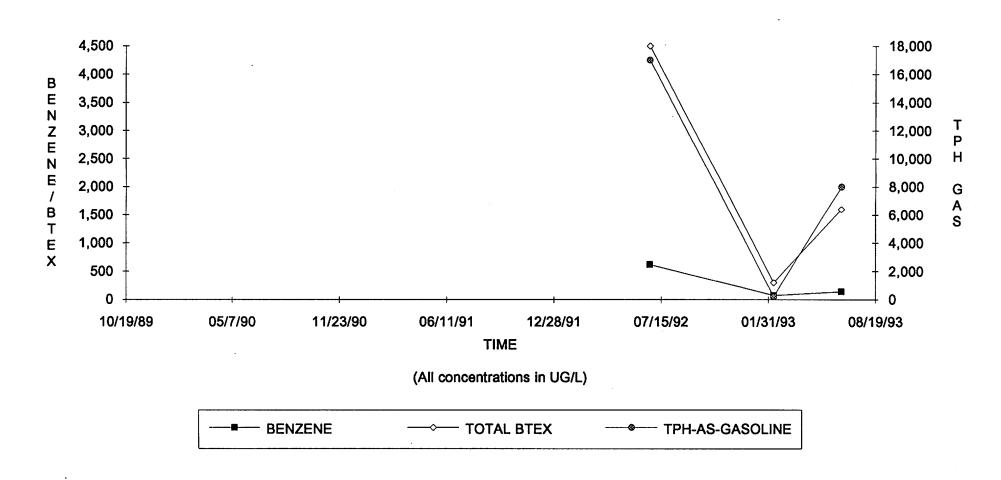


# MONITOR WELL MW-8 DISSOLVED BENZENE/BTEX AND TPH-AS-GAS CONCENTRATIONS -VS- TIME





# MONITOR WELL MW-9 DISSOLVED BENZENE/BTEX AND TPH-AS-GAS CONCENTRATIONS -VS- TIME





#### **APPENDIX A**

AS-BUILT DIAGRAMS OF REMEDIATION SYSTEM AND SITE SURVEY

NMED/Barelas disk 2 1&2Qtr93.rpt



# SOIL VAPOR EXTRACTION AND AIR SPARGE REMEDIATION SYSTEM

800 BRIDGE BLVD. S.W. ALBUQUERQUE, NEW MEXICO

Prepared for:

NEW MEXICO ENVIRONMENT DEPARTMENT UNDERGROUND STORAGE TANK BUREAU

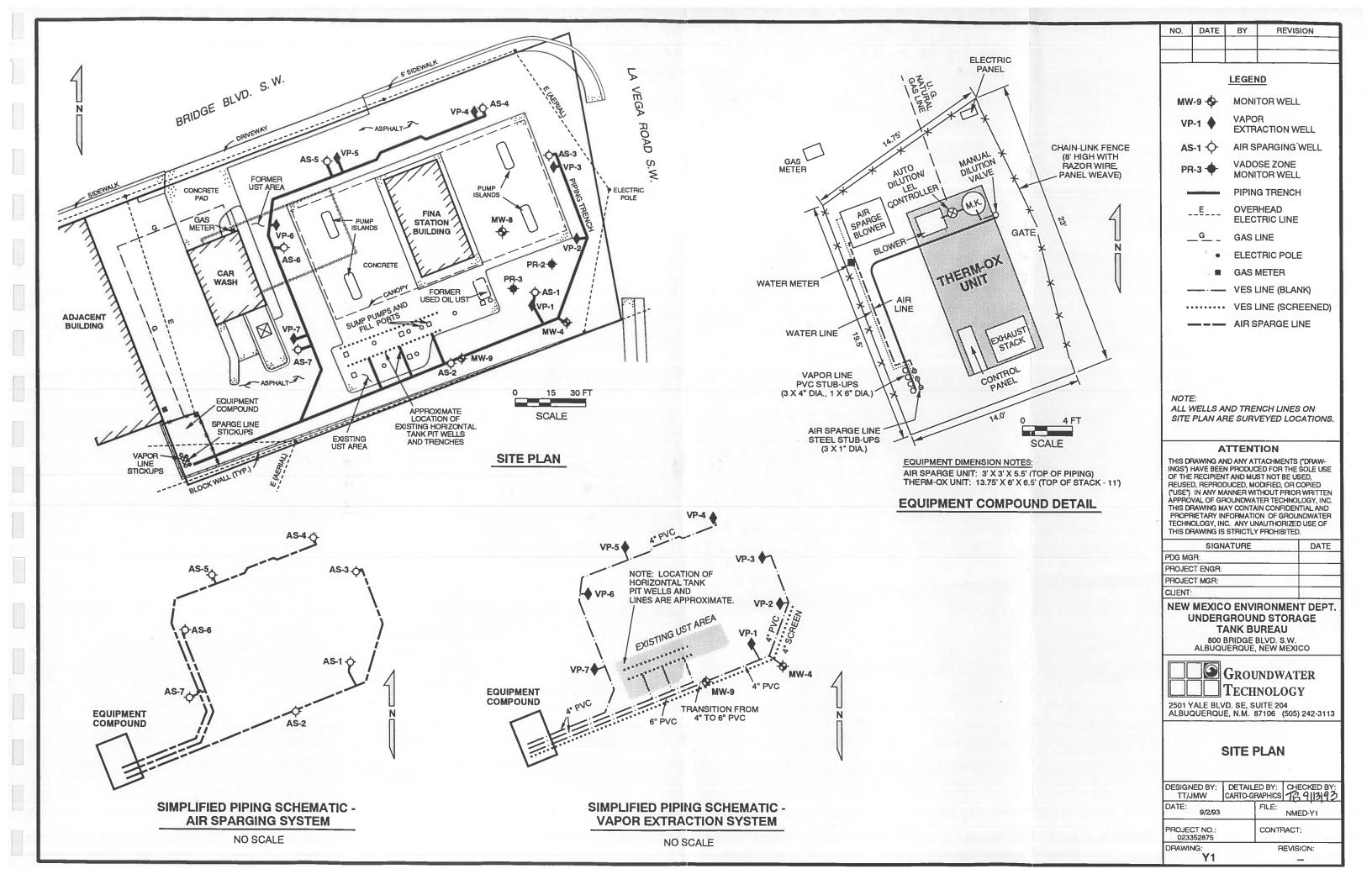
PROJECT NO. 023352875

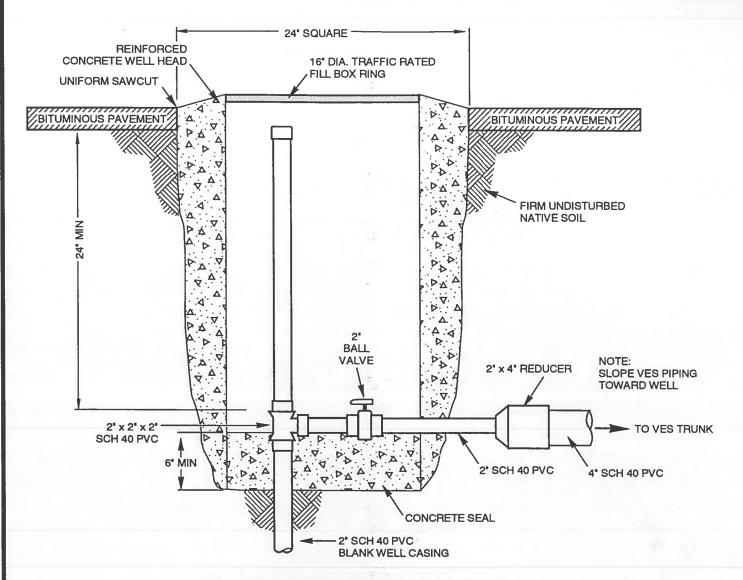
AS-BUILT DIAGRAMS APRIL – MAY 1993

### SHEET INDEX

DWG. NO.	TITLE
Y1	SITE PLAN
Y2	WELLHEAD AND PIPING MANIFOLD DETAILS
Y3	TRENCH DETAIL

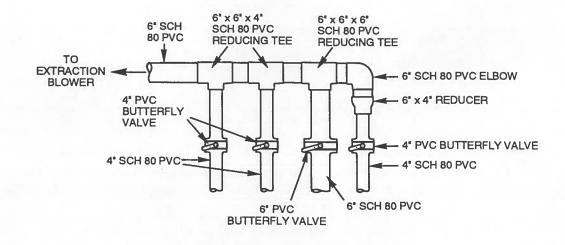






### **VAPOR EXTRACTION WELLHEAD (TYPICAL)**

NO SCALE



**VES PIPING MANIFOLD (TYPICAL)** 

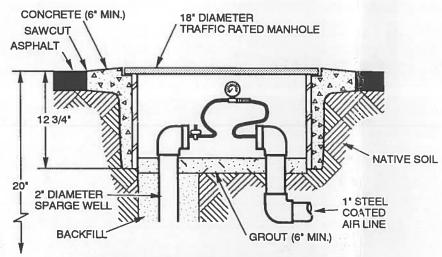
NO SCALE

LOW FLOW/
LOW PRESSURE
REGULATOR WITH
0-60 PSI GAUGE
WILKERSON MODEL
R 07-02-L00

HOSE CONNECTIONS
SPARGE POINT
(REDUCED TO 1/4")
A
SPARGE AIR SUPPLY
(REDUCED TO 1/4")

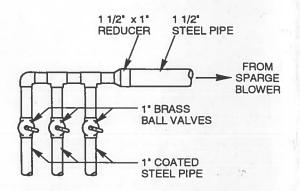
### SPARGE WELLHEAD DETAIL (TYPICAL) PLAN VIEW

NO SCALE



### SPARGE WELLHEAD DETAIL (TYPICAL)

NO SCALE



#### SPARGE PIPING MANIFOLD (TYPICAL)

NO SCALE

				_
-	AT	TE	NTI	OI

DATE

BY

NO.

REVISION

THIS DRAWING AND ANY ATTACHMENTS ("DRAWINGS") HAVE BEEN PRODUCED FOR THE SOLE USE OF THE RECIPIENT AND MUST NOT BE USED, REUSED, REPRODUCED, MODIFIED, OR COPIED ("USE") IN ANY MANNER WITHOUT PROR WRITTEN APPROVAL OF GROUNDWATER TECHNOLOGY, INC. THIS DRAWING MAY CONTAIN CONFIDENTIAL AND PROPRIETARY INFORMATION OF GROUNDWATER TECHNOLOGY, INC. ANY UNAUTHORIZED USE OF THIS DRAWING IS STRICTLY PROHIBITED.

SIGNATURE	DATE	
PDG MGR:		
PROJECT ENGR:		
PROJECT MGR:		
CLIENT:		

#### NEW MEXICO ENVIRONMENT DEPT. UNDERGROUND STORAGE TANK BUREAU

800 BRIDGE BLVD. S.W. ALBUQUERQUE, NEW MEXICO



2501 YALE BLVD. SE, SUITE 204 ALBUQUERQUE, N.M. 87106 (505) 242-3113

#### WELLHEAD AND PIPING MANIFOLD DETAILS

			7.0
DESIGNED BY: TT/JMW	DETAILED BY: CARTO-GRAPHICS		CHECKED BY:
DATE: 9/1/93		FILE:	NMED-Y2
PROJECT NO.: 023352875		CONTR	ACT:
DRAWING: Y2		RI	EVISION:

NOTE: **VES PIPING SLOPES FROM EQUIPMENT COMPOUND TOWARD** WELLS - MINIMUM 1% SLOPE **NEW PAVEMENT** 2" MIN PLANT MIX BITUMINOUS PAVEMENT PRIME COAT -WIDTH AS DETERMINED BY TRENCH -BITUMINOUS PAVEMENT BITUMINOUS PAVEMENT ABC ONE SACK SLURRY DEPTH OF TRENCH TO BE DETERMINED IN FIELD **ATTENTION** THIS DRAWING AND ANY ATTACHMENTS ("DRAWINGS") HAVE BEEN PRODUCED FOR THE SOLE USE OF THE RECIPIENT AND MUST NOT BE USED, REUSED, REPRODUCED, MODIFIED, OR COPIED ("USE") IN ANY MANNER WITHOUT PRIOR WRITTEN APPROVAL OF GROUNDWATER TECHNOLOGY, INC. THIS DRAWING MAY CONTAIN CONFIDENTIAL AND NATIVE BACKFILL PROPRIETARY INFORMATION OF GROUNDWATER TECHNOLOGY, INC. ANY UNAUTHORIZED USE OF THIS DRAWING IS STRICTLY PROHIBITED. SIGNATURE PDG MGR: 4" PVC SCH 40 PROJECT ENGR: BLANK PROJECT MGR: **VES PIPING NEW MEXICO ENVIRONMENT DEPT. UNDERGROUND STORAGE TANK BUREAU** 800 BRIDGE BLVD. S.W. ALBUQUERQUE, NEW MEXICO 4" MIN 4" MIN 4° MIN GROUNDWATER 6" MAX 6" MAX TECHNOLOGY 2501 YALE BLVD. SE, SUITE 204 ALBUQUERQUE, N.M. 87106 (505) 242-3113 TRENCH DETAIL (TYPICAL) TRENCH DETAIL NO SCALE DESIGNED BY: DETAILED BY: CHECKED BY: TT/JMW CARTO-GRAPHICS 18 9/2/93 DATE: PROJECT NO .: CONTRACT:

**NEW BASE COURSE** 6" MIN COMPACTED

AGGREGATE BASE COURSE

UNIFORM SAW CUT.

FIRM UNDISTURBED NATIVE SOIL

1" STEEL COATED

AIR LINE

4" PVC SCH 40 SLOTTED

**VES PIPING** 

4" TYP

EXISTING BITUMINOUS PAVEMENT.

**EXISTING BASE COURSE** 

REVISION

DATE

NMED-Y3

REVISION:

023352875 DRAWING:

DATE

BY