DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

08 OCT 1996

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT
Groundwater Protection & Remediation Bureau
Attn: Julie Jacobs
1190 St Francis Dr
Santa Fe NM 87502

FROM: 49 CES/CEV
550 Tabosa Avenue
Holloman AFB NM 88330-8458

SUBJECT: Air Sparging and Soil Vapor Extraction Pilot Test Report for Officer's Club Site SS-57

1. Attached please the Draft Final Air Sparging and Soil Vapor Extraction Pilot Test Report for Officer's Club Site SS-57. This report details the results of the pilot test conducted in April 1996, as well as previous investigations performed at the site. In addition, the report outlines the recommendations for remediation of the site and the associated conceptual design. Holloman AFB will be initiating the recommended alternative as a voluntary cleanup action later this month.

2. If you have any questions regarding the attached report, or the voluntary cleanup action, please contact Warren Neff at your earliest convenience at (505) 475-5395.

HOWARD E. MOFFITT
Deputy Base Civil Engineer

Attachment:
Draft Final Air Sparging and Soil Vapor Extraction Pilot Test Report for Officer's Club Site SS-57

cc: w/Atch

Mr Steve Pullen
New Mexico Environment Department
Hazardous & Radioactive Materials Bureau
P.O. Box 26110
Santa Fe, NM 87502

Mr Allen Chang
US Environmental Protection Agency, Region 6
Hazardous Waste Management Division
1445 Ross Ave
Dallas, TX 75202-2733

DRAFT FINAL
AIR SPARGING AND SOIL VAPOR EXTRACTION PILOT TEST REPORT FOR OFFICERS CLUB SITE SS-57 HOLLOMAN AIR FORCE BASE, NEW MEXICO

Prepared for:

49 CES/CEV
Holloman Air Force Base, NM

and

HQ ACC/ESVR
Langley Air Force Base, VA

Prepared by:

Foster Wheeler Environmental Corporation
143 Union Blvd., Suite 1010
Lakewood, Colorado 80228-1824

and

Groundwater Technology
Government Services, Inc.
2501 Yale Blvd., S.E., #204
Albuquerque, NM 87106

Under Contract No. DACW45-94-D-0003
Delivery Order No. 8, Work Authorization Directive 35:

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

October 1996

HAFB-24/DO8W29wp.doc

TABLE OF CONTENTS

LIST OF FIGURES iii

LIST OF TABLES iv

LIST OF APPENDICES v

LIST OF ACRONYMS vi

1.0 INTRODUCTION 1-1
- 1.1 Purpose and Organization of Document 1-1
- 1.2 Site Location 1-1
- 1.3 Previous Site Investigations 1-1

2.0 SCOPE OF WORK 2-1
- 2.1 Soil Boring and Well Installation 2-1
- 2.2 Soil Sampling and Analyses 2-2
- 2.3 Well Sampling and Analyses 2-3
- 2.4 Surveying and Well Gauging 2-3
- 2.5 Air Sampling 2-4
- 2.6 Short-Term Pilot Testing Procedures 2-4

3.0 HYDROGEOLOGIC SETTING AND SAMPLING RESULTS 3-1
- 3.1 Hydrogeologic Setting 3-1
- 3.2 Soil Sample Results 3-2
- 3.3 Groundwater Flow Direction 3-5
- 3.4 Groundwater Sample Results 3-5

4.0 DESCRIPTION OF *IN SITU* AIR SPARGING/VAPOR EXTRACTION PILOT TESTS 4-1
- 4.1 Description of the Tests 4-1

TABLE OF CONTENTS (Concluded)

4.1.1 Vapor Extraction Tests 1 through 3 4-1
4.1.2 Sparge Tests 4 through 6 4-2
4.2 Results of the Tests 4-4
4.2.1 Radius of Influence for Vapor Extraction 4-4
4.2.2 Mass Removal Rates for Vapor Extraction 4-5
4.2.3 Modeling Results for the Vapor Extraction Test 4-6
4.2.4 Radius of Influence for In Situ Air Sparging 4-7
4.2.5 Injection Pressure and Flowrate 4-10
4.3 Summary of Pilot Test Results 4-10

5.0 RECOMMENDATIONS AND BASIS FOR DESIGN 5-1
5.1 Recommendations and Basis for Design 5-1

6.0 CONCEPTUAL DESIGN 6-1
6.1 Conceptual Design 6-1

7.0 REFERENCES 7-1

LIST OF FIGURES

FIGURE 1 Holloman Air Force Base Site Location Map

FIGURE 2 Holloman Air Force Base Facility Map

FIGURE 3 Site SS-57 Officers Club Site Map

FIGURE 4 TPH Distribution In Soil Map

FIGURE 5 Groundwater Gradient Map

FIGURE 6 Induced Vacuum Versus Distance, Test No. 3

FIGURE 7 Wellhead Vacuum Versus Flowrate, Test No. 3

FIGURE 8 Extracted Hydrocarbon Concentrations Versus Time, Test No. 3

FIGURE 9 Groundwater Elevation Versus Distance, Test No. 5

FIGURE 10 Dissolved Oxygen Versus Distance, Test No. 4

LIST OF TABLES

TABLE 2-1 Summary of Well Construction Data

TABLE 3-1 Summary of Soil Analytical Results

TABLE 3-2 Summary of Groundwater Elevations

TABLE 3-3 Summary of Groundwater Analytical Results

TABLE 4-1 Summary of Pilot Test Air Sample Results

LIST OF APPENDICES

A. FIELD LOGS

- A-1 Soil Boring Logs
- A-2 Air Monitoring Forms
- A-3 Equipment Calibration Sheets
- A-4 Daily Quality Control Reports, Tailgate Safety Meeting Notes, and Field Notes
- A-5 Monitoring Well Purging Records
- A-6 Well Gauging Data Forms
- A-7 Containerized Materials Logs
- A-8 Preliminary Incident Reports
- A-9 Work Clearance Permits
- A-10 Excavation Checklists
- A-11 Drillers Daily Reports

B. SOIL TESTING RESULTS

- B-1 Laboratory Analytical Results
- B-2 Soil Physical Properties Testing Results

C. GROUNDWATER ANALYTICAL RESULTS

D. PILOT TEST FIELD DATA

E. AIR SAMPLE ANALYTICAL RESULTS

F. VENT-ROI RESULTS

LIST OF ACRONYMS

<	Less Than
%	Percent
AB-01	Angle Boring Number 1
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
amsl	Above Mean Sea Level
API	American Petroleum Institute
AS/SVE	Air Sparging/Soil Vapor Extraction
ASTM	American Society for Testing and Materials
bgs	below ground surface
CFA	California Fertilizer Association
CH	High Plasticity Clay
CL	Lean Clay
cm/sec	Centimeters per Second
CO_2	Carbon Dioxide
CS_2	Carbon Disulfide
D	Deep Zone (37.5-39.5 Feet)
DO	Dissolved Oxygen
DTW	Depth To Water
DUP	Duplicate
EPA	U.S. Environmental Protection Agency
FOP	Field Operations Plan
FWENC	Foster Wheeler Environmental Corporation
GP	Poorly-Graded Gravel
H_2S	Hydrogen Sulfide
HVAC	Heating Ventilation and Air Conditioning
IRP	Installation Restoration Program
IWC	Inches of Water Column
lb/day	Pounds per Day
lb/hr	Pounds per Hour
M	Medium Zone (28-30 Feet)
mg/l	Milligrams per Liter
mg/kg	Milligrams per Kilogram
ML	Low Plasticity Silt
MW-01	Monitoring Well Number 1
N	Nitrogen

LIST OF ACRONYMS (Concluded)

NA	Not Analyzed
O_2	Oxygen
ORC®	Oxygen Releasing Compound
P	Phosphorus
PID	Photoionization Detector
ppbv	Parts per Billion by Volume
ppm	Parts per Million
ppmv	Parts per Million by Volume
psi	Pounds per Square Inch
psig	Pound per Square Inch Gauge
PVC	Poly-Vinyl Chloride
ROI	Radius of Influence
RP	Recommended Practice
S	Shallow Zone (18-20 Feet)
scfm	Standard Cubic Feet per Minute
SM	Silty Sand
SMP-01	Sparge Monitoring Point Well Number 1
SO_4	Sulfate
SP-01	Sparge Well Number 1
SQCSR	Sampling and Quality Control Summary Report
SVE	Soil Vapor Extraction
SW	Solid Waste
SW	Well-Graded Sand
TKN	Total Kjeldahl Nitrogen
TNMOC	Total Nonmethane Organic Compound
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
μg/l	Micrograms per Liter
USCS	Unified Soil Classification System
VB-01	Vertical Boring Number 1
VET-01	Vapor Extraction Trench Number 1
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

1.1 Purpose and Organization of Document

This report has been prepared to document the installation and pilot testing of an air sparging/soil vapor extraction (AS/SVE) system at Installation Restoration Program (IRP) Site SS-57, the Officers Club, Holloman Air Force Base (AFB), New Mexico.

This document is organized in the following manner: Section 1.0 discusses the project objective and briefly summarizes previous investigations conducted at the site. Section 2.0 discusses the scope of work including soil boring, well installation, and short-term pilot testing procedures. Section 3.0 presents the hydrogeologic setting and soil and groundwater analytical results. Section 4.0 presents the protocol and results for the short-term pilot tests. Section 5.0 summarizes the recommendations and basis for design and Section 6.0 presents the conceptual design. Selected references are presented in Section 7.0.

1.2 Site Location

Holloman AFB is located directly west of Alamogordo, New Mexico (Figure 1). The Officers Club (Building No. 531) is located at the corner of West Eighth Street and West New Mexico Avenue at Holloman AFB. The location of the Officers Club is illustrated in Figure 2. A site map of the Officers Club is presented in Figure 3.

1.3 Previous Site Investigations

In the Fall of 1991, hydrogen sulfide (H_2S) odors were identified in the Officers Club building. A geotechnical investigation was performed in October 1991 to evaluate soil and groundwater conditions to determine the cause of H_2S odors present in the Officers Club building (Wilson & Company, June 1992). A second investigation was conducted in May 1992 to determine the source of the odors and make recommendations to alleviate this

problem (Wilson & Company, June 1992). Radian conducted a third investigation at the site during November 1992, with the objective of collecting data to better define the horizontal and vertical extent of petroleum hydrocarbon contamination (Radian, May 1993). The analytical data from these investigations indicated that the source of the odor is H_2S resulting from natural anaerobic biodegradation of subsurface diesel fuel. Detailed summaries of these investigations are presented in the Field Operations Plan (FOP) (Foster Wheeler Environmental Corporation [FWENC] and Groundwater Technology, Inc., October 1995). The results of these investigations are briefly summarized in the following paragraphs.

The investigations conducted by Wilson & Company consisted of the installation of soil borings and collection of water samples. The investigation concluded that odors emanating near the basement of the Officers Club consisted primarily of carbon disulfide (CS_2) and H_2S resulting from the anaerobic organic degradation of diesel fuel hydrocarbons present beneath the site. The investigation also identified total petroleum hydrocarbons (TPH) as diesel in groundwater samples at concentrations ranging from 2 to 130 milligrams per liter (mg/l). Concentrations of TPH as Diesel up to 1,500 milligrams per kilogram (mg/kg) were detected in soil samples collected at 14 to 15.5 feet below ground surface (bgs). A positive pressure air-handling system was subsequently installed at the Officers Club to prevent nuisance odors from accumulating in the building.

The subsurface investigation conducted by Radian in November 1992 entailed the drilling of four vertical borings (VB-01 to VB-04) and two angle borings (AB-01 and AB-02) near the southern corner of the Officers Club (Radian, May 1993). Samples were analyzed for TPH as Diesel. Other analyses conducted on the soils included a bacteria enumeration study and a biological screening. The investigation results were summarized in the May 1993 *Sampling and Quality Control Summary Report (SQCSR)* by Radian. The investigation concluded that the maximum TPH concentration was encountered at 18 feet in boring AB-02 with 12,000 parts per million (ppm) TPH as Diesel Fuel, and TPH as Diesel was detected in all borings except VB-04. Diesel concentrations greater than 1,000 ppm were present in 14 of the 25 soil samples analyzed. Bacteria enumeration results indicated that eight of the 13 samples analyzed exceeded the minimum bacteria counts

required before initiation of remediation, as recommended by U.S. Environmental Protection Agency (EPA) guidance documents for evaluating different remedial technologies. The concentrations of bacteria, however, did not correspond to the areas of highest TPH impact. Results from the nutrient concentration analysis indicate that soil at the Officers Club is considered to be nutrient deficient (nitrogen [N] and phosphates) (Air Force Center for Environmental Excellence [AFCEE], February 1994). The report recommended that the remedial alternative with the highest potential to reduce soil, water and air contamination at the Officers Club is biosparging and SVE. Further, the report recommended implementation of a pilot-scale system to provide the air permeability and radius of influence (ROI) information (parameters necessary to design the system).

It was also noted during previous site investigations that there was a depression in the Officers Club parking lot in an area that corresponds to a subsurface sanitary sewer main line, possibly suggesting a sewer line break. There is also some evidence of corrosion of a sanitary sewer manhole cover along the same sewer line, possibly as a result of H_2S dissolving into the residual moisture to form hydrochloric acid. Although, a break in the sewer line in the parking lot could contribute some local H_2S odors, pressure tests confirm that the sewer lines exiting the Officers Club and connecting to the main sanitary sewer line are intact.

2.0 SCOPE OF WORK

A detailed explanation of the scope of work performed is summarized in the FOP (FWENC and Groundwater Technology, Inc., October 1995). A brief explanation of the scope of work is summarized in the following subsections.

2.1 Soil Boring and Well Installation

A total of eight wells and one vapor extraction trench were installed under this scope of work. One well was a triple-nested air sparging well, three were triple-nested sparge monitoring wells, and the other four were single-casing groundwater monitoring wells. A summary of well construction data is given in Table 2-1.

One triple-nested air sparging well, SP-01, was installed for the short-term pilot test. This well is located 22 feet from the southernmost corner of the Officers Club building which is the primary area of the H_2S odor problems (Figure 3). Due to the interbedded nature of soils at this site, which range from clay to poorly-graded gravel stringers and the presence of gypsum nodules, the nested sparge well consisted of three well casings completed at three different depths (screened intervals of 18-20, 28-30, and 37.5-39.5 feet bgs). Soil boring and well installation logs are provided in Appendix A-1.

Due to the reported shallow groundwater levels and H_2S vapors in the basement of the Officers Club building, a horizontal vapor extraction trench (VET-01) was installed parallel to the southeastern wall of the building (Figure 3). The trench was 10 feet long situated approximately 7 feet from the sparge well.

Three sparge monitoring point wells (SMP-01 to SMP-03) were installed to monitor response during the pilot test. The sparge monitoring point wells were situated at distances ranging from 10 to 30 feet from SP-01 well (Figure 3). The sparge monitoring point wells are triple-nested wells screened at approximate intervals to the sparge well (Table 2-1).

Four groundwater monitoring wells were installed for the short-term pilot test (MW-01 to MW-04). Three of the monitoring wells (MW-01, MW-02, and MW-03) are located between 10 and 46 feet from the sparge well and are within the expected extent of the dissolved plume. The fourth monitoring well (MW-04) was situated outside the reported extent of subsurface hydrocarbons for use as a background well (Figure 3). The wells were installed to total depths of 14 to 17.5 feet bgs, with 10-foot screened intervals.

To avoid hitting underground utilities, the locations of MW-02 and SMP-02 were changed from the locations proposed in the FOP. MW-02 was installed approximately 30 feet northwest of the original location and the SMP-02 location was moved approximately 45 feet to the southeast.

2.2 Soil Sampling and Analyses

Soil samples were collected during the installation of the air sparging well, sparge monitoring points, and groundwater monitoring wells. Soil samples were collected at 5-foot intervals from hydrocarbon impacted zones as determined by screening with a photoionization detector (PID). Soil samples were collected using a modified California split-spoon sampler fitted with four 2-inch by 6-inch long brass ring inserts. After each sample was collected, the bottom ring was removed from the sampler, covered with TEFLON® sheeting, capped with a polyethylene cap, sealed with a TEFLON® septum, labeled, and placed on ice for transport to NEI/GTEL Environmental Laboratories, Inc. in Wichita, Kansas. One of the remaining rings was used to measure organic vapor content with a precalibrated PID and to perform lithologic characterization in accordance with the Unified Soil Classification System (USCS).

Soil samples for chemical analysis were analyzed for TPH as Diesel Fuel by Modified American Society for Testing and Materials (ASTM) Method D3328; Total Organic Carbon (TOC) by California Fertilizer Association (CFA) Method 18.0; and Sulfate by Modified EPA Method 375.4. In order to determine the available nutrient concentrations at the site, select soil samples were analyzed for Total Kjeldahl Nitrogen (TKN) by

Modified EPA Method 351.2; and Total Phosphorus (P) by Modified EPA Method 365.4. Additionally, the samples were analyzed for Total Iron by EPA Method 6010A to compare current levels of iron which can act as an oxygen (O_2) receptor (Hinchee et al., May 1992). Other inorganic parameters included Alkalinity by Modified EPA Method 310.1; pH by Solid Waste (SW)-846 Method 9045A; and Moisture Content by ASTM D2216-80. In order to characterize the physical conditions within the pilot test area, select samples were analyzed for Atterberg Limits by ASTM Method D4318; Air Permeability by American Petroleum Institute (API) Method Recommended Practice (RP) 40; and Sieve Analyses by ASTM Method D4464. Soil analysis did not screen for the presence of wastewater contaminants.

2.3 Well Sampling and Analyses

Groundwater samples were collected from the four newly-installed monitoring wells (MW-01 to MW-04) and three existing monitoring wells (MW-05, MW-07, and MW-09). Additionally, the triple-nested sparge well (SP-01) was sampled at all three depths. The groundwater samples were analyzed for TPH as Diesel Fuel by Modified ASTM Method D3328, Dissolved Iron by EPA Method 6010A, and Sulfates by Modified EPA Method 375.4, to evaluate the subsurface conditions relative to the feasibility of sparging. Groundwater analysis did not screen for the presence of wastewater contaminants.

2.4 Surveying and Well Gauging

Each new well location was surveyed by Southwest Engineering, Inc. Wells were located horizontally using the Base coordinate system, and tied into the existing well network to an accuracy of 0.1 foot. Ground surface elevations were surveyed to the nearest 0.10 foot, while top of well casings were surveyed to the nearest 0.01 foot above mean sea level (amsl). The poly-vinyl chloride (PVC) casing of each well was marked to help the surveyor measure well casing elevations and to provide a reference point for depth to groundwater measurements. All future elevation and depth to water (DTW) measurements will be completed using this reference mark.

2.5 Air Sampling

Air samples were collected during the short-term pilot test from the effluent stack of the SVE system. Air samples were analyzed for TPH as Gasoline by Modified EPA Method TO-3, for sulfur gases by ASTM Method D5504, and for various volatile organic compounds (VOCs) and Total Nonmethane Organic Compounds (TNMOCs) by EPA Method TO-14. The air samples for all analyses, except for total sulfur gases, were collected in SUMMA canisters to minimize potential permeation losses of the more volatile hydrocarbon constituents in diesel. Since several of the reduced sulfide constituents react with metal, sulfide air samples were collected in TEDLAR® bags with no metal fittings. SUMMA canisters and TEDLAR® bags were provided by the laboratory.

2.6 Short-Term Pilot Testing Procedures

Short-term pilot testing was conducted for five days. The testing equipment was located at the wellheads of the nested sparge well and horizontal vapor extraction well. A trailer-mounted AS/SVE system manufactured by FliteWay Air Products, Inc., was used to conduct the testing. The AS/SVE system consisted of two 200 standard cubic feet per minute (scfm) positive displacement blowers driven by a propane-fired internal combustion engine. A short-term SVE-only test was performed first to determine the ROI and blower sizing for a permanent system, and to quantify the levels of VOCs and H_2S extracted from the vadose zone. Following the SVE test, a combination AS/SVE test was performed to determine the effectiveness of the SVE and to measure concentrations in the emissions of carbon dioxide (CO_2), O_2, VOCs, and H_2S generated by sparging. Concurrent with the AS/SVE testing, a helium tracer test was also performed to determine the ROI of the sparging system and the capture ROI of the SVE.

3.0 HYDROGEOLOGIC SETTING AND SAMPLING RESULTS

3.1 Hydrogeologic Setting

The site of the pilot tests is located within the boundaries of Holloman AFB, near Alamogordo, New Mexico. The area is located within the Tularosa Basin. To the east of the Tularosa basin are the Sacramento Mountains which serve as a source of groundwater recharge for the basin. The surface area is classified as arid and the majority of surface water courses are ephemeral. The Sacramento Mountains also serve as a source of dissolved gypsum which is prevalent in the groundwater underlaying Holloman AFB. Periodic episodes of heavy rain have carried silicilate sands and suspended clay material into the Tularosa Basin where they have formed lenses of highly transmissive sands and lenses of very low transmissive clays.

Review of the boring logs and the geotechnical data from the previous investigations indicates that the soils beneath the site are very heterogeneous. Field soil descriptions range from a stiff (high plasticity) clay (CH) to a poorly-graded gravel (GP). The boring logs also identify caliche layers at various depths in some of the borings. The laboratory-applied USCS classifications ranged from a lean (low plasticity) clay (CL) to a silty sand (SM), and the laboratory permeability results ranged from 8.5×10^{-7} to 3.4×10^{1} centimeters per second (cm/sec).

The groundwater underlaying the area is generally saturated with dissolved salts and minerals. Calcium, sulfate, carbonate, sodium, and potassium ions are prevalent. As a result of the high sulfate concentration, a strong reducing environment exists in the subsurface. The depth to groundwater ranges between 10 and 40 feet bgs across Holloman AFB. The direction of groundwater flow is generally southwest but can be affected greatly by surface irrigation.

3.2 Soil Sample Results

Two soil samples from each sparge monitoring point and the air sparging well, and one sample from each groundwater monitoring well were selected for laboratory analysis in accordance with the FOP. Soil samples were shipped to NEI/GTEL Environmental Laboratories, Inc. in Wichita, Kansas for analysis. Soil samples were analyzed for TPH as Diesel Fuel by Modified ASTM Method D3328; TOC by CFA Method 18.0; and Sulfate by Modified EPA Method 375.4; TKN by Modified EPA Method 351.2; Total Phosphorus by Modified EPA Method 365.4; Total Iron by EPA Method 6010A; Alkalinity by Modified EPA Method 310.1; pH by SW-846 Method 9045A; and Moisture Content by ASTM D2216-80.

Table 3-1 summarizes the soil sampling analytical results. The laboratory analytical reports are provided in Appendix B-1. The TPH concentrations range between <10 mg/kg at SS57-MW04-9-9.5 (9 feet bgs) to 4,800 mg/kg at SS57-SMP03-19.5-20. In general, it appears that TPH concentrations are greatest at the 14 to 19-foot bgs sampling interval. The TPH concentrations are plotted in Figure 4. Based on these results, it appears that TPH impact in soil is limited to the southwest lawn of the Officers Club and extends to a depth of approximately 20 feet bgs.

Analysis of soil samples for TOC and various other nutrient parameters was conducted to assess the viability of biodegradation. The TOC results range from 660 to 7,300 mg/kg, TKN concentrations range from 25 to 71 mg/kg, and total phosphorus ranges from 66 to 140 mg/kg (Table 3-1). Bioremediation guidance documents indicate that soils containing less than 3 mg/kg phosphorus and less than 20 mg/kg nitrogen are considered nutrient deficient (AFCEE, February 1994). The soil sample results are greater than these values and indicate that the system will not be phosphorus or nitrogen limited. Furthermore, for aerobic biodegradation to take place in the vadose zone, the right balance of TOC, nitrogen, and phosphorous must be present. Previous research (Hinchee et al., 1992) suggests that the ideal ratio of these compounds, as analyzed from soil samples, should range from 100 mg/kg TOC : 10 mg/kg N : 1 mg/kg P to 100 mg/kg TOC : 1 mg/kg N :

0.5 mg/kg P. Results of the soil sample analyses reveal that the average ratio for the soil samples was 59 mg/kg TOC : 1 mg/kg N : 2 mg/kg P. This ratio falls within the acceptable range for active aerobic bioactivity and indicates that the system will not be either nitrogen or phosphorus limited.

Other key elements for successful biodegradation are the soil pH and soil moisture. Ideal conditions for bioactivity are a pH ranging from 6-8 and a moisture content ranging from 40-85 percent (%). Results of the soil sample analyses indicate the pH ranged from 6.9 to 7.6 with an average of 7.3. Soil moisture content ranged from 15.3% to 33.3% with an average of 24%. All pH values are within the ideal range but the moisture content is lower than ideal. However, as air sparging is performed, air saturated with moisture will permeate upward through the unsaturated zone and increase the moisture content in the vicinity of the air sparge well. Therefore, the lack of adequate soil moisture will likely not be a limiting factor to bioactivity in the vadose zone. The alkalinity of the soil was also measured and ranged from 6,500 to 84,000 mg/kg with an average of 36,533 mg/kg. This is a high alkalinity and will result in pH levels staying fairly constant while the biological degradation processes take place.

Total iron analysis was also conducted and results ranged from 1,500 to 6,200 mg/kg with an average of 3,222 mg/kg. This is a moderately high iron content. According to the literature, iron can serve as an electron acceptor, which would reduce the amount of O_2 available for biological reactions. Furthermore, iron which oxidizes can form a precipitate which could reduce the permeability of the soil. In general, however, the overall effect of iron oxidation, even when high iron concentrations have been present, has not been considered significant in reducing the effectiveness of biodegradation. By performing an in-situ respirometry test in an uncontaminated area and comparing the results to a test performed in a contaminated area, the effect of iron oxidation can be determined quantitatively. The oxidation of iron tends to be much more important in groundwater pumping situations, where the pumps can be fouled by the presence of the iron precipitate. Bioactivity should not be greatly affected by the presence of iron in the soil.

Core samples of soil were also collected from the sparge well (SP-01) borehole to evaluate physical soil properties and to classify the soils. Soil cores were collected for physical properties testing at the 19 to 19.5-, 29 to 29.5-, and 39 to 39.5-foot depth intervals. The soil samples were tested for Particle Size Distribution by ASTM Method D4464, Atterberg Limits by ASTM Method D4318; and Air Permeability by API Method RP40. The Particle Size Distribution test measures grain size percentages in soils. Soils with greater percentages of coarse-grain materials (e.g., sand, gravel) generally allow greater air flow. The Atterberg Limits test measures soil plasticity. Higher plasticity is an indication of greater fine-grain soil content and more clay, which generally impedes air flow. The Air Permeability test directly measures the soil sample permeability to air flow. The physical properties testing results are provided in Appendix B-2.

The results of the testing on the 19 to 19.5-foot depth interval sample indicate the presence of approximately 39% sand, 50% silt, and 11% clay. The Atterberg Limits test results indicate a plasticity index of 4, and a liquid limit of 36. According to the USCS, this soil sample would be classified as sandy, low plasticity silt (ML) based on the particle size distribution and the Atterberg Limits results. By the same USCS classification, the 29 to 29.5-foot and the 39 to 39.5-foot interval samples would be classified as well-graded sand (SW) and SM, respectively.

The Air Permeability test results correspond with the soil classification relative permeabilities. The 29 to 29.5-foot SW sample had the greatest effective permeability at 1,185 millidarcys. The 39 to 39.5-foot SM sample and the 19 to 19.5-foot ML sample had effective permeabilities of 17.8 and 6.42 millidarcys, respectively. According to EPA guidance documents, the 6.42 millidarcy permeability in the 19 to 19.5-foot sample indicates marginal viability for AS/SVE application (EPA, May 1995).

Additionally, many utility lines were encountered in the vicinity of the vapor extraction trench as well as some large cavities that had formed as a result of sprinkler head leaks. Based on these observations, the soil adjacent to the trench is expected to be especially permeable to SVE flow.

3.3 Groundwater Flow Direction

Depth to water at the site ranged from 8.5 feet to 12.4 feet bgs. Table 3-2 summarizes well gauging information collected in April 1996 and groundwater elevations. The well gauging data from April 9, 1996 was used to prepare the groundwater flow map presented in Figure 5. The flow direction is southwest with an approximate gradient of 0.013 to 0.025 feet per foot.

3.4 Groundwater Sample Results

Groundwater samples were collected between April 10, and April 12, 1996 from wells MW-01 through MW-04, and MW-05, MW-07, and MW-09 (located approximately 100 to 200 feet north of the Officers Club), and SP-01 (all three depth intervals). The samples were submitted to NEI/GTEL Environmental Laboratories, Inc., Wichita, Kansas for analysis by Modified ASTM Method D3328 for TPH as Diesel Fuel, EPA Method 6010A for Dissolved Iron, and Modified EPA Method 375.4 for Sulfates. Laboratory analytical results for groundwater samples are provided in Appendix C. Table 3-3 summarizes the water sample results. TPH concentrations ranged from < 100 to 9,700 micrograms per liter (μg/l) with the highest concentration occurring in MW-03. Iron concentrations ranged from < 100 to 3,100 μg/l with the highest concentration occurring in MW-04. Sulfate concentrations ranged from 1,500 to 2,100 mg/l with the highest concentration occurring in MW-03. Based on historical information and previous sampling in the area, the source of TPH is reportedly from a past diesel fuel release.

4.0 DESCRIPTION OF *IN SITU* AIR SPARGING/VAPOR EXTRACTION PILOT TESTS

4.1 Description of the Tests

The AS/SVE pilot tests were conducted on April 15 - April 18, 1996. The primary objective of the tests was to assess the feasibility of using air sparging in conjunction with vapor extraction to minimize H_2S generation in the area southwest of the Officers Club. The data collected during the tests will also be used to determine design parameters for the AS/SVE system installation. These parameters include ROI, injection pressure, and flowrate.

Initial depth to water, dissolved oxygen (DO), hydrocarbon, H_2S, methane, CO_2, and O_2 concentrations and static wellhead pressure were recorded at SMP-01, SMP-02, SMP-03, MW-01, MW-02, MW-03, and MW-04 prior to beginning the tests. The data collected during the tests are recorded on the Pilot Test Field Data Records presented in Appendix D, and in the Field Notes included in Appendix A-4.

Next, a positive displacement blower (Roots model 36 URAI®) was attached to VET-01, which was used as a vapor extraction well. VET-01 is a horizontal well consisting of a 10-foot long section of 4-inch diameter slotted PVC pipe installed in a trench at 4 feet bgs. The slotted PVC pipe terminates at a vertical riser where the vapor extraction blower was attached. The extracted vapor passed through a 200-pound granular activated carbon unit prior to discharge to the atmosphere.

4.1.1 Vapor Extraction Tests 1 through 3

On April 15, 1996, the initial test on VET-01 was conducted for 26 minutes with the dilution valve open 75% (test #1). The vacuum and flowrate were 6 inches of water column (IWC) and <25 scfm, respectively. Also on April 15, a test was conducted for 30 minutes on VET-01 at 50% dilution with a vacuum and flowrate of 15 IWC and 105 scfm,

respectively (test #2). On April 16, the last vapor extraction test was performed for 140 minutes on VET-01 using no dilution air and the vacuum at the well ranged from 22 to 26 IWC while the flowrate ranged from 124 to 145 scfm (test #3). Vacuum and flowrate data are presented in Appendix D. Hydrogen sulfide was not detected during the vapor extraction pilot tests, but VOC concentrations ranged from 200 to 3,580 parts per million by volume (ppmv). Air samples were taken after 40 minutes and 140 minutes during test #3.

4.1.2 Sparge Tests 4 through 6

On April 16, 1996, a sparge test was performed using the 18 to 20-foot screened interval of well SP-01 for air injection (test #4). The test was conducted for 4½ hours. A Roots model 33 URAI® positive displacement blower was used to achieve air injection pressures ranging from 8.7 to 9.8 pounds per square inch (psi) and flowrates ranging from 10 to 15 scfm during the test. Pressure, O_2, CO_2, H_2S, helium, DO, and depth to water were measured periodically in SMP-01, SMP-02, SMP-03, MW-01 and MW-03. During the sparge test, 130 scfm of air at 20 IWC of vacuum was extracted continuously from VET-01. An air sample was taken from VET-01 after 4½ hours of operation.

After the initial 4½ hour test, helium was injected into SP-01 at the 18 to 20-foot interval. Undiluted helium was injected at 20 psi for 39 minutes. The concentration of helium was monitored for one hour after injection at SMP-01, SMP-02, SMP-03, MW-01, MW-03, and VET-01. The flowrate from VET-01 was 140 scfm during the helium tracer test.

On April 17, 1996, a sparge test was conducted on SP-01 at the 28 to 30-foot interval (test #5). The test was conducted for 3½ hours. A Roots model 33 URAI® positive displacement blower was used to achieve air injection pressures ranging from 9.4 to 11 psi and flowrates ranging from 2 to 7 scfm during the test. Pressure, O_2, CO_2, H_2S, DO, and depth to water were measured periodically in SMP-01, SMP-02, SMP-03, MW-01, and MW-03. During the sparge test, 120-150 scfm of air at 22 IWC of vacuum was extracted continuously from VET-01. An air sample was taken from VET-01 after 3½ hours of operation.

After the initial 3½ hour test, helium was injected into SP-01 at the 28 to 30-foot interval. Undiluted helium was injected at 20 psi for 42 minutes. The concentration of helium was monitored for 2½ hours after injection at SMP-01, SMP-02, SMP-03, MW-01, MW-03, and VET-01. The flowrate from VET-01 ranged from 125-155 scfm during the helium tracer test.

On April 18, 1996, a sparge test was conducted on SP-01 at the 37.5 to 39.5-foot interval (test #6). The test was conducted for 3 hours. A Roots model 33 URAI® positive displacement blower was used to achieve air injection pressures ranging from 10 to 12.6 psi and flowrates ranging from <2 to 5 scfm during the test. Pressure, O_2, CO_2, H_2S, helium, DO, and depth to water were measured periodically in SMP-01, SMP-02, SMP-03, MW-01 and MW-03. During the sparge test, 115-130 scfm of air at 17-21 IWC of vacuum was extracted continuously from VET-01. An air sample was taken from VET-01 after 3 hours of operation.

After the initial 3 hour test, helium was injected into SP-01 at the 37.5 to 39.5-foot interval. Undiluted helium was injected at 20 psi for 47 minutes. The concentration of helium was monitored for 2½ hours after injection at SMP-01, SMP-02, SMP-03, MW-01, MW-03, and VET-01. The flowrate from VET-01 ranged from 125-130 scfm during the helium tracer test.

All air samples were collected at the influent of the carbon unit. Samples were collected in 6-liter SUMMA canisters for analysis by Modified EPA Method TO-3 (TPH) and EPA Method TO-14 (VOCs). Samples were also collected in TEDLAR® bags for analysis by ASTM Method D5504 (sulfur gases). All air samples were placed in opaque containers and submitted to Air Toxics LTD. in Folsom, California for analysis. The analytical results are summarized in Table 4-1. Analytical laboratory reports and chain of custody records are provided in Appendix E.

4.2 Results of the Tests

4.2.1 Radius of Influence for Vapor Extraction

The field measurement used to estimate the ROI for a vapor extraction system is the vacuum measured in various monitoring points. Data from test #3 were used to calculate the ROI. Test #3 was conducted at maximum applied vacuum conditions and flow. The induced vacuums developed at the monitoring points are shown graphically in Figure 6 as a plot of vacuum versus distance from VET-01. Figure 7 is a graph of the wellhead vacuum versus flowrate. The data is also tabulated in Appendix D. Pertinent test results are summarized below.

- At an applied vacuum of 22 IWC, an average flowrate of 152 scfm was achieved in VET-01.
- Well MW-01, located 7 feet from the VET-01 vertical riser, had an average measured induced vacuum of 0.15 IWC during the test.
- Well MW-03, located 29 feet from the VET-01 vertical riser, had an average measured induced vacuum of 0.02 IWC during the pilot test.

The ROI is assumed to end where the induced vacuum drops below 0.1 IWC. Based on the graph shown in Figure 6, the ROI for VET-01 is 11 feet at an applied vacuum of 22 IWC. This value is considered very conservative since the soil underlaying the vapor extraction trench has a relatively high permeability which will minimize the generation of large negative pressures. Since well SP-01 is located 7 feet from the vapor extraction trench, it is likely that VET-01 could capture the majority of fugitive vapors that would be generated by air sparging in SP-01. The average flowrate from VET-01 was 152 scfm at an applied vacuum of 22 IWC as shown in Figure 7.

4.2.2 Mass Removal Rates for Vapor Extraction

During test #3, hydrocarbon concentrations in the extracted vapor stream were measured with a portable organic vapor analyzer. Effluent hydrocarbon concentrations ranged from 1,500 ppmv to 1,920 ppmv over 140 minutes of vapor extraction with an average of 1,678 ppmv (Figure 8). The flowrates ranged from 140 to 170 scfm with an average of 152 scfm (Figure 7). The average TPH mass removal rate from VET-01, based on field measurements, is 4.05 pounds per hour (lb/hr).

Two air samples were taken during the vapor extraction test on VET-01. One air sample was collected after 40 minutes of operation and another after 140 minutes of operation. The air sample taken after 40 minutes was analyzed by Modified EPA Method TO-3 for TPH, TO-14 for VOCs, and ASTM Method D5504 for reduced sulfur compounds. The air sample taken after 140 minutes was only analyzed using Modified EPA Method TO-3 and EPA Method TO-14. Both samples were similar in TPH concentration (33 vs. 32 ppmv). Hydrogen sulfide was not detected after 40 minutes of operation. Benzene, trichloroethene, toluene, m,p-xylene, 1,2,4-trimethylbenzene, acetone, hexane, tetrohydrofuran, cyclohexane, and heptane were all detected at low levels (3.1 to 160 parts per billion by volume [ppbv]). Aside from TPH, the highest concentration detected was hexane in the 140 minute sample (160 ppbv). Air sample analytical results are provided in Appendix E. The TPH mass removal rate from VET-01, based on analytical data, was 0.08 lb/hr. The maximum H_2S mass removal was 7.6×10^{-5} pounds per day (lb/day), based on a possible concentration of 4 ppmv which is the detection limit for H_2S.

The discrepancy between the TPH concentrations measured by field instruments and the laboratory analytical results is likely due to methane being present in the effluent. This theory is supported by the field concentration measurements taken before and after the carbon drum which show that the carbon is only removing 0 to 140 ppmv of TPH. As confirmed by the analytical results, the influent contains only 33 ppmv of TPH, so the difference is likely methane. Methane exists in the effluent at a concentration around 1,500 ppmv as measured with an instrument calibrated to hexane. Therefore, it is likely

that the actual TPH mass removal rate from VET-01 will be 0.08 lb/hr when the sparge system is not in operation.

Air samples taken during the sparge tests indicate that TPH concentrations up to 67 ppmv and H_2S concentrations up to 250 ppbv, with a corresponding flowrate of 133 scfm, may be encountered during air injection in SP-01. Therefore, the maximum TPH mass removal rate from VET-01, based on laboratory data taken while sparge well SP-01 was in operation, was 0.14 lb/hr. The maximum H_2S mass removal was 4.2×10^{-3} lb/day.

4.2.3 Modeling Results for the Vapor Extraction Test

The data from test #3 was input into a vapor extraction model called VENT-ROI that was created by Groundwater Technology, Inc. The program was used to estimate design parameters for the full-scale system by determining an effective ROI for both physical (volatilization) and biological processes. Several assumptions concerning the expected conditions to be encountered during air sparging were made, including the modeling of H_2S as an extremely volatile compound. Diesel was input at the concentrations encountered in the unsaturated zone. A flowrate of 170 scfm at 27 IWC was used during the modeling.

The results of the modeling indicate that H_2S, or any other highly volatile compounds such as benzene, may be captured and removed by volatilization for a radius up to 159 feet around the vapor extraction trench (VET-01). The model also indicates that diesel contamination within a 75-foot radius can be effectively removed by biodegradation during vapor extraction from VET-01. The complete modeling results are shown in Appendix F.

As previously mentioned in Section 4.2.1, the measured ROI for VET-01 was determined to be 11 feet, with some influence up to 29 feet away (the distance to well MW-03). The ROI predicted by VENT-ROI is based on the solution to a vadose zone fate and transport model which assumes ideal (isotropic) conditions. The measured ROI is considered more accurate than that calculated by VENT-ROI.

4.2.4 Radius of Influence for In Situ Air Sparging

Field measurements used to estimate the ROI for a sparge system include induced pressure, groundwater mounding, and DO, O_2, CO_2, helium, and H_2S concentrations. Each of these parameters were measured during the course of the sparging pilot tests. Graphs of groundwater mounding and DO versus distance from the sparge well SP-01 are presented in Figures 9 and 10, respectively. The test data are also shown in tabular form in Appendix D. A summary of the test results is presented below.

Results for the test on SP-01 at the 18 to 20-foot interval (test #4):

- O_2 levels in all monitoring points except MW-03 (12.3 to 18.5%) remained at saturation levels (20.1 to 20.7%).

- Increases in water table elevation (groundwater mounding) occurred at all monitoring points. The elevation change was very minor in SMP-02 (38-40 feet) and MW-03. A maximum water table mound of 2.54 feet above the static water table was observed in SMP-01 (18-20 feet), located 10.0 feet from SP-01.

- Elevated DO concentrations were noted at all monitoring points. The most significant rises in DO occurred in MW-01 and MW-03 (0.70 to 1.75 mg/l and 0.65 to 1.8 mg/l, respectively).

- Helium was detected above instrument background levels in only one monitoring point during the tracer test; 0.9% helium was detected in SMP-01 (28-30 feet). Up to 2.6% helium was detected in SVE flow from VET-01.

- CO_2 was only present in well MW-03 (a maximum of 4%).

- H_2S was present in well MW-03 and SMP-03 (18-20 feet) (maximum of 95 and >200 ppbv, respectively).

- No significant (>0.05 IWC) induced pressures were observed in any of the sparge monitor points.

Results for the test on SP-01 at the 28 to 30-foot interval (test #5):

- O_2 levels in all monitoring points except MW-03 (12.3 - 16.7%) and SMP-01 (28-30 feet) (17.3 - 17.5%) remained at saturation levels.

- Increases in water table elevation occurred at all monitoring points. The elevation change was minor in MW-01 and MW-03. A maximum water table mound of 3.87 feet above the static water table was observed in SMP-01 (18-20 feet), located 10.0 feet from SP-01.

- Elevated DO concentrations were noted at all monitoring points. The most significant rises in DO occurred in MW-01 and SMP-01 (18-20 feet) (0.70 to 1.3 mg/l and 0.35 to 1.40 mg/l, respectively).

- SMP-01 (all depths) was the only monitoring point where helium was detected. The maximum concentrations detected at the 18 to 20-, 28 to 30-, and 38 to 40-foot intervals were 5.0, 3.3, and 14%, respectively. Up to 0.20% helium was detected in SVE flow from VET-01.

- CO_2 was only present in well MW-03 and SMP-01 (28-30 feet) (maximum of 4.6% and 0.4%, respectively)

- H_2S was present in well MW-03, SMP-01 (38-40 feet), SMP-03 (18-20 feet), and SMP-03 (38-40 feet) (maximum of >200, >200, >200, and 10 ppmv, respectively).

- Induced pressures of 0.2 and 0.4 IWC were observed in well SMP-01 (28-30 feet) at 40 and 130 minutes, respectively. No other induced pressures were observed in the other sparge monitoring points.

Results for the test on SP-01 at the 37.5 to 39.5-foot interval (test #6):

- O_2 levels in all monitoring points except MW-03 (14.5 - 16.8%) and SMP-01 (28-30 feet) (8.8 - 20.4%) remained at saturation levels.

- Increases in water table elevation occurred at all monitoring points. The elevation change was very minor in MW-01, MW-03, and SMP-03. A maximum water table mound of 3.4 feet above the static water table was observed in SMP-01 (28-30 feet), located 10.0 feet from SP-01.

- Elevated DO concentrations were noted in all wells except SMP-03 (18-20 feet). The greatest increase (0.25 to 6.60 mg/l) occurred at SMP-01 (28-30 feet).

- Helium was detected only in SMP-01. The maximum helium concentrations detected at the 18 to 20-, 28 to 30-, and 38 to 40-foot intervals were 1.7, 89, and 1.6%, respectively. Up to 0.30% helium was detected in SVE flow from VET-01.

- CO_2 was only present in well MW-03 and SMP-01 (28-30 feet) (maximum of 3.3 and 0.3%, respectively).

- H_2S was present in well MW-03, SMP-03 (18-20 feet), SMP-03 (28-30 feet) and SMP-03 (38-40 feet) (maximum of 19, >200, 2, and 18 ppmv, respectively).

- No induced pressures were observed in any of the sparge monitoring points.

The DO and helium concentrations are typically used as the best estimators for the ROI for sparging since they provide compelling evidence of where air is traveling in the groundwater. Based on DO data and helium concentrations, it can be concluded that the ROI for well SP-01 at all depths is greater than 10 feet (the distance to SMP-01). Air injection into the 18 to 20- and 28 to 30-foot intervals caused minor elevations in DO in SMP-02 (20 feet away) and SMP-03 (30 feet away). Helium injected into the 18 to 20- and 28 to 30-foot intervals did not reach SMP-02, MW-01, MW-03, or SMP-03. At the

37.5 to 39.5-foot interval, the ROI appears to be less than 20 feet (the distance to SMP-02). Therefore, based on all available data, the ROI for SP-01 at 18-20 and 28-30 feet is assumed to be 20 feet, while the ROI at 37.5 - 39.5 feet is assumed to be 15 feet.

4.2.5 Injection Pressure and Flowrate

The pressure required to achieve breakthrough was recorded for each test. For the test on SP-01 at the 18 to 20-foot interval, breakthrough occurred at a pressure of 8 pounds per square inch gauge (psig) and a flow rate of 10 scfm was established. For the test on SP-01 at the 28 to 30-foot interval, breakthrough occurred at a pressure of 10 psig and a flowrate of 5 scfm was established. For the test on SP-01 at the 37.5 to 39.5-foot interval, breakthrough occurred at a pressure of 10 psig and a flowrate of 2 scfm was established. Breakthrough was achieved in a few minutes for all the tests.

4.3 Summary of Pilot Test Results

The conclusions of the short-term AS/SVE pilot test are summarized below.

- The radius of influence for VET-01 is 11 feet with some minor influence detected as far away as 29 feet (the distance from VET-01 to well MW-03).
- At an applied vacuum of 22 IWC, an average flowrate of 152 scfm was achieved in VET-01.
- The maximum TPH mass removal rate from VET-01 was 0.08 lb/hr with no sparging.
- The maximum H_2S mass removal rate from VET-01 was 7.6×10^{-5} lb/day with no sparging.
- The maximum TPH mass removal rate from VET-01 was 0.14 lb/hr with sparging.
- The maximum H_2S mass removal rate from VET-01 was 4.2×10^{-3} lb/day with sparging.
- The sparge radius of influence for SP-01 is approximately 20 feet at the 18 to 20- and 28 to 30-foot intervals, and 15 feet at the 37.5 to 39.5-foot interval.

- A minimum pressure of 10 psig was needed to achieve sparge breakthrough in all SP-01 intervals.
- Maximum sparging operating pressures of 9.8, 11, and 12.6 psig and maximum operating flowrates of 15, 7, and 5 scfm, respectively, were achieved during testing on SP-01 at the 18 to 20-foot, 28 to 30-foot, and 37.5 to 39.5-foot intervals, respectively.

The results of all the pilot tests, coupled with the modeling results, indicate that VET-01 will effectively capture fugitive vapors generated by the operation of sparge well SP-01 at all depths. It is also apparent from the low O_2 levels and the elevated H_2S and CO_2 levels that there is biological activity occurring in the vicinity of MW-03. This is a strong indication of significant hydrocarbon mass in the soil and groundwater adjacent to MW-03. The short-term pilot testing conducted from April 15 - April 18, 1996 had a limited effect in raising the DO level in the monitoring points. It is likely that DO levels will increase with time as O_2 diffuses into groundwater.

5.0 RECOMMENDATIONS AND BASIS FOR DESIGN

5.1 Recommendations and Basis for Design

Prior to testing air sparging and soil vapor extraction for remediation of diesel contamination and abatement of H_2S odors at the Officers Club, several other technologies were considered and were deemed unsuitable. First, a no action alternative was considered, but was rejected due to the potential for vapors to migrate into the Officers Club, and for H_2S odors to persist. Oxygen Releasing Compound (ORC®) was considered as a method for oxygenation of the groundwater, which could result in aerobic biodegradation of diesel fuel and elimination of the anaerobic production of H_2S. The problem with this method is the quantity of O_2 required and the amount of O_2 the ORC® can deliver, as well as the high cost of ORC® per pound of O_2 released. Pump and treat technology was ruled out due to the long period of time required for treatment, and the problems associated with pumping and disposing of the poor quality groundwater at the site. Finally, excavation of the contaminated soil was considered, but the volume, proximity to the Officers Club building, and excavation below the water table rendered this option unattractive.

In situ air sparging and vapor extraction were considered the most technologically and cost-effective treatment option. Air sparging would serve to oxygenate the groundwater, which would transform the anaerobic, chemically reduced environment to an aerobic, oxidized one. This in turn will enhance growth of naturally occurring aerobic microorganisms that will degrade the diesel fuel contaminants and halt the production of H_2S. Vapor extraction will insure that any H_2S gas in the unsaturated zone is captured and prevented from migrating to the surface or into the Officers Club, while also adding O_2 to the unsaturated zone to promote aerobic biodegradation of diesel contaminants that may be adsorbed to soil.

Pilot testing of air sparging and vapor extraction was conducted at the site to establish design parameters. Results indicated that existing air sparging wells and the vapor

extraction trench can be utilized effectively to remediate the area at the southwest corner of the Officers Club. Best results for air sparging were obtained by injecting air into the medium depth sparge well, screened from 28 to 30 feet bgs. The vapor extraction trench proved effective in controlling H_2S vapors up to 27 feet away from the extraction trench (the distance to SMP-02). Test results indicated that no air pollution control equipment would be required during operation of an AS/SVES. Helium tracer tests during sparging indicated that sparging in the middle zone influences groundwater from 18 feet to 40 feet bgs. Test results indicated that O_2 was being consumed, and CO_2 was generated, indicating that aerobic biodegradation was stimulated by air sparging and vapor extraction.

Areas of high H_2S production were localized in the eastern portion of the area assessed with diesel hydrocarbons in soil, and were not present over the entire area where diesel hydrocarbons are present. It is possible other organic material is present in the subsurface and is contributing to H_2S production. Nevertheless, the process of air sparging will promote aerobic biodegradation of the organic material, eliminating production of H_2S. It is estimated that the organic material (diesel and non-diesel) will be sufficiently degraded within one year to levels that are below 1,000 ppm, and to levels which do not produce H_2S. This is dependent on there being no continued source of non-diesel organic contaminant (i.e., sewer leak).

6.0 CONCEPTUAL DESIGN

6.1 Conceptual Design

The conceptual design is to air sparge into existing well SP-01, which is screened from 28 to 30 feet bgs, and to extract vapors from the existing vapor extraction trench, VET-01. The vapor extraction flow rate would be approximately 200 scfm under an applied vacuum of 35 IWC. Air sparging would be conducted at a flow rate of 6 scfm at an injection pressure of 10 psi.

A 5-horsepower regenerative blower could be used for vapor extraction, while a 2-horsepower rotary vane pump could be used for air injection. The pumps could be mounted on a small (6 feet by 6 feet) concrete pad located behind the retaining wall or near the chillers for the building's heating ventilation and air conditioning (HVAC) system. The blowers could be placed inside a noise suppressing housing and/or placed on timers to minimize noise during Officers Club open hours. All piping to the well and trench would be underground.

In the case that off-gas treatment would become necessary, activated carbon canisters could be placed at the pump pad and plumbed into the vapor extraction discharge line. The only controls in place, other than a timer, if desired, would be an interlock that would cause the air sparging pump to turn off in case of failure of the vapor extraction blower. This would insure that air sparging was not conducted without vapor extraction.

7.0 REFERENCES

AFCEE, February 1994, *Addendum One to Test Plan and Technical Protocol for a Field Treatability Test for Bioventing: Using Soil Gas Surveys to Determine Bioventing Feasibility and Natural Attenuation Potential.*

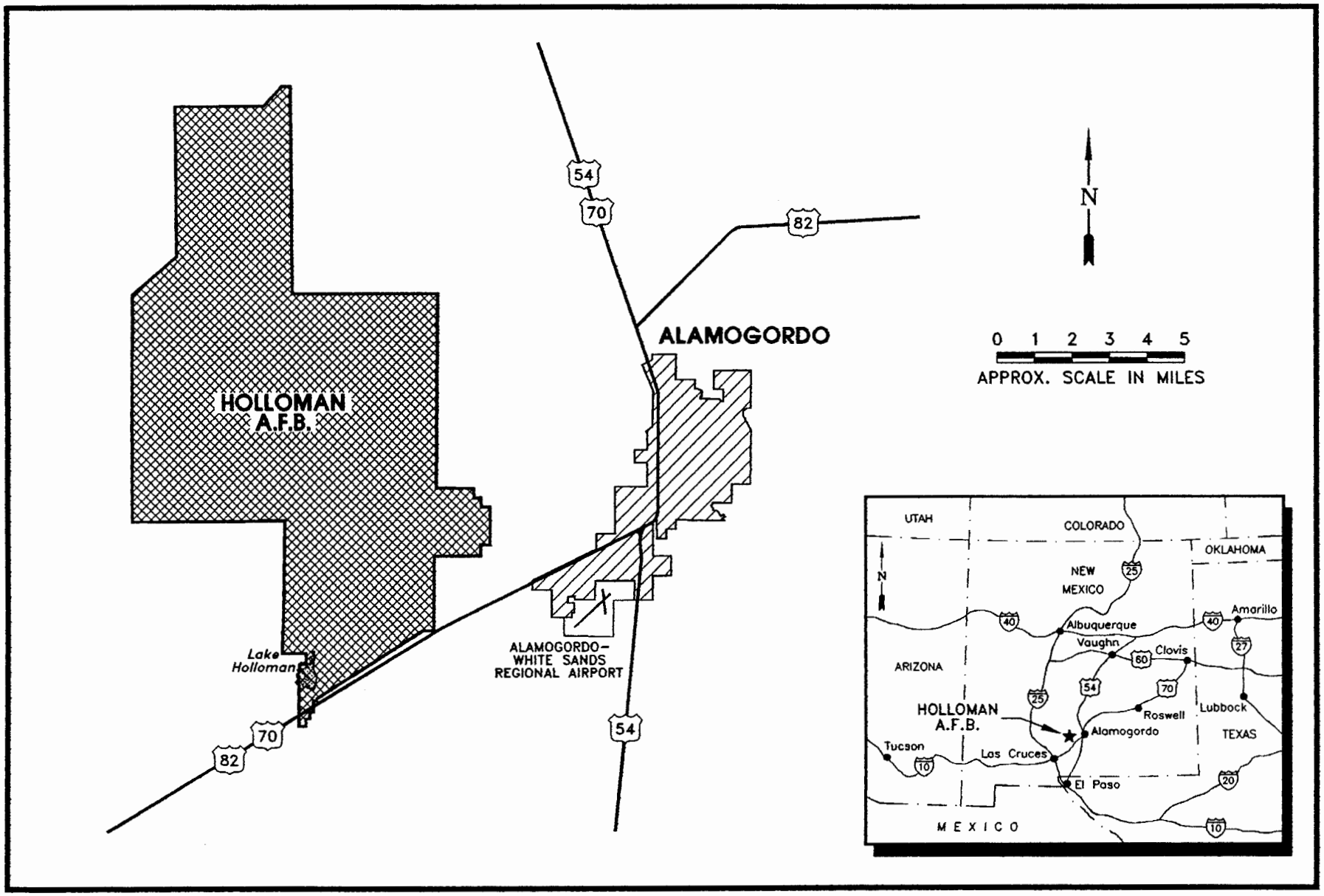
FWENC and Groundwater Technology, Inc., October 1995, *Draft Final Work Plan, Remediation at Site SS-57 - Officers Club.*

EPA, May 1995, *How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites, A Guide for Corrective Action Plan Reviewers,* EPA 510-B-95-007

Hinchee, R.E., Ong, S.K., Miller, R.N., Downey, D.C., Frandt, R., May 1992, *Test Plan and Technical Protocol for a Field Treatability Test for Bioventing* prepared for AFCEE.

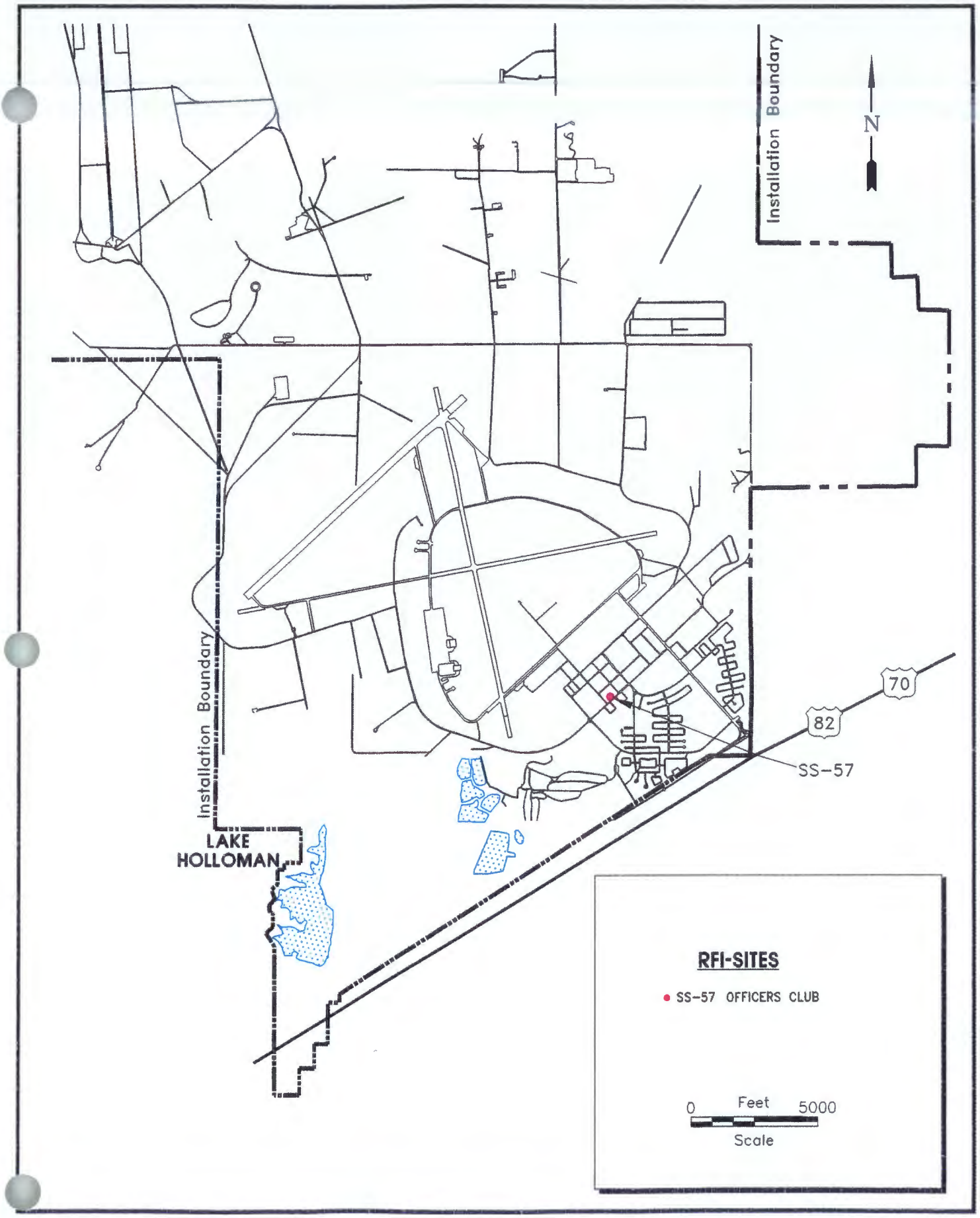
Radian, May 1993, *Sampling and Quality Control Summary Report, Officers Club Soil Investigation, Holloman Air Force Base, New Mexico.*

Wilson & Company, June 1992, *Study to Determine Source of Odor at the Officers Club.*



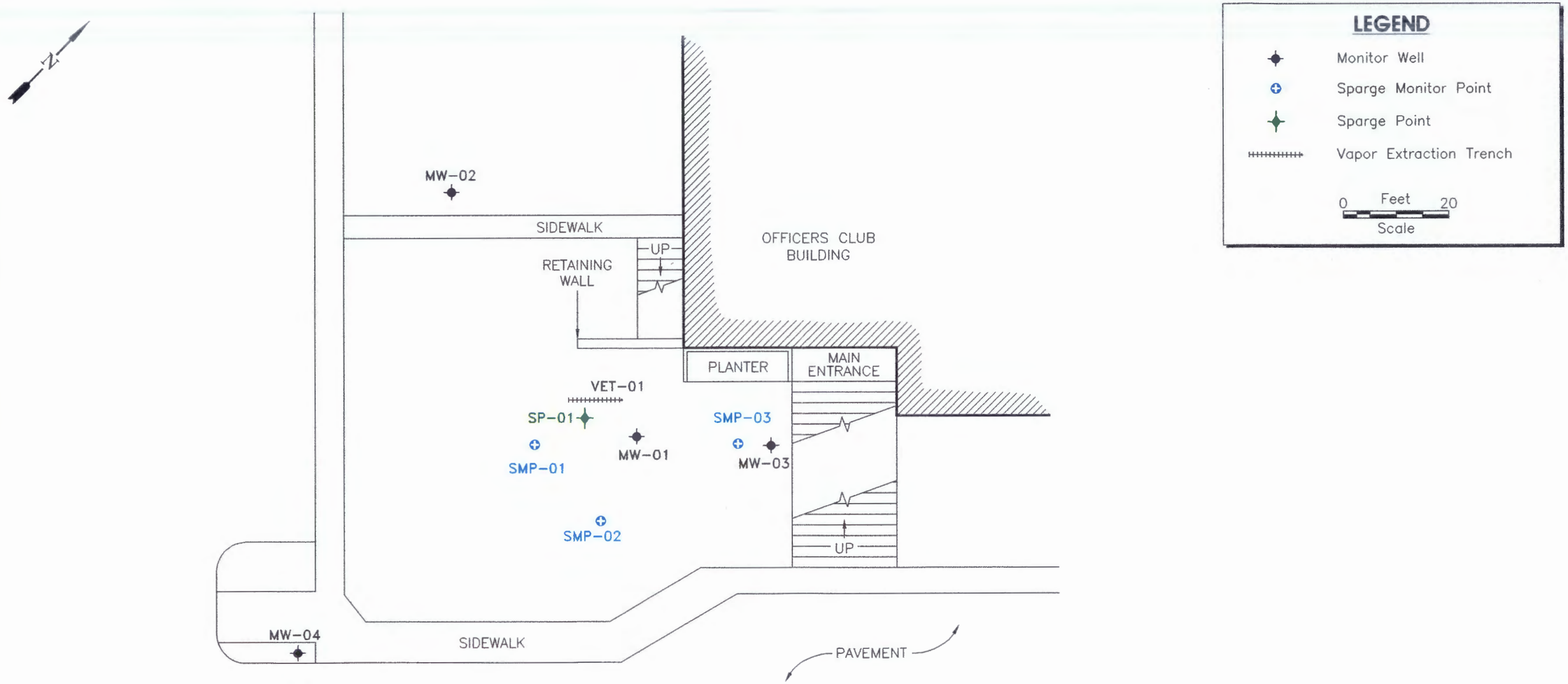
2201SITE

FIGURE 1, LOCATION MAP
SITE SS-57, HOLLOMAN AIR FORCE BASE



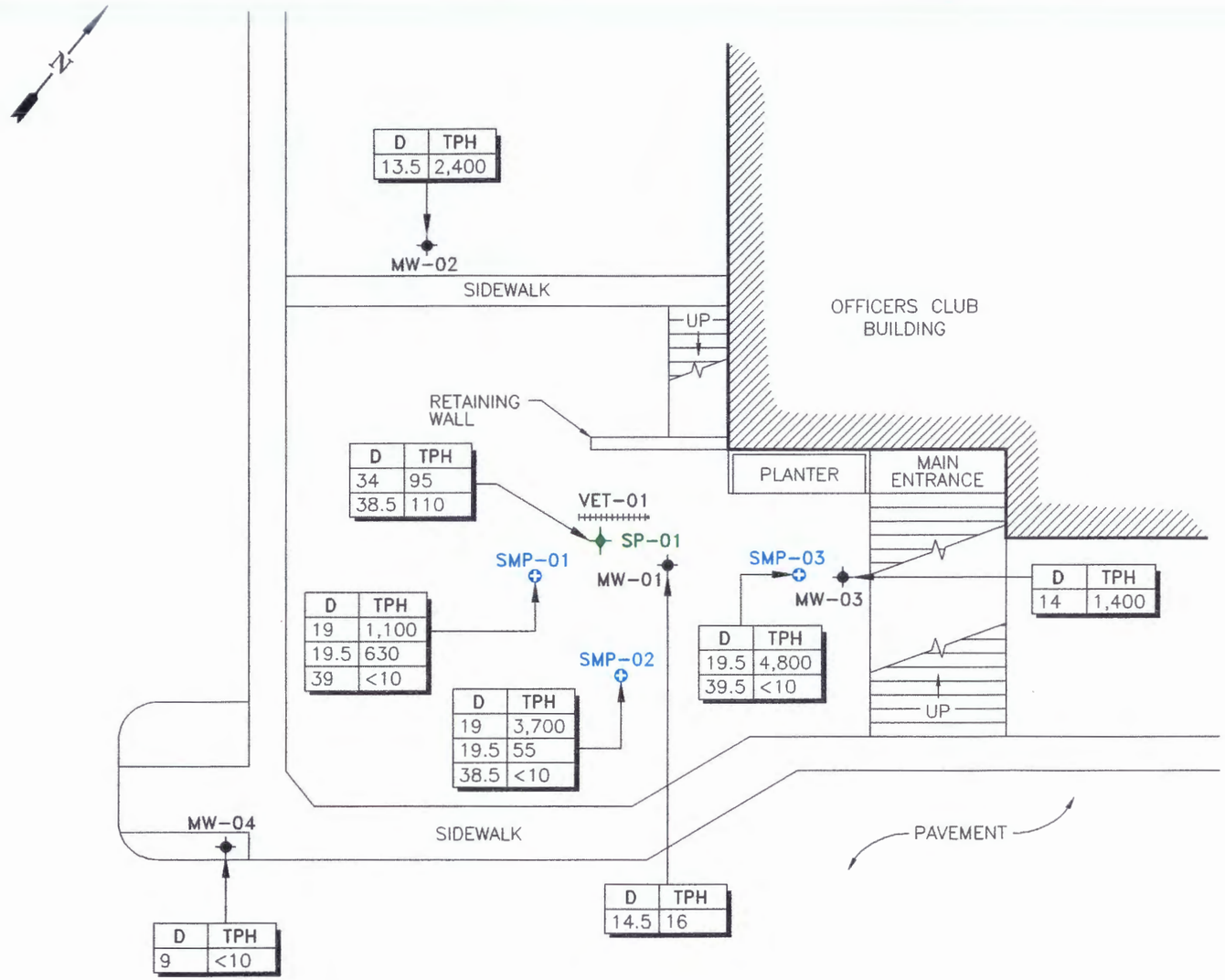
2201FAMD

FIGURE 2, FACILITY MAP
SITE SS-57, HOLLOMAN AIR FORCE BASE



2208-SM, 9/26/96 (1:20)

Figure 3: Site SS-57, Officers Club Site Map



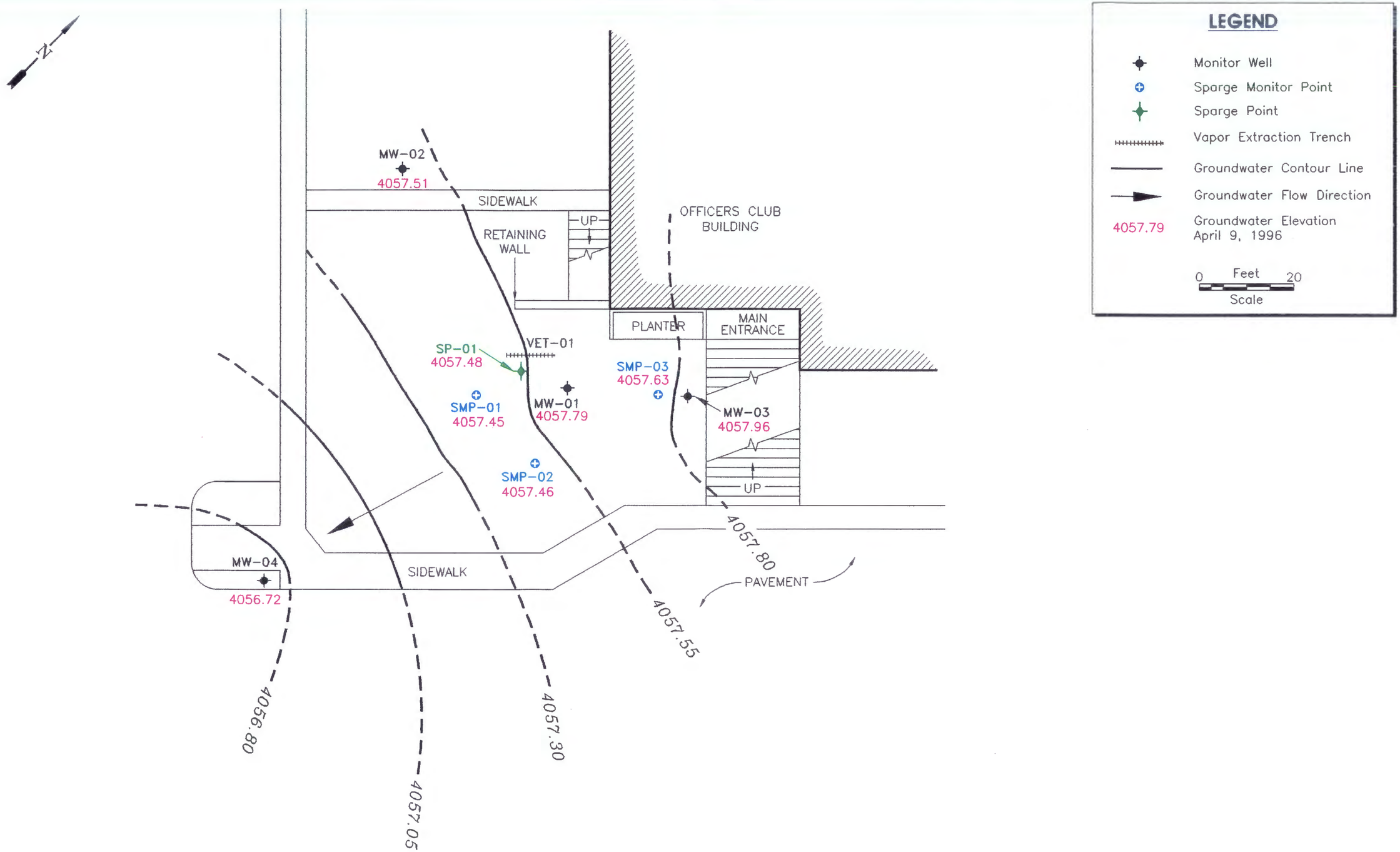
LEGEND

✦	Monitor Well
⊕	Sparge Monitor Point
✦	Sparge Point
++++++++++	Vapor Extraction Trench
D	Depth Of Soil Sample Below Ground Surface (Feet)
TPH	Concentration Of Total Petroleum Hydrocarbons as Diesel Fuel in Soil (mg/kg)
<	Analyte Not Indicated Above Stated Reporting Limit

0 Feet 20
Scale

2208BASX, 9/27/96 (1:20)

Figure 4: Site SS-57, TPH Distribution in Soil
March 1996



2208-GW, 9/26/96 (1:20)

Figure 5: Site SS-57, Groundwater Gradient Map, Based on Data from April 9, 1996 Gauging

Figure 6: Induced Vacuum Versus Distance During Test Number Three (140 min.) on VET-01 at an Applied Vacuum of 22 Inches Water Column

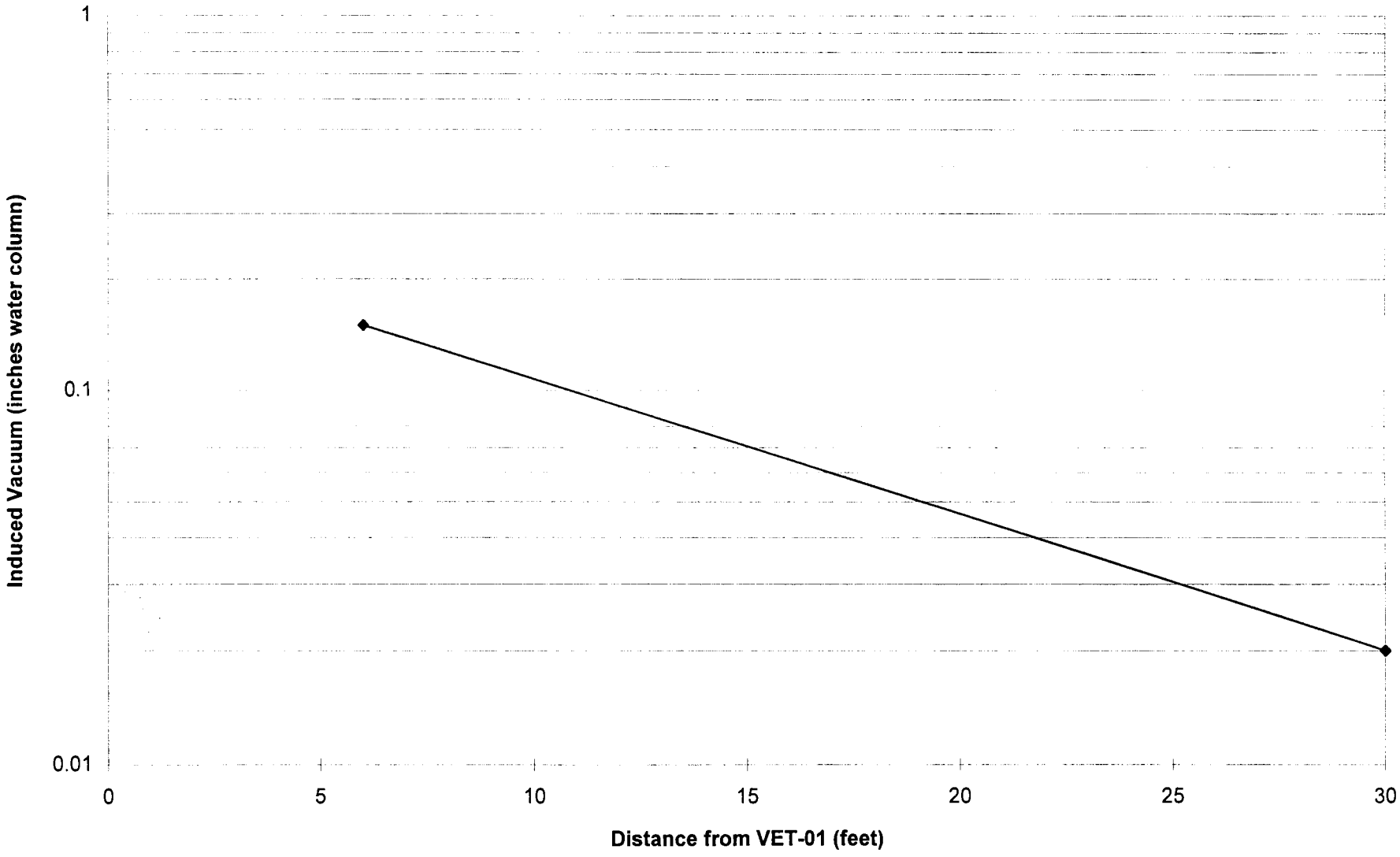


Figure 7: Wellhead Vacuum Versus Flowrate During Test Number Three on VET-01

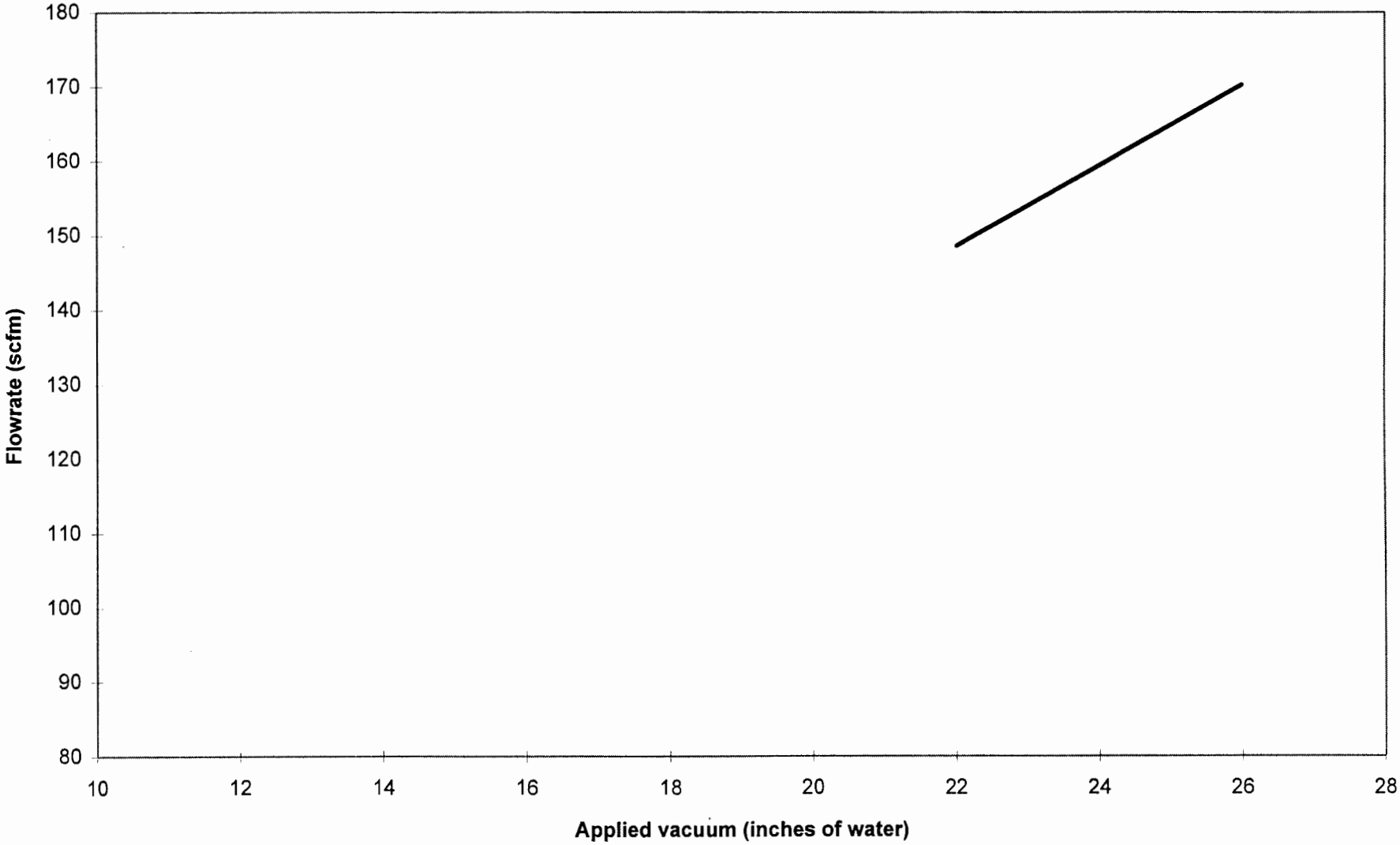


Figure 8: Extracted Hydrocarbon Concentrations vs Time for Test Number Three on VET-01

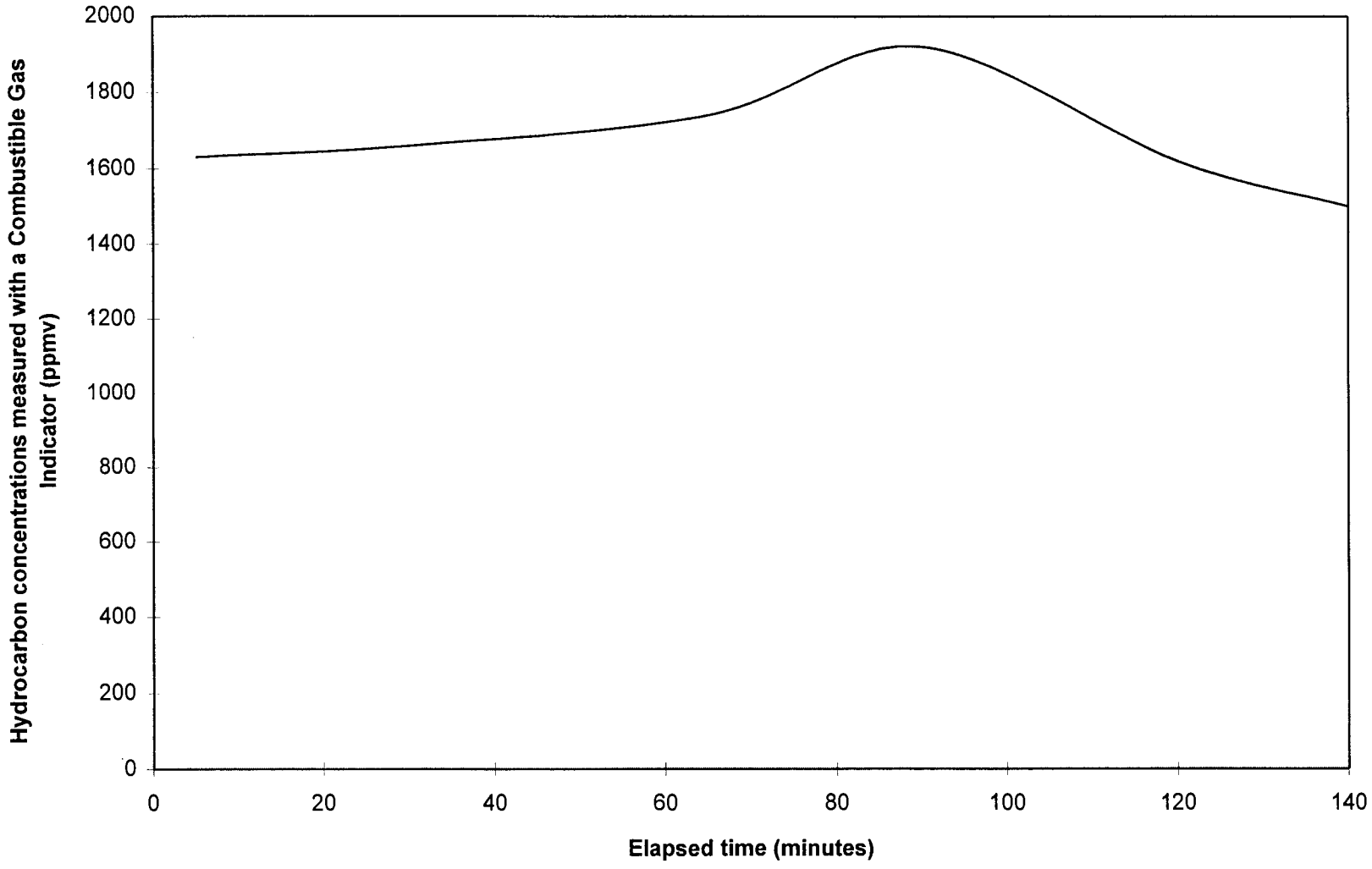


Figure 9: Groundwater Elevation Versus Distance During Test Number 5 After 190 Minutes

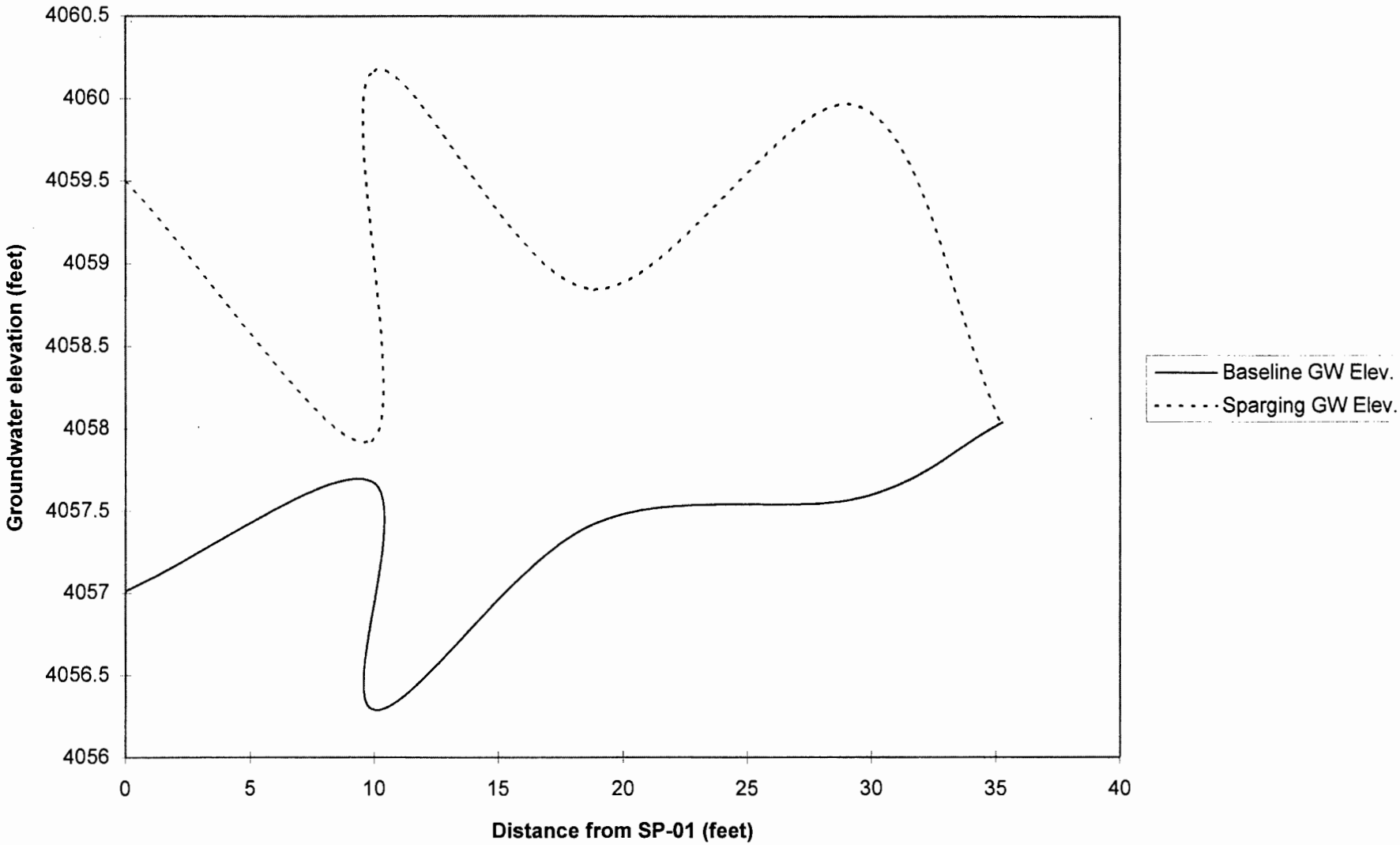
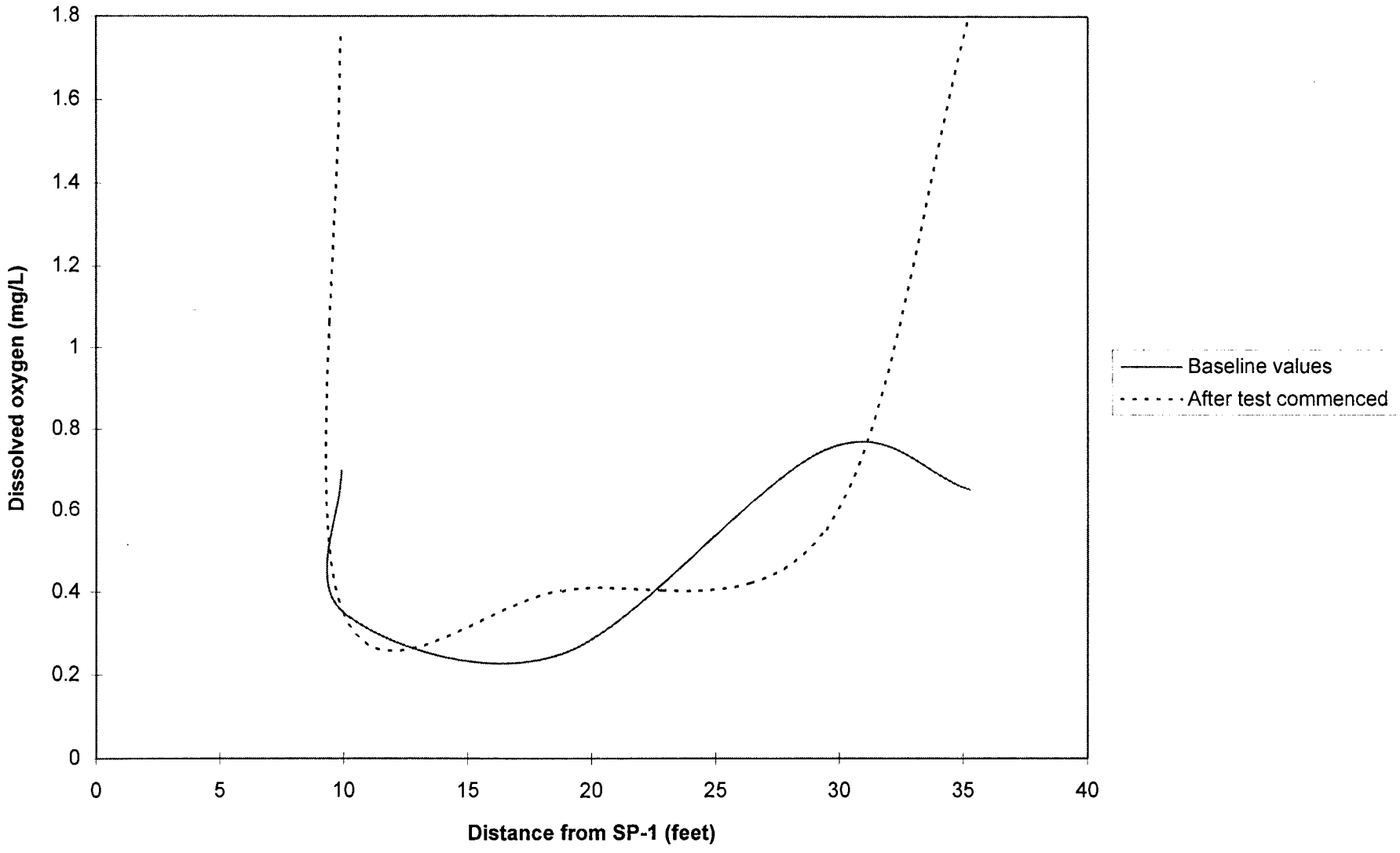
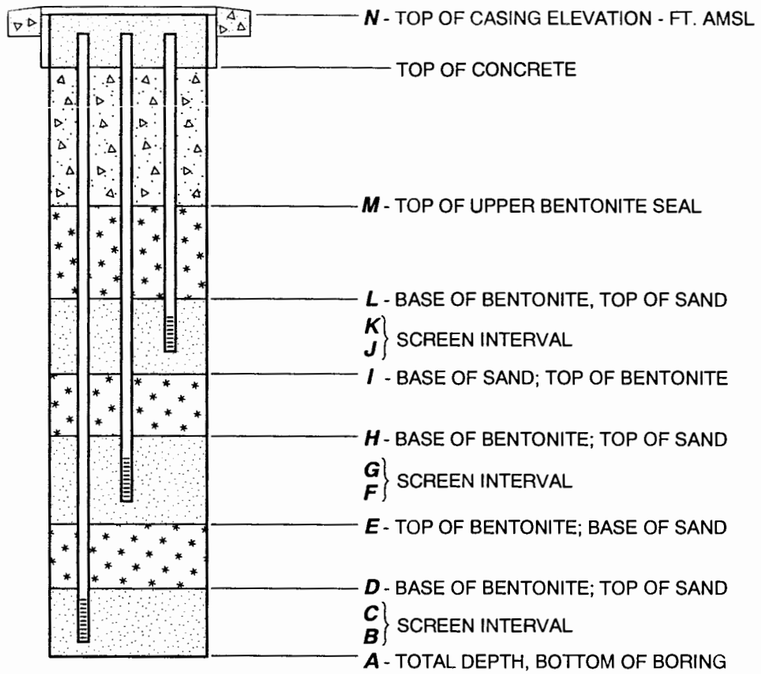


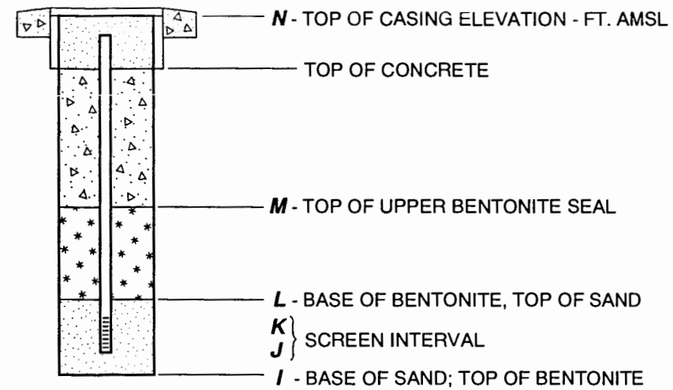
Figure 10: Dissolved Oxygen Versus Distance for Test No. 4 (180 min.)
Based on Data from MW-01, MW-03 and the 18-20 feet intervals of the SMP wells



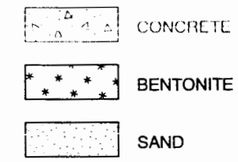
TRIPLE-NESTED WELL CONSTRUCTION DIAGRAM



GROUNDWATER MONITOR WELL CONSTRUCTION DIAGRAM



LEGEND



DATA SUMMARY TABLE

WELL ELEMENT	CODE	A	B	C	D	E	F	G	H	I	J	K	L	M	N_S	N_I	N_D
WELL TYPE	WELL NAME	DEPTH TO WELL ELEMENT (FT. BGS)													TOP-OF-CASING ELEVATION (FT. AMSL)		
TRIPLE-NESTED AIR SPARGE	SP-01	41	39.5	37.5	36	31	30	28	27	21	20	18	16.5	6	4068.78	4068.75	4068.85
TRIPLE-NESTED AIR SPARGE MONITOR	SMP-01	41	40	38	36	31	30	28	27	21	20	18	17	6	4068.13	4068.12	4068.12
	SMP-02	40.5	39	37	36	31	30	28	27	21	20	18	17	6	4068.13	4068.13	4068.13
	SMP-03	42	40	38	36.5	29	28	26	25.5	21	20	18	17	6	4069.85	4069.90	4069.83
GROUNDWATER MONITOR (SINGLE CASING)	MW-01	NA								17	15	5	4.5	2	4069.41	NA	
	MW-02	NA								15	14	4	3.5	2	4067.88	NA	
	MW-03	NA								17.5	17	7	6.5	2	4069.91	NA	
	MW-04	NA								14	13	3	2.5	2	4065.19	NA	

NOTES:

AMSL – ABOVE MEAN SEA LEVEL

BGS – BELOW GROUND SURFACE

NA – NOT APPLICABLE

OFFICERS CLUB, SS-57

PROJECT NO.: 812200083507 | **LOCATION: HOLLOMAN AFB, N.M.**

TABLE 2-1

SUMMARY OF WELL CONSTRUCTION DATA

TABLE 3-1
SUMMARY OF SOIL ANALYTICAL RESULTS
OFFICERS CLUB, SS-57
HOLLOMAN AFB, NEW MEXICO
MARCH 1996

Sample No. SS57-	MW01-14.5-15	MW02-13.5-14	MW03-14-14.5	MW04-9-9.5	SP01-34-34.5	SP01-38.5-39	SMP01-19-19.5
Sample Location	MW01@14.5'	MW02@13.5'	MW03@14'	MW04@9'	SP01@34'	SP01@38'	SMP01@19'
Date Sampled	3/27/96	3/30/96	3/25/96	3/30/96	3/27/96	3/27/96	3/28/96
TPH as Diesel by Modified ASTM Method D3328 (mg/kg)	16	2,400	1,400	<10	95	110	1,100
Alkalinity by Modified EPA Method 310.1 (mg/kg)	18,000	32,000	8,300	51,000	6,500	NA	69,000
pH by EPA Method 9045A	7.4	7.2	6.9	7.2	7.5	NA	7.4
SO_4 by Modified EPA Method 375.4 (mg/kg)	64,000	55,000	83,000	61,000	12,000	22,000	23,000
Kjeldahl Nitrogen by Modified EPA Method 351.2 (mg/kg)	54	71	56	44	25	NA	66
TOC by Method CFA 18.0 (mg/kg)	1,600	3,800	4,200	850	660	NA	4,300
Phosphorous (total) by Modified EPA Method 365.4 (mg/kg)	78	96	66	66	140	NA	98
Moisture Content (%) by ASTM Method D2216-80	33.3	18.7	28.6	24.8	15.3	NA	19.5
Percent Solids (%)	66.7	81.3	71.4	75.2	84.7	83.7	80.5
Iron by EPA Method 6010A (mg/kg)	2,800	3,600	3,000	2,300	1,500	NA	6,200

TABLE 3-1 (Concluded)
SUMMARY OF SOIL ANALYTICAL RESULTS
OFFICERS CLUB, SS-57
HOLLOMAN AFB, NEW MEXICO
MARCH 1996

Sample No. SS57-	SMP01-19.5-20	SMP01-39-39.5	SMP02-19-19.5	SMP02-19.5-20	SMP02-38.5-39	SMP03-19.5-20	SMP03-39.5-40
Sample Location	SMP01@19.5'	SMP01@39'	SMP02@19'	SMP02@19.5'	SMP02@38.5'	SMP03@19.5'	SMP03@39.5'
Date Sampled	3/28/96	3/28/96	3/29/96	3/29/96	3/29/96	3/25-26/96	3/26/96
TPH as Diesel by Modified ASTM Method D3328 (mg/kg)	630	<10	3,700	55	<10	4,800	<10
Alkalinity by Modified EPA Method 310.1 (mg/kg)	NA	NA	40,000	20,000	NA	84,000	NA
pH by EPA Method 9045A	NA	NA	7.6	7.5	NA	7.0	NA
SO_4 by Modified EPA Method 375.4 (mg/kg)	NA	13,000	24,000	39,000	20,000	110,000	NA
Kjeldahl Nitrogen by Modified EPA Method 351.2 (mg/kg)	NA	NA	52	50	NA	58	NA
TOC by Method CFA 18.0 (mg/kg)	NA	NA	4,500	690	NA	7,300	NA
Phosphorous (total) by Modified EPA Method 365.4 (mg/kg)	NA	NA	82	68	NA	85	NA
Moisture Content (%) by ASTM Method D2216-80	NA	NA	26.7	NA	NA	21.2	NA
Percent Solids (%)	NA	77.1	73.3	76.0	81.0	78.8	NA
Iron by EPA Method 6010A (mg/kg)	NA	NA	2,400	3,000	NA	4,200	NA

NOTES:
< - Analyte not detected above stated reporting limit
% - Percent
ASTM - American Society for Testing and Materials
EPA - Environmental Protection Agency
CFA - California Fertilizer Association
mg/kg - Milligrams per kilogram
NA - Not analyzed
SO_4 - Sulfate
TOC - Total Organic Carbon
TPH - Total Petroleum Hydrocarbons

TABLE 3-2
SUMMARY OF GROUNDWATER ELEVATIONS
OFFICERS CLUB, SS-57
HOLLOMAN AFB, NEW MEXICO
MARCH 31 - APRIL 9, 1996

Gauging Date	March 31	April 1	April 9
Well Gauged	Groundwater Elevations in feet AMSL		
MW-01	4057.56	4057.55	4057.79
MW-02	4057.76	4057.87	4057.51
MW-03	NM	4057.70	4057.96
MW-04	4056.66	4056.66	4056.72
SP01S	4057.24	4057.29	4057.48
SP01M	4057.15	4057.24	4057.37
SP01D	4057.05	4057.20	4057.29
SMP01S	4057.18	4057.22	4057.45
SMP01M	4057.12	4057.15	4057.27
SMP01D	4057.14	4057.17	4057.28
SMP02S	4057.21	4057.27	4057.46
SMP02M	4056.98	4057.14	4057.27
SMP02D	4056.58	4057.14	4057.27
SMP03S	4057.39	4057.41	4057.63
SMP03M	4057.50	4057.52	4057.75
SMP03D	4057.42	4057.44	4057.61

NOTES:
April 9, 1996 groundwater elevations most representative of steady state conditions. Groundwater elevations on 3/31/96 and 4/1/96 measured within 24 hours of well development activities.

AMSL - Above mean sea level
NM - Not measured
S - Shallow Zone (18-20 feet)
M - Medium Zone (28-30 feet)
D - Deep Zone (38-40 feet, except 37.5-39.5 for SP01)

TABLE 3-3
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
OFFICERS CLUB, SS-57
HOLLOMAN AFB, NEW MEXICO
APRIL 1996

Sample No. SS57-	MW-01	MW-02	MW-03	MW-04	MW-05	MW-07	MW-09	SP-01S	SP-01S(DUP)	SP-01M	SP-01D
Date Sampled	4/9/96	4/9/96	4/10/96	4/9/96	4/12/96	4/12/96	4/12/96	4/10/96	4/10/96	4/10/96	4/11/96
TPH as Diesel by Modified ASTM Method D3328 (μg/L)	2,500	4,100	9,700	250	<100	<100	<100	3,300	3,400	790	1,200
Dissolved Iron by EPA Method 6010A (μg/L)	110	<100	<100	3,100	NA	NA	NA	190	230	<100	140
Sulfate by Modified EPA Method 375.4 (mg/L)	1,700	1,700	2,100	1,700	1,700	1,500	1,800	1,800	2,000	NA	NA

NOTES:
< - Analyte not detected above stated reporting limit
ASTM - American Society for Testing and Materials
DUP - Duplicate sample
EPA - Environmental Protection Agency
mg/L - Milligrams per liter
NA - Not analyzed
S - Shallow Zone (18-20 feet)
M - Medium Zone (28-30 feet)
D - Deep Zone (37.5-39.5 feet)
TPH - Total Petroleum Hydrocarbons
ug/L - Micrograms per liter

TABLE 4-1
SUMMARY OF AIR SAMPLE ANALYTICAL RESULTS
OFFICERS CLUB, SITE SS-57
HOLLOMAN AFB, NEW MEXICO
APRIL 1996

Pilot Test Number	1 [1]	1 [2]	2	3	4	5	6
Sample No. SP01-	VET-01-1	VET-01-2	18-20-AS	28-30-AS	28-30-DS	28-30-EFF	38-40-AS
Date Sampled	4/16/96	4/16/96	4/16/96	4/17/96	4/17/96	4/17/96	4/18/96
Analysis by Modified EPA Method TO-3							
TPH (μg/L)	140	130	200	170	280	130	220
TPH (ppmv)	33	32	48	42	67	31	53
Analysis by ASTM Method D-5504 (ppbv)							
Hydrogen Sulfide	<4.0	NA	NA	250	NA	NA	4.1
Carbonyl Sulfide	5.0	NA	NA	<4.0	NA	NA	7.3
Dimethyl Sulfide	15	NA	NA	<4.0	NA	NA	<4.0
Carbon Disulfide	<4.0	NA	NA	<4.0	NA	NA	4.4
Analysis by EPA Method TO-14 (ppbv)							
TNMOC	2200	3000	9400	3900	5300	230	6300
Freon 12	<2.9	<1.6	1.2	17	18	<0.95	30
Freon 11	<2.9	<1.6	0.83	3.3	3.6	<0.95	43
Freon 113	<2.9	<1.6	<0.73	<1.2	<1.5	<0.95	2.0
Methylene Chloride	<2.9	<1.6	<0.73	<1.2	<1.5	2.5	<0.78
1,1,1-Trichloroethane	<2.9	<1.6	<0.73	<1.2	<1.5	0.98	<0.78
Benzene	9.7	11	14	15	22	<0.95	14
Trichloroethene	35	29	18	20	18	2.8	17
Toluene	4.8	5.7	9.5	9.9	16	6.2	13
Ethyl Benzene	<2.9	<1.6	1.2	<1.2	<1.5	<0.95	<0.78
m,p -Xylene	3.1	3.2	2.7	2.9	3.3	3.1	2.7
o-Xylene	<2.9	<1.6	1.2	<1.2	<1.5	1.1	1.5
1,3,5-Trimethylbenzene	<2.9	<1.6	0.83	<1.2	<1.5	<0.95	1.2
1,2,4-Trimethylbenzene	6.3	4.3	3.1	3.2	3.4	1.7	4.3
Acetone	14	22	26	40	18	4.4	73
Carbon Disulfide	<11	<6.5	7.0	<5.0	<6.0	<3.8	<3.1
2-Propanol	<11	<6.5	<2.9	<5.0	<6.0	5.4	<3.1
2-Butanone (MEK)	<11	<6.5	4.5	5.3	<6.0	<3.8	14
Hexane	120	160	180	150	230	<3.8	210
Tetrahydrofuran	140	89	39	22	23	5.1	<3.1
Cyclohexane	79	110	300	120	160	<3.8	140
Ethanol	<11	<6.5	4.4	6.1	<6.0	8.5	<3.1
Heptane	33	40	58	60	92	<3.8	78

NOTES:
Air samples were collected while venting on vapor extraction trench VET-01.
Only detected compounds for ASTM Method D-5504 and EPA Method TO-14 are reported in table.

[1] Sample collected after 40 minutes
[2] Sample collected after 140 minutes
< - Analyte not detected above stated reporting limit
ASTM - American Society for Testing and Materials
EPA - Environmental Protection Agency
NA - Not analyzed
ppbv - Part per billion by volume
ppmv - Parts per million by volume
TPH - Total Petroleum Hydrocarbons referenced to gasoline
TNMOC - Total Non-Methane Organic Compounds referenced to heptane
ug/L - Micrograms per liter

APPENDIX A
FIELD LOGS

APPENDIX A-1
SOIL BORING LOGS

HTRW DRILLING LOG

DISTRICT	OMAHA
HOLE NUMBER	MW-01
1. COMPANY NAME	GROUNDWATER TECHNOLOGY GOVT. SVC
2. DRILL SUBCONTRACTOR	LAYNE ENVIRONMENTAL
SHEET / SHEETS	1 OF 2
3. PROJECT	DO 8 WAD 35 Contract DACW-45-94-D0003-5557
4. LOCATION	OFFICER'S CLUB - HOLLOMAN AFB, N.M.
5. NAME OF DRILLER	DON KIRSNIS
6. MANUFACTURER'S DESIGNATION OF DRILL	FAILING F-10
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	8" HSA; 24" Calif. STYLE SPLIT SPOONS
8. HOLE LOCATION	SEE MAP
9. SURFACE ELEVATION	~4070' AMSL
10. DATE STARTED	27 MARCH 1996
11. DATE COMPLETED	27 MARCH 1996
12. OVERBURDEN THICKNESS	
15. DEPTH GROUNDWATER ENCOUNTERED	~9.5'-10'
13. DEPTH DRILLED INTO ROCK	NONE
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	11.86' on 1 Apr 1996
14. TOTAL DEPTH OF HOLE	17'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
14.5'-15'						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		L.S. STEVENSON

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
DACW-45-94-D0003; DO 8 WAD 35-5557-REMED. @ O'CLUB.	MW-01

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-01

PROJECT: DOB WAD35 - 5557 - O'CLUB
CONTRACT: DACW-45-94-D0003

INSPECTOR: L.S. STEVENSON

SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		SAND, SOD; Brown ish					
	1	silty fine sand (SM) tan (10YR 7/2)					
	2						
	3						
	4	gypsum cemented sand, (SM), very hard, w/ crystals.	0.3ppm				hand auger refusal.
	5						
	6	silty sand (SM), tan (10YR 6/4), with gypsum nodules					
	7						
	8		0.2ppm			7	
	9					10 14 19	becoming wet
	10	sand (SM), dense, moist, grey (5Y 6/1)					
	11						
	12						no odors noticable.
	13						
	14	sand w/ silt (SM), grey (5Y 6/1)	0.7ppm		5557-MW01-14.5-15	12 17 23 29	
	15	TD					
	16						
	17						

PROJECT: HOLLOMAN AFB.
DO 8 WAD35-5557-REMED. AT OFFICERS CLUB.

HOLE NO. MW-01

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: OMAHA		HOLE NUMBER: MW-02
1. COMPANY NAME: GROUNDWATER TECHNOLOGY GOV. SVC	2. DRILL SUBCONTRACTOR: LAYNE ENVIRONMENTAL	SHEET 1 OF 2 SHEETS
3. PROJECT: DO 8 WAD 35 contract DACW-45-94-D0003-5557	4. LOCATION: OFFICER'S CLUB - HOLLOMAN AFB, N.M.	
5. NAME OF DRILLER: DON KIRSNIS	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING F-10	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8" HSA w/ 24" CALIF STYLE SPLIT SPOONS.	8. HOLE LOCATION: SEE MAP.	
	9. SURFACE ELEVATION: 4068' AMSL	
	10. DATE STARTED: 30 MARCH 1996	11. DATE COMPLETED: 30 MARCH 1996.
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: ~8.75'	
13. DEPTH DRILLED INTO ROCK: NONE	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 10.01 on 1 Apr. 1996	
14. TOTAL DEPTH OF HOLE: 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
13.5-14.						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		L.S. STEVENSON

LOCATION SKETCH/COMMENTS

SCALE:

PROJECT	HOLE NO.
DACW-45-94-D0003: DO 8 WAD 35-5557-REMED. @ O'CLUB.	MW-02

ENG FORM 5056-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-02

PROJECT: DO 8 WAD 35 - SS57 - O'CLUB
cont. DACW-45-94-D0003

INSPECTOR: L. S. STEVENSON

SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1	RUBBLE + FILL					
	2						
	3	silty sand, fine (ML), light tan (10 YR 8/4)	0.0 ppm				
	4						
	5						
	6						
	7						
	8	fine sand (SM), tan (7 YR 7/4), wet.	0.0 ppm			6	
	9					9	
						14	
						19	
	10						
	11						
	12	very fine silty sand (ML), grey (5 Y 6/1), wet					
	13	~~orange~~ fine sand and clay, orange, w/ gypsum crystals, v. hard			SS57-MW02-13.5-14		
	14	very fine sand (SP), grey (5 Y 7/1)				24 65/4"	18" recovery strong odor.
	15	TD	10.2 ppm				

PROJECT: SS 57 - REMED. AT OFFICERS CLUB
DACW-45-94-D0003 - DO 8 - WAD 35

HOLE NO. MW-02

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: OMAHA		HOLE NUMBER: MW-03
1. COMPANY NAME: GROUNDWATER TECHNOLOGY GOV. SVC	2. DRILL SUBCONTRACTOR: LAYNE ENVIRONMENTAL	SHEET 1 OF SHEETS 2
3. PROJECT: DO 8 WAD 35 contract DACW-45-94-D0003-5557	4. LOCATION: OFFICER'S CLUB - HOLLOMAN AFB, N.M.	
5. NAME OF DRILLER: DON KIRSNIS	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING F-10	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8" HSA w/ 24" Calif. Style Split spoons.	8. HOLE LOCATION: SEE MAP.	
	9. SURFACE ELEVATION: 4070' AMSL.	
	10. DATE STARTED: 25 MAR 1996	11. DATE COMPLETED: 25 MAR 1996.
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED:	
13. DEPTH DRILLED INTO ROCK: NONE	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12.21' on 1 Apr 1996	
14. TOTAL DEPTH OF HOLE: 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
14-14.5'						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		L. S. STEVENSON S. Stevenson

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
DACW-45-94-D0003: DO 8 WAD 35-5557-REMED. @ O'CLUB.	MW-03.

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-03

PROJECT: SS 57 - REMED. AT O'CLUB
DACW-45-94-D0003: D08 WAD 35

INSPECTOR: C.S. STEVENSON

SHEET ___ OF ___

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1	silty sand (SM), tan (10 YR 7/2)					
	2						
	3						
	4		0.1 ppm				
	5						
	6						
	7						
	8	fine sand w tr. silt (SM) tan (10 YR 8/4)				9	
	9					17	
						24	
						36	
	10						
	11						
	12						
	13	silty sand (SM), grey (5Y 6/1) moist	102.5 ppm			12	strong odor, reminiscent of cleaning chemicals
						17	
						27	
	14				SS57-MW03-14-14.5	35	
	15	TD					100 ppm H_2S in Headspace
	16						
	17						
	18						
	19						
	20						

PROJECT: SS57 - REMED. at Officers CLUB.
DACW-45-94-D0003: D08 WAD 35

HOLE NO. MW-03

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT	OMAHA
HOLE NUMBER	MW-04
1. COMPANY NAME	GROUNDWATER TECHNOLOGY GOT. SVC
2. DRILL SUBCONTRACTOR	LAYNE ENVIRONMENTAL
SHEET / SHEETS	1 OF 2
3. PROJECT	DO 8 WAD 35 contract DACW-45-94-D0003-5557
4. LOCATION	OFFICER'S CLUB - HOLLOMAN AFB, N.M.
5. NAME OF DRILLER	DON KIRSNIS
6. MANUFACTURER'S DESIGNATION OF DRILL	FAILING F-10
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	8" HSA w/ 24" Calif. Style Split Spoons.
8. HOLE LOCATION	SEE MAP
9. SURFACE ELEVATION	4066' AMSL
10. DATE STARTED	30 MAR 1996
11. DATE COMPLETED	30 MAR 1996.
12. OVERBURDEN THICKNESS	
15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK	NONE
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	8.53 on 1 Apr 1996
14. TOTAL DEPTH OF HOLE	14'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
9-9.5'						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
		X		L. S. STEVENSON

LOCATION SKETCH/COMMENTS SCALE:

PROJECT	HOLE NO.
DACW-45-94-D0003: DO 8 WAD 35-5557-REMED. @ O'CLUB	MW-04

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: MW-04

PROJECT: SS 57 - Remed at O'Club. DACW-45-94-D0003; D08 WAD35

INSPECTOR: L.S. STEVENSON

SHEET 2 OF 2 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1	coarse river rock + pavement base					
	2						
	3	silty, v. fine sand (ML) tan (10YR 7/3), slightly moist	0.0ppm				
	4						
	5						
	6						
	7	silty fine sands (ML), mottled tan + brown w/ gyp nodules					
	8	silty fine sand (SM), orange (10YR 6/6), moist to wet @ 8.5'	0.1ppm			9 14 29 33	18" recovery.
	9						
	10						
	11						
	12	clayey fine sand (CL) orange (2.5YR 4/6) very hard, dry, w/ large (3/8") gypsum crystals	0.0ppm			9 22 56/2"	15" recovery
	13						
	14	TD					

PROJECT: DACW-45-94-D0003; D08 WAD35 - SS57 - Remed at O'Club.

HOLE NO. MW-04

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: OMAHA.		HOLE NUMBER: SP-01
1. COMPANY NAME: GROUNDWATER TECHNOLOGY GOV. SVC	2. DRILL SUBCONTRACTOR: LAYNE ENVIRONMENTAL	SHEET 1 OF 3 SHEETS
3. PROJECT: DO 8 WAD 35 Contract DACW-45-94-D0003-5557	4. LOCATION: OFFICER'S CLUB - HOLLOMAN AFB, N.M.	
5. NAME OF DRILLER: DON KIRSNIS	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING F-10	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8" HSA w/ 24" Calif. Style Split spoons — ovendrilled w/ 15" HSA	8. HOLE LOCATION: See MAP.	
	9. SURFACE ELEVATION: 4069' AMSL	
	10. DATE STARTED: 27 MAR 1996	11. DATE COMPLETED: 31 MAR 1996
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED:	
13. DEPTH DRILLED INTO ROCK: NONE	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 11.5'	
14. TOTAL DEPTH OF HOLE: 41'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
18', 28', 38'		X	

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
(2) 34' + 39'						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
			See comments.	L.S. STEVENSON

LOCATION SKETCH/COMMENTS SCALE:

Sparge well: cluster of 3 installed in hole;
Pilot hole w/ 8" HSA, completed 27 MAR 1996
ovendrilled w/ 15" HSA on 29 MAR 1996.
Well installation completed 31 MAR 1996.

PROJECT: DACW-45-94-D0003: DO 8 WAD 35-5557-REMED. @ O'CLUB | HOLE NO. SP01

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SP-01

PROJECT: 5557-REMEDIATION AT O CLUB
DACW-45-94-D0003:D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1						
	2	silty fine sands (SM), tan (10 YR 8/2), w/ gypsum nodules	--				
	3						
	4						
	5		0.2				
	6	silty fine sands (SM), tan (10 YR ~~7/2~~ 7/4) w/ small (0.1") gypsum crystals					
	7						
	8					3	
	9		0.5			7	
	10					11 19	
	11	fine sand (SP), grey (5Y 6/1)					
	12						
	13					12	
	14		4.4			17 25	some odor
	15					33	
	16						
	17						
	18	clayey sand (CL), grey and tan (5Y 7/1), moist, slightly plastic	6.6			7 13 26	
	19	clayey sand (SC), tan (5Y 8/1), dry, hard, gypsum nodules		5557 SP01 19-19.5		50/4"	
	20						

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 ; 5557 - REMED. @ O'Club

HOLE NO.

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SP-01

PROJECT: 5557-REMEDIATION AT O CLUB
DACW-45-94-D0003:D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 3 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	21	medium to coarse sand (SM), grey (5Y 6/1), wet					
	22						
	23		5.8ppm				
	24	clay (CL), orange (10YR 7/4), soft				37 70+ for 5"	18" recovery
	25	fine sand (SP), grey (5Y 6/1)					
	26						
	27						
	28	silty clayey fine sand (ML), ~~w/ gypsum crystals~~ grey (5Y6/1), w gypsum xtals	1.0ppm			10 19	
	29	fine sand (SP), wet, grey (5Y5/1)		5557SP01-29-29.5		31 50	
	30						
	31						
	32	fine sand (SP), dry to moist, grey (5Y 6/1)					
	33		7.9ppm			~~42~~ 50+/2"	
	34	fine sand (SP), dry, orange (10YR 7/6), very dense.			5557 SP01 34-34.5	42 50+/2"	12" recovery.
	35						
	36	fine sand (SP), moist, grey (5Y 5/1)					
	37						
	38		8.6ppm				
	39	clay (CL), dry, red/white (5YR 5/4) very dense, w/ gypsum crystals		5557 SP01 39-39.5	5557 SP01 38.5-39	17 36 61	overdrilled to 41' for sparge point installation
	40						

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 : 5557-REMED. @ O'Club

HOLE NO. SP-01

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: OMAHA.		HOLE NUMBER: SMP-01
1. COMPANY NAME: GROUNDWATER TECHNOLOGY GOV. SVC	2. DRILL SUBCONTRACTOR: LAYNE ENVIRONMENTAL	SHEET 1 OF SHEETS 3
3. PROJECT: DO 8 WAD 35 contract DACW-45-94-D0003-5557	4. LOCATION: OFFICER'S CLUB - HOLLOMAN AFB, N.M.	
5. NAME OF DRILLER: DON KIRSNIS	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING F-10	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8" HSA w/ 24" Calif. Style Split Spoons - overdrilled w/ 1'5" HSA for sparge monitoring point installation.	8. HOLE LOCATION: SEE MAP	
	9. SURFACE ELEVATION: 4069' AMSL	
	10. DATE STARTED: 28 MAR 1996	11. DATE COMPLETED: 28 MAR 1996
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: ~~11.49' on 1 Apr~~	
13. DEPTH DRILLED INTO ROCK: NONE	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 11.49' on 1 Apr 1996	
14. TOTAL DEPTH OF HOLE: 41'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
(2) 39' 39'						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
			X	L.S. STEVENSON

LOCATION SKETCH/COMMENTS SCALE:

Sparge monitoring point - cluster installation.

PROJECT: DACW-45-94-D0003: DO 8 WAD 35-5557 - REMED. @ O'CLUB. HOLE NO.

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SMP-01

PROJECT: SS57-REMEDIATION AT O CLUB
DACW-45-94-D0003:D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 2 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1						
	2	Silty sands (SM), tan (10YR 8/2)	---				
	3						
	4		0.2ppm				
	5						
	6						
	7						
	8	Silty fine sands (SM), tan (10YR 8/3), w/ few gypsum nodules				10	
	9		1.8ppm			12	
						14	
	10					14	
	11						
	12						
	13	clayey fine sands (SC), moist, grey (5Y 7/1)	11.1ppm			11	
	14					15	
						21	
	15					27	
	16						
	17						
	18	clayey fine sand (ML), grey (5Y 6/1).	26.4ppm			7	
	19				SS57 SMP01 19-20	11	
						26	
	20	fine sand (SC), dry, grey (5Y 6/1), very hard				50	

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 ; SS57 - REMED. @ O'Club

HOLE NO.

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SMP-01

PROJECT: 5557-REMEDIATION AT O CLUB
DACW-45-94-D0003 D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	21						very hard drilling
	22						
	23						
	24	~~very~~ gypsum crystals, mottled, grey + white, very hard.	0.5ppm.			45	
	25					60/4"	9" recovery
	26	clayey sand (ML), orange + green (10YR 8/3)					lifting rig on auger pull-down.
	27						
	28	fine sand (SP), grey (5Y 6/1)					out of hard zone
	29		2.0			22	
		medium to fine sand (SW), orange (10YR 7/3)				39	18" recovery
	30					50	
	31						
	32						
	33	silty fine sand (SM), orange (7.5YR 6/6)	5.0			10	
	34	bands of grey, orange, white fine sands				17	
						24	
	35					32	
	36						
	37						
	38	sandy clay (CL), orange thin band (3"), soft, plastic					
	39	fine sand (SM) w/ silt, grey 5Y 6/1			5557 SMP01 39-39.5	12	
						16	
						25	
	40					30	

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 : 5557-REMED. @ O'Club

HOLE NO.

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: OMAHA		HOLE NUMBER: SMP-02
1. COMPANY NAME: GROUNDWATER TECHNOLOGY GOV. SVC	2. DRILL SUBCONTRACTOR: LAYNE ENVIRONMENTAL	SHEET 1 OF 3 SHEETS
3. PROJECT: DO 8 WAD 35 Contract DACW-45-94-D0003-5557	4. LOCATION: OFFICER'S CLUB - HOLLOMAN AFB, N.M.	
5. NAME OF DRILLER: DON KIRSNIS	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING F-10	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8" HSA w/ 24" Calif Style Split Spoons - overdrilled w/ 15" HSA for monitoring point installation.	8. HOLE LOCATION: SEE MAP.	
	9. SURFACE ELEVATION: 4069' AMSL.	
	10. DATE STARTED: 29 MAR 1996	11. DATE COMPLETED: 30 MAR 1996
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED:	
13. DEPTH DRILLED INTO ROCK: NONE	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 10.86' on 1 Apr 1996	
14. TOTAL DEPTH OF HOLE: 40.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
(2) 19-20 & 39-40						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
			X	L. S. STEVENSON

LOCATION SKETCH/COMMENTS SCALE:

Sponge monitoring point installation

PROJECT	HOLE NO.
DACW-45-94-D0003: DO 8 WAD 35-5557-REMED. @ O'CLUB.	SMP-02

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SMP-02

PROJECT: 5557-REMEDIATION AT O CLUB
DACW-45-94-D0003:D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		SOD					
	1	gravel					
		red clay fill					
	2	silty fine sands (ML), brown to tan 10 YR 7/2					
	3						
	4		0.1ppm				
	5						
	6						
	7						
	8	fine sand (SM), dry, tan (10 YR 7/4)	0.0ppm			8	
	9	fine sand (SM), grey (5 Y 6/1)				11 14 17	
	10						
	11						
	12						
	13	fine sand (SM), moist to wet, grey (5Y 7/1)	28.5ppm			6	
	14					11	
						21	
	15					34	
	16						
	17						
	18	silty fine sand (ML), moist, grey (5Y 6/1)			5557 SMP02	8	
	19	clayey fine sand (CL) gypsum cemented	93.1ppm		19.5-20	16 39 50/3"	21" recovery.
	20						

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 ; 5557 - REMED. @ O'Club

HOLE NO.

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SMP-02

PROJECT: 5557-REMEDIATION AT O CLUB
DACW-45-94-D0003 ; D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	21						interbedded hard & soft clays, silty sands.
	22						
	23	silty fine sand w clay (CL), moist, orange (5YR 7/6)					
	24	~~clayed~~ clays & gypsum nodules (SM), dry, orange (5YR 7/6)	0.7.			17 29 50	18" recovery
	25						
	26						
	27						
	28	sandy clay (CL), orange - yellow (10YR 8/4) w/ thin sand lamina.	1.5			12	
	29					16 24	
	30					31	
	31						
	32						
	33	med sand w/ clay + gyp. nodules (SC), moist, tan & orange 10YR 7/2				10	
	34					17 27	
	35					35	
	36						
	37	fine sand (ML) w/ silt, moist, tan (10YR 7/2), soft.					
	38						
	39	clayey fine sand (CL), dry, red (5YR 6/4), very hard, w/ gypsum crystals.			5557 SMP02 38-39	14 19 34 50+/4"	18" recovery
	40						

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 : 5557-REMED. @ O'club

HOLE NO. SMP-02

ENG FORM 5056A-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG

DISTRICT: OMAHA		HOLE NUMBER: SMP-03
1. COMPANY NAME: GROUNDWATER TECHNOLOGY GOV. SVC	2. DRILL SUBCONTRACTOR: LAYNE ENVIRONMENTAL	SHEET 1 OF SHEETS 3
3. PROJECT: DO 8 WAD 35 Contract DACW-45-94-D0003-5557	4. LOCATION: OFFICER'S CLUB - HOLLOMAN AFB N.M.	
5. NAME OF DRILLER: DON KIRSNIS	6. MANUFACTURER'S DESIGNATION OF DRILL: FAILING F-10	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 8" HSA w/ 24" Exlif style split spoons - overdrilled w/ 15" HSA	8. HOLE LOCATION: SEE MAP	
	9. SURFACE ELEVATION: 4070' AMSL	
	10. DATE STARTED: 26 MAR 1996	11. DATE COMPLETED: 26 MAR 1996
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED:	
13. DEPTH DRILLED INTO ROCK: NONE	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 12.44' on 1 Apr 1996	
14. TOTAL DEPTH OF HOLE: 41'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
NONE			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
			X	L.S. STEVENSON

LOCATION SKETCH/COMMENTS SCALE:

Sparge Monitoring Point Installation.

PROJECT	HOLE NO.
DACW-45-94-D0003: DO 8 WAD 35-5557-REMED. @ O'CLUB	SMP-03

ENG FORM 5056-R, AUG 94 (Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SMP-03

PROJECT: 5557-REMEDIATION AT O CLUB
DACW-45-94-D0003:D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 2 OF 3

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	1	silty fine sands (SM), tan (10 YR 8/3)					
	2						
	3						
	4		0.0 ppm				
	5						
	6						
	7						
	8	silty fine sands (SM) tan (10 YR 7/3), mottled.				15	
	9		0.0 ppm			26	
	10					50	
						53	
	11						
	12						
	13	fine sand (SP), grey (2.5 Y 7/1)	87				very hard auging.
	14					missing data (SS)	
	15						
	16						
	17						
	18	clayey sand (CL), light grey (2.5 Y 6/1), cohesive				14	
	19		991		5557 SMP03 19.5-20	16 23	
	20					32	

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 ; 5557 - REMED. @ O'Club

HOLE NO.

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER: SMP-03

PROJECT: 5557-REMEDIATION AT O CLUB
DACW-45-94-D0003:D08 WAD 35

INSPECTOR: L.S. STEVENSON

SHEET 3 OF 3 SHEETS

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
	21						
	22						
	23						
	24	clayey silt (ML), grey (2.5 Y 5/1)	202ppm			16 29 40 50/4"	
	25						
	26						
	27						
	28						
	29	clayey fine sand (ML), grey (2.5 Y 6/1), cohesive, w/ traces of orange + black fine sand grains.	183ppm			11 19 27 40	moist bands of sandy materials.
	30						
	31						
	32						
	33	sand (SM), orange 10 YR 7/8, mottled w/ tan + dark orange	0.7ppm			8	
	34	clay (CL), tan				14 19	
	35	fine sand (SP), tan 10 YR 8/1				29	
	36						
	37						
	38	clay (CL), banded red + grey (10YR 6/3), w/ some 1/2" thick sand stringers.	0.4.			7 12	hard + stiff
	39				5557 SMP03 @9.5-40	17 24	
	40						

PROJECT: ~~D08~~ DACW-45-94-D0003 : D08 WAD 35 ; 5557-REMED. @ O'Club

HOLE NO.

ENG FORM 5056A-R, AUG 94

(Proponent: CECW-EG)

APPENDIX A-2
AIR MONITORING FORMS

AIR MONITORING DATA	Today's Date: 3-29-96
Project/Task Name: DOE WAD 35 O'Club	Project/Task Numbers: 830012208 35050
Form Completed By: Charles Madewell (print name)	(signature) Chuck Madewell (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.)			Comments
		FID	PID	%LEL	%O_2	H_2S (type/units) ppm	(type/units)	(type/units)	
0745	SP-01 Work Area		Ø	Ø	20.9	Ø			Before Drilling
0830	SP-01 Work Area		Ø	Ø	20.9	Ø			Drilling 10" Augers
0920	SP-01 Work Area		Ø	Ø	20.8	Ø			Drilling 10" Augers Setting pipe
1000	SP-01 Work Area		Ø	Ø	20.9	Ø			Pulling Augers Installing well
1100	SP-01 Work Area		Ø	Ø	20.9	Ø			Installing well Pulling Augers
1145	SP-01 Work Area		Ø	Ø	20.9	Ø			Installing well Removing Auger
1300	SPM-02 Work Area		Ø	Ø	20.9	Ø			Hand Auging
1345	SPM-02 Work Area		Ø	Ø	20.8	Ø			Drilling 8" Hole Borehole Sampling
1410	SPM-02 Work Area		Ø	Ø	20.9	Ø			Drilling 8" Hole Borehole Sampling
1515	SPM-02 Work Area		Ø	Ø	20.9	Ø			Removing 8" Augers

AIR MONITORING DATA	Today's Date: 30 Mar 1996
Project/Task Name: 008 WA035 D'Club	Project/Task Numbers: 830012208.35050
Form Completed By: Charles Madewell (print name)	(signature) Charles Madewell (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.)			Comments
		FID	PID	%LEL	$\%O_2$	H_2S (type/units) ppm	(type/units)	(type/units)	
[illegible]	SMF03 Work Area		0	0	20.9	0			Before [illegible] Start
[illegible]	Trench Area		0	0	20.9	0			[illegible]
[illegible]	SMF03 Work Area		0	0	20.9	0			Pulling [illegible] Well [illegible]
[illegible]	Trench Area		0	0	20.9	0			Removing Top Soil/grass
[illegible]	MW-4 Work Area		0	0	20.8	0			Before [illegible]
[illegible]	Trench		0	0	20.8	0			Digging [illegible] backhoe
[illegible]	MW-4 Work Area		0	0	20.9	0			Drilling [illegible]
[illegible]	Trench		0	0	20.9	0			Installing [illegible] gravel
[illegible]	MW-4 Work Area		0	0	20.9	0			Installing well - [illegible]
1530	MW-2 Work Area		0	0	20.8	0			Drilling Bore Sampling
1600	Trench		0	0	20.9	0			Back Filling

AIR MONITORING DATA	Today's Date: 3-31-96
Project/Task Name: DOE WAD35 closure	Project/Task Numbers: 830012208, 35050
Form Completed By: Charles Madewell (print name)	(signature) [illegible] Site Supervisor (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.)			Comments
		FID	PID	%LEL	%O_2	H_2S ppm (type/units)	(type/units)	(type/units)	
[illegible]	work area sweep		0	0	20.8	1			[illegible]
[illegible]	MW-03 BZ		0			8			odor [illegible] clean [illegible] area checked
09:16	MW-03 well bore					>200			~2' down well
09:16	MW-03 purged water.					75			purge water container HS (5 gal bucket)
[illegible]	all work areas sweep		0			(0) 1			
[illegible]	MW-01 purge water		0			2			
[illegible]	BZ sweep		0			1			
[illegible]	work area sweep		0			1			
[illegible]	"		0			1			
14:35	"		0			1			
15:58	SMP-01-M purge water (bucket HS)		0			5			
16:58	work area sweep		0			1			
16:30	"		0			1			

BZ= Breathing Zone.

AIR MONITORING DATA	Today's Date: 3-28-96
Project/Task Name: D08 WA035 O'club	Project/Task Numbers: 8300122083.35050
Form Completed By: Charles Madewell (print name)	(signature) [signature] (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.)			Comments
		FID	PID	%LEL	$\%O_2$	H_2S (type/units) ppm	(type/units)	(type/units)	
0715	General work area		Ø	Ø	20.9	Ø			
0730	SMP-01 work area		Ø	Ø	20.8	Ø			Hand auging
0815	SMP-01 work area		Ø	Ø	20.8	Ø			Drilling
0915	SMP-01 work area		Ø	Ø	20.9	Ø			Drilling & bore sampling
1000	SMP-01 work area		Ø	Ø	20.8	Ø			Removing 8" Augers
1050	SMP-01 work area		Ø	Ø	20.9	Ø			Drilling 10" Augers
1130	SMP-01 work area		Ø	Ø	20.8	Ø			Drilling 10" Augers
1240	SMP-01 work area		Ø	Ø	20.9	Ø			Installing wells Removing Augers
1430	SMP-01 Work Area		Ø	Ø	20.9	Ø			Removing Augers Installing wells
1515	SMP-01 Work Area		Ø	Ø	20.9	Ø			Removing Augers Bentonite pouring

AIR MONITORING DATA	Today's Date: 9 Aug 2005
Project/Task Name: HAFB-O'Club	Project/Task Numbers: 83001220 8.35 050
Form Completed By: S. Stevens (print name)	(signature) (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.)			Comments
		FID	PID	%LEL	%O_2	ppm @ Hexane (type/units)	H_2S (type/units) ppm	(type/units)	
	MW04					280	0		
	MW02					260	0		
	MW01					340	0		
	SMP-025					240	~~190~~ 0		
	M					240	0		
	D					280	0		
	SMP 01 S					~~1900~~ 220	~~1900~~ 0		
	M					~~600~~ 240	0		
	D					~~640~~ 260	0		
	SP 01 S					1900	1		
	M					600	0		
	D					640	0		
	SMP03 S					360	>200		
	M					180	0		
	D					220	0		
	MW03					340	2		

Transcribed from Mon. Well gauging form

AIR MONITORING DATA	Today's Date: 3/27/96
Project/Task Name: ~~830012~~ HAFB O'Club	Project/Task Numbers: 830012208, 35056
Form Completed By: Charles Madewell (print name)	(signature) (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.)			Comments
		FID	PID	%LEL	%O_2	H_2S (type/units) ppm	(type/units)	(type/units)	
0955	MW-01 Work Zone		Ø						Before
0950	MW-01 Work Zone		Ø	2Ø	20.8	Ø			Hand Augering
1045-1100	MW-01		Ø	Ø	20.9	Ø			Filling borehole w/ sand & Bentonite
1145	SP-01 Work area		Ø	Ø	20.9	Ø			Begin Drilling
1230	SP-01 Work area		Ø	Ø	20.9	Ø			Drilling & Taking Core Samples
1315	SP-01 Work Area		Ø	Ø	20.9	1			Drilling & Taking Core Samples
1345	SP-01 Work Area		Ø	Ø	20.8	Ø			Removing Augers
1415	SP-01 Work Area		Ø	Ø	20.8	Ø			Removing Augers

AIR MONITORING DATA	Today's Date:
Project/Task Name:	Project/Task Numbers:
Form Completed By: (print name)	(signature) [illegible] (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.)			Comments
		FID	PID	%LEL	%O_2	H_2S (type/units) ppm	(type/units)	(type/units)	
0935	SMP-03		Ø	Ø	20.8	Ø			initial readings
0915	SMP-03		Ø	Ø	20.8	Ø			Drilling & taking boring samples
1000	SMP-03		Ø	Ø	20.8	Ø			Drilling & taking bore samples
1045	SMP-03		Ø	Ø	20.4	Ø			Drilling & taking bore samples
1130	SMP-03		Ø	Ø	20.8	Ø			Drilling
1300	SMP-03		Ø	Ø	20.8	Ø			Drilling
1400	SMP-03		Ø	Ø	20.8	Ø			Drilling
1430	SMP-03		Ø	Ø	20.8	Ø			Setting plug
1520	SMP-03		Ø	Ø	20.8	Ø			Installing 1st 40' well, Sand pack
1600	SMP-03		Ø	Ø	20.8	Ø			Installing 1st 40' well, Bentonite interval
1700	SMP-03		Ø	Ø	20.8	Ø			Setting wells, Sand pack/Bentonite

AIR MONITORING DATA	Today's Date: 3/25/96
Project/Task Name: DOE WAD35 O'Club	Project/Task Numbers: 830012208, 35050
Form Completed By: (print name) Charles Madewell	(signature) [signature] (date)

Time	Location	Ionization Detector Reading		Explosimeter Reading		Other Instruments (detector tubes, dust monitor, etc.) (2 is zero)			Comments
		FID	PID	%LEL	$\%O_2$	H_2S (type/units)	(type/units)	(type/units)	
1430	MW-03		Ø.Ø	Ø	20.8	Ø			
1500	MW-03		Ø	Ø	20.8	Ø			Augering
1515	MW-03		Ø	Ø	20.8	Ø			8-10'
1545	MW-03		4.5	Ø	20.4	Ø			Auger Opening 15'
1610	MW-03		0.1	Ø	20.5	Ø			Drilled 3 more ft Auger Open 18'

APPENDIX A-3
EQUIPMENT CALIBRATION SHEETS

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: D08WA035 O'Club

Project/Task Numbers: 830812208.35050

Form Completed By: (print name) Charles Maderwell (signature) [illegible] (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
3-30-96	0720	PID	—	201289	X		Isobutylene	100	100	X	
		LEL	—	GB 441	X		Hexane	Fuel Sensor	Fuel Sensor	X	
		H_2S	—	GS 441	X		H_2S	Fuel Sensor	Fuel Sensor	X	

COMMENTS:

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: D08 WAD35 O'Club

Project/Task Numbers: 8 3CK12208.35CK0

Form Completed By: (print name) Charles Madewell (signature) [illegible] (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
3/31/96	0745	PID	10.2	201289	X		Isobutylene	100	99.7	X	
		LEL	—	65441	X		Hexane	Fuld Gas ck	Fuld Gas ck	X	
		H_2S	—	65441	X		H_2S	Fuld Gas ck	Fuld Gas ck	X	

COMMENTS:

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: 8 D08 WAD35 O'Club

Project/Task Numbers: 8 30012208. 35050

Form Completed By: (print name) Charles Mackewell

(signature) Charles Mackewell (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
3-28-96	0700	PID	10.2	201289	X		Isobutylene	100	100.2	X	
↓	↓	LEL	—	GS 441	X		Hexane	Full Scale	Full Ops Ck	X	
↓	↓	H_2S	—	↓	X		H_2S	Full Ops Ck	Full Ops Ck	X	

COMMENTS:

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: HAFB-Officers Club

Project/Task Numbers: 8300122208.35050

Form Completed By: (print name) Scott Stevenson

(signature) Scott Stevenson (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
9 Aug 1996	13:25	GT302			✓		C_6H_{14}	4800	4750	✓	—
							H_2S	25 ppm	24 ppm		

COMMENTS:

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: D08 WAD35 O'Club

Project/Task Numbers: 830012208.35050

Form Completed By: (print name) Charles Mackewell (signature) [signature] (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
3/26/96	0800	PID	10.2	201289	X		Isobutylene	100	99.0	X	
3/26/96	0815	LEL	—		X		Hexane	Fieldcheck	—	X	

COMMENTS:

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: D08 WAD-35 O'Club

Project/Task Numbers: 830012298

Form Completed By: (print name) Charles Maderwell (signature) [signature] 3/25/96 (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
3-25-96	1245	PID	10.2	201289	X		Isobutylene	100 ppm	99.4	X	
1	1300	LEL	—		X		Hexane	40 ppm	40	X	

COMMENTS:

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: D08 WAD35 O'club

Project/Task Numbers: 8300 12208.35050

Form Completed By: (print name) Charles Maxwell (signature) [signature] (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
3-27-96	0855	PID	10.2		X		Isobutylene	100	100.4	X	
3-27-96	0945	LEL	—		X		Hexane	Fuel check	Fuel check	X	
3-27-96	↓	H_2S	—		X		H_2S	Fuel check	"	X	

COMMENTS:

DAILY AIR MONITORING INSTRUMENT CALIBRATION & REFERENCE STANDARD CHECKS

Project/Task Name: D08 WA035 ok lub

Project/Task Numbers: 830012208.35050

Form Completed By: (print name) Charles Madewell (signature) [signature] (date)

DATE	TIME	AIR MONITORING INSTRUMENT			BATTERY CHECK		REFERENCE (SPAN) GAS		UNADJUSTED INSTRUMENT READING	CALIBRATION	
		TYPE	LAMP eV	SERIAL #	OK	LOW	TYPE	CONCENTRATION		OK	ADJUSTMENT REQ'D
3-29-96	0745	PID	10.2	201289	X		Isobutylene	100	99.8	X	
↓	↓	LEL	—	05441	X		Hexane	Field ck	Fld ck	X	
↓	↓	H_2S	—	↓	X		H_2S	Fld ck	Fld ck	X	

COMMENTS: _____

Instrument (Name/Model No./Serial No.): HyPAC ph, Temp, cond.

Manufacturer _____ Date Purchased _____

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
9 Apr 1996	N A	pH 7, 4	per mfr.	zero @ 7, span @ 4	7, 4.	LSS.	
10 Apr 1996		7, 10	"	10		LSS	for SS56
10 Apr 1996		7 4	"	4		LSS.	for SS57
11 Apr 1996	'	7/4	"	adjusted per spec	-	LSS	for LTM LK01
"	"	"	"	"	"	LSS	for SS57-0'club
12 Apr 1996	"	—	per mfr.	set do 7, 4	7.0, 4.0	L.S.S.	for 0'club.

Instrument (Name/Model No./Serial No.): Mini Rae / PGM-75 / 000832

Manufacturer RAE Date Purchased rented

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
4/16/96	zero = 0 span =	100 ppm Isobutylene	zero + span	spanned	0, 100	L.S. Stum	
17 Apr 1996		"	refer. manu	span.	0, 100	L.S. Stum	
18 Apr 1996		"	"	"	0, 100	L.S. Stum	
19 Apr 1996	0, 102	100 ppm isobutylene	check cal.	non	recals 102.2	L.S. Stum	

Instrument (Name/Model No./Serial No.): GA90 Gas Analyzer / GA90 / Hogco # 10468

Manufacturer Land Tec Date Purchased rented 4/11/96

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
16 Apr 1996		15% CO_2, 15% CH_4 0 ox.	per mfr.		15% CO_2, 15% CH_4	L.S. Stone	
17 Apr 1996		"	"		"	L.S. Stone	
18 Apr 1996		15% CO_2, 15% CH_4 zero air	"	re-calibrate	15% CO_2, 15% CH_4	[illegible]	
19 Apr 1996		"	"	re-calibrate	14.8% CH_4, 14.7% CO_2, 0% O_2	[illegible]	

Instrument (Name/Model No./Serial No.): H_2S Personal Monitor / Ind. Sci. HS267 / Hazco # 1417

Manufacturer Industrial Scientific Date Purchased rented 4/11/96

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
4/15/96	— Not	used —					
4/16/96	10 ppm alarm	25 ppm H_2S	field span + zero	reset alarm point to 5 ppm	reset 25 ppm no adjustment span	[illegible]	
4/17/96	5 ppm alarm	25 ppm H_2S	"	zero O.K. max span to 23	5 ppm alarm 23 ppm	[illegible]	
4/18/96	"	"	"	None	25 ppm H_2S 0	[illegible]	
4/19/96	"	"		None	25 ppm H_2S 0	[illegible]	

Instrument (Name/Model No./Serial No.): H_2S personal monitor / HS267 / Hazco # 1416

Manufacturer Industrial Scientific Date Purchased rented 4/11/96

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
4/16/96	alarm at 10 ppm	25 ppm H_2S	field zero + span	reset alarm to 5 ppm	span read 24 ppm	[illegible]	
4/17/96	alarm at 5 ppm	25 ppm H_2S	"	zero o.k. spanned max	span read 21	[illegible]	
4/18/96	"	"	"	None	read 24 ppm	[illegible]	
4/19/96	"	"	"	None	read 24 ppm	[illegible]	

Instrument (Name/Model No./Serial No.): H_2S Personal Monitor / HS 267 / Hoyco # 5156

Manufacturer Industrial Scientific Date Purchased rented 4/11/96

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
4/15/96	10 ppm alarm	25 ppm H_2S	field span + zero (2 min)	reset alarm to 5 ppm	span to 25 ppm	[illegible]	
4/16/96	5 ppm alarm	25 ppm H_2S	field zero + span (2 min)	None span to 25 ppm	o.K.	[illegible]	
4/17/96	5 ppm alarm	25 ppm H_2S	"	zero o.K. spanned to 24	span 24	[illegible]	
4/18/96	"	"	"	None	read 24 ppm	[illegible]	
4/19/96 CW	"	"	"	None	read 24 ppm	[illegible]	

Instrument (Name/Model No./Serial No.): H_2S personal monitor / HS267 / Hazco # 7429

Manufacturer Industrial Scientific Date Purchased rented 4/11/96

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
4/15/96	10 ppm alarm	25 ppm H_2S	Field zero + span	reset alarm to 5 ppm	read 21 ppm span marked	[illegible]	
4/16/96	5 ppm alarm	25 ppm H_2S	Field zero + span	rezeroed, spanned	read 24 ppm	[illegible]	
4/17/96	5 ppm alarm	25 ppm H_2S	"	Zero o.k. Must span to 21	21 ppm	[illegible]	To be used on stack
4/18/96	"	"	"	None	read 24 ppm	[illegible]	"
4/19/96	"	"	"	None	read 23 ppm	[illegible]	used on stack

Instrument (Name/Model No./Serial No.): Gastech / GT302 / Honeywell #6600

Manufacturer Gastech Date Purchased rented 4/11/96

Calibration Date	Initial Settings	Standard/Gas Used	Procedure	Adjustments Made	Final Settings	Signature	Comments
16 Apr 1996		25 ppm H_2S, 0 air	per mfr.		0, 25 ppm H_2S 0, 20.8 O_2	LSS	
18 Apr 1996		25 ppm H_2S Zero air	per mfr.	none	0, 23 ppm H_2S Zero = 0	[illegible]	
19 Apr 1996		"	"	none	25 ppm H_2S	[illegible]	

APPENDIX A-4
DAILY QUALITY CONTROL REPORTS, TAILGATE SAFETY MEETING NOTES, AND FIELD NOTES

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 1 Date: 25 MAR 1996
Contract No.: DACW-45-94-D003
Project Title & Location: DOB-WAD35 REMEDIATION AT OFFICERS CLUB
Weather: F Cloudy windy -W- Precipitation: none In.: Temp.: 40 Min.: 70 Max.:

1. Contract/Subcontractors and Area of Responsibility:

	NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
C	Schick		07:15 - 17:30	GTI/GSI	O Club - set up, coord.
C	Madewell		07:15 - 18:30	"	O'Club - Site Safety
S	Stevenson	Scientist	07:15-1830	"	O'Club - drill log, sample, QC
D	Kirsnis	Driller	10:00 ÷ 1830	Layne	Drill MW03; setup SMP03
A	Kent	Helper	10:00 - 1830	"	" " " "

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Drill Rig	25 Mar 96		5	2	
PID	"	NA	6		–
3 gas meter	"	NA	6		–

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Safety coord w/ FW; set up work zones at O'club, erect fence, inspect utilities, Set up and drill MW-03, install well, place sand and bentonite; move drill rig to SMP 03.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Check w/ drillers for proper materials - well screen, casing, sand, bentonite. Set up decon area. Set up and arrange for handling of drill cuttings.

Sand on pallet is 12/20 rather than 10/20. Discussed w/ T. Reiner COE, will be OK for MW03. Arrange w/ drill Co (Layne) to try to get specified sand size.

Large augers have dirt around dust; need decon prior to use.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

6. Material Received: (Note inspection results and storage provided).

Well Screen, casing. Sample tubes, caps, teflon sheeting. Bentonite pellets, 1/4". - All per specifications -
Filter pack sand - one pallet 12/20; (10/20 specified)

Stored east of IDW compound.

7. Submittals Reviewed:

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. **Off-site Surveillance Activities, Including Action Taken:**

NONE

9. **Job Safety: (List items checked, results, instructions and corrective actions taken).**

Tailgate Safety meeting; FW safety briefing; drillers to wear tyvek suits.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Confusion over bentonite placement procedures. Agreed practice: 6" lift w/ ½ hr hydration; followed by 1' lift + add H_2O, 1' lift + H_2O, etc. Minimum ½ hr for hydration after full placement, prior to grouting.

Handling procedures for drill cuttings will be further discussed on 26 Mar 1996. Currently - clean cuttings on plastic @ parking area, w/ daily removal. Stained cuttings → drums.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 2 Date: 26 MAR 1996
Contract No.: DACW-45-94-D-0003
Project Title & Location: DO 8, WAD 35 - Remediation at O'Club - HAFB
Weather: p cloudy light breeze Precipitation: none In.: Temp.: 40 Min.: 60 Max.:

1. Contract/Subcontractors and Area of Responsibility:

	NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
C	Schick		06:30-16:00	GTI	O'Club - Proj. coord + support; oversight
C	Madewell		06:30-19:30	GTI	" -
S	Stevenson	Scientist	06:30-19:30	GTI	" - Logging; sampling; QC.
D	Kirsnis	Driller	06:30-19:30	Layne	Install Wells
A	Kent	helper	06:30-19:30	Layne	"
A	Gomez	helper	06:30-19:15	Layne	"

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Drill Rig	25 Mar 96		10.5	-	-
PID	"	NA	11.0		
3-Gas Meter	"	NA	11.0		

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Installed Sponge Monitoring Point SMP-03. Established closer definition + control in work & support areas.

SMP-03 first augured to depth w/ 8" auger to allow sampling; then over drilled w/ 15". Triple nest wells installed; screen depth 38-40; 26-28; 18-20. Sand and bentonite placed. 3 soil samples sent to GTEL-wichita for chem. analysis.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

~~None~~ Confirmed lengths on casings - note 0.2' loss of length due to flush threaded joints,

Confirmed screen sections - 2' long, 2" Sch. 80 PVC, 0.020 slot size. Confirmed casing is Sch 80 PVC.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

6. Material Received: (Note inspection results and storage provided).

90 Bags 10/20 Colorado Silica Sand - for filter pack:

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. **Off-site Surveillance Activities, Including Action Taken:**

NONE.

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Tailgate Safety meeting; as attached. Placed hand wash area near exit from controlled area.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Middle section of triple nest has screen interval at 26'-28' BLS. Last bucket of bentonite added (#4) resulted in excess fill, to 29' BGS rather than 31' BGS. Prior to addition, top of bentonite was ~ 34' BGS. Probable cause is wall material entering annular space, originally suspected strong vertical expansion of plug from hydration. Placed one foot sand over bentonite; to depth 28' BGS, installed well at this depth. Reduced thickness of bentonite above well screen; plug is from 25.5' up to 21'.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 3 Date: 27 MAR 1996
Contract No.: DACW-45-94-D-0003
Project Title & Location: DOR - WAD 35
Weather: Clear Precipitation: none In.: Temp.: 45 Min.: 70 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
C. MADEWELL		07:00 - 17:45	GTI	Site Safety officer; support
S. STEVENSON	Scientist	" "	GTI	Logging; sampling; QC
D Kirsnis	Driller	" "	Layne	Install wells at O' club
A Kent	Helper	" "	Layne	"
A Gomez	Helper	" "	Layne	"

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Drill Rig	25 Mar 1996		9	-	-
PID	"		9	-	-
3 Gas Meter	"		9	-	-

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Sampled soil & installed MW-01.
Drill sampling pilot hole @ SP-01.
Checked out power line clearance
Set up drill rig on SMP-01

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Inspected overhead powerline clearance, Met w/ base TECO, closest wire are Telephone, stms are 120/208. Primary is 14.4 KV. OK to work.
Moved SMP01 ~ 2 feet to miss underground cable - noted field location SMP-02 would not be within range for proper pilot test.
Noted that 5' sections of Sch 80 PVC were needed but not on hand for SP installation. Proper lengths to be picked up this evening.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

NONE

6. Material Received: (Note inspection results and storage provided).

NONE

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. **Off-site Surveillance Activities, Including Action Taken:**

NONE

9. **Job Safety: (List items checked, results, instructions and corrective actions taken).**

Site Safety meeting: met w/ Diane re: power line clearance, met w/ Base TECO re power line clearance.

10. **Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).**

Noted locations for SMP-03, SMP-02 were too far from SP-01 to provide needed data. Initiated discussions. PCR to follow.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stevenson 27 Mar 1996

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 4 Date: 28 MAR 1996
Contract No.: DACW-45-94-D-0003
Project Title & Location: DOR WAD 3 Remediation at officers Club, HAFB
Weather: clear, becoming Cloudy Precipitation: none In.: Temp.: 45 Min.: 70 Max.:

1. Contract/Subcontractors and Area of Responsibility:

	NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
C	Madewell		06:15 : 18:15	GTI	Officer's Club - Site Safety + Support
S	Stevenson	Scientist	06:15 : 18:15	GTI	Logging; QA; site mgr.
D	Kignis	Drill	06:15 : 18:15	Layne	Drilling
A	Kent	Helper	06:15 : 18:15	Layne	Drilling support
A	Gomez	Helper	08:30 : 14:50	Layne	" "

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Drill Rig	25 MAR 1996		9	–	–
PID	"		9	–	–
3 gas meter	"		9	–	–

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Drilled and installed SMP-01, including litholigic sampling, & sampling for chem. analysis: Packed & shipped samples, including geotech samples f. SP-01 sparge intervals.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Field Inspection meeting w/ COE + FW.

Confirmed materials used in well installation as per specs- Sch 80 PVC, 0.020 slot, Sch. 80 PVC casing. 10/20 silica sand, 1/4" Bentonite pellets.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

6. Material Received: (Note inspection results and storage provided).

2 1/2' sections flush tread Sch. 80 PVC for use in SP-01 to allow proper depth for topmost galvanized section.

7. Submittals Reviewed:

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken:

NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Site Safety meeting - also note driller's now fully equipped. Met w/ J. Mosely - AFCEE camera crew will film on Fri - they must stay o/o work area.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Final decision on location for SMP-02 (ref. Fig 3-FOP) is still pending. Recommended location 20' (18') south of SP-01. Will need decision by ~11:00 on Fri.

Notified at meeting at 13:00 that AFCEE film crew will be documenting sampling tomorrow. Tentative time 09:00. Need to be informed that 14:00 is best time.

Drill cuttings removed from area at 17:00 by FW.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stumm — 28 MAR 1996

CQC System Manager — Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 5 Date: 29 MAR 1996
Contract No.: DACW-45-94-D0003
Project Title & Location: Remediation at officer's Club-HAFB NM- DO 8 WAD35
Weather: Windy (w/ dust storm) Precipitation: none In.: ___ Temp.: 45 Min.: 70 Max.: ___

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
S. STEVENSON	Scientist	06:45-18:45	GTI	O'Club- sample log, QA for well installation
C MADEWELL		06:45-18:45	GTI	" - Site Safety & Support.
D KIRSNIS	Driller	06:45-18:45	Layne	Drill wells & install. SP-01, SMP-02
A KENT	Helper	06:45-18:45	Layne	"
J PINON	Helper	10:45-18:30	Layne	"

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Drill Rig	25 Mar 1996		11	-	-
PID	"		9	-	-
3 gas meter	"		9	-	-

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Drillout and install SP-01 - except waiting on steel casing.

Drill, sample, & partially install SMP-02

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Check galv. casing - was wrong thread.
Ensured sand, casing, + screen met specifications.
10/20 silica - sch. 80 PVC, sch. 80 PVC 0.020 slot.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

~~Check galv. casing was wrong th~~

6. Material Received: (Note inspection results and storage provided).

Sand 90 bags 10/20 silica (Drillers-supplies)
gravel for trench bottom - stored by cuttings storage area.
gravel for concrete mix " " " "

7. Submittals Reviewed:

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action
PCR 003	Fig 3		moved location SMP02 to 18' S of SP-01

8. Off-site Surveillance Activities, Including Action Taken:

None

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

SITE SAFETY MEETINGS:

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Galvanized casing for SP-01 cut w/ wrong threads (Sch 40 rather than sch. 80) Installed wells w/ PVC risers, loose joint at ~~expected~~ "galvanized" connection. Will install galvanized when it arrives. (on 30th)

Waiting on sand to complete installation of wells @ SMP-02

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee S. Hartmann 29 March 1996

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 6 Date: 30 MAR 1995
Contract No.: DACW-45-94-D003
Project Title & Location: Remediation of offices Club
Weather: clear Precipitation: none In.: - Temp.: 45 Min.: 75 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
MADEWELL		07:00-18:00	GTI	O'Club - SSO
STEVENSON	Scientist	07:00-18:00	GSI	O'Club - log, sample, OSC, QA.
D KIRSNIS	Driller	07:00-18:00	Layne	Drill wells; O'club
A KENT	Helper	07:00-18:00	Layne	" ; "
J Pinon	Helper	07:00-18:00	Layne	" ; "
D Mojan	P. Mgr.	08:00 17:00	Layne	finish wells, vaults, etc.; SVE trench install
B. Sepulveda	Laborer	08:00 18:00	Layne	" " " ;
O. Medrano	Laborer	08:00 18:00	Layne.	" " " ;
G. Smallwood	Supv.	07:30 - 13:00	Dailey Const	Dig trench - supervision.
F. Rust.	Operator	07:30 - 13:00	" "	" " - Backhoe Operator

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Drill Rig	25Mar/29Mar.		7	4	-
PID	25Mar/		9	2	-
3 gas meter	25Mar/		9	2	-
Backhoe	29Mar/29Mar		3	2	-

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Install SVE trench, w/ piping + Vault.
Finish installation of SMP-02 (install shallow well, ~~bring~~ finish).
Install ~~#~~ MW-04, MW-02.
Install pads + manholes on all wells except SP-01.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Ground review utility locations in trench area. Search for unmarked; esp. electric feed to lights in front. Hand dug to locate. Found unmarked water/sewer line, move trench to accomodate.
Checked gravel for SVE trench backfill; resolve issues w/ subs on which to use.
Check well screen + casing materials, sand, + bentonite to ensure specs. (O.K per plans).

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans). NONE

6. Material Received: (Note inspection results and storage provided).
NONE.

7. Submittals Reviewed:
NONE.

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken:
NONE.

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Tailgate Safety Meeting(s); Manual dig near utilities; excavation checklist O.K.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Found abandoned gas line, broken. Found abandoned gas line, intact, at west end of SVE trench. Tried to reach base utilities, no ans. Repeat on verbal confirmation that gas now comes fr. west. Will reconfirm on Monday. Moved vault location SVE trench to east end to avoid old gas lines, for safety + potential channeling effects. Verbal notification to Dan Holmquist + Jeff
Found void in trench area while excavating; may aid in SVE.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Sturman 31 Mar 1996
CQC System Manager Date

Groundwater Technology
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 7 Date: 31 Mar 1991
Contract No.: DACW-Ø45-94-D003
Project Title & Location: DOB WAD 35 Remediation of Officer's Club - HAFB
Weather: Clear Precipitation: none In.: - Temp.: 45 Min.: 70 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
C. Madewell		07:00-08:20	GTI	O'club - SSO; calibrate monitors; safety mtg.
S. Stevenson	Scientist	07:00-18:50	GTI	" - Develop wells, QA, OSC./SSO.
B. Sepulveda	Laborer	07:00-18:40	Layne	O'club - Finish wells, develop
O. Medrano	"	" "	Layne	" "

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
PID	25 Mar 1996/		9		
3 gas meter	25 Mar 1996/		9		
Red-flo (develop-ment pump)	31 Mar 1996		7.5		
generator for pump	"		7.5		

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Raised SP-01-S to proper depth; installed galv steel casing on all SP. Wells; complete bentonite lift; concrete + set pad, manhole. Remove sand & develop all wells.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Check depth SP-01-S. (Too deep). Raised to proper depth

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans). None.

6. Material Received: (Note inspection results and storage provided).

Steel casing w/ sch. 80 flush threads

7. Submittals Reviewed:
NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken:
NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Site Safety meeting. Excess H_2S at initial bailing of MW-03, cleared area for ~ 1 minute, breeze came up; no further H_2S in B.Z.

10. Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

No incidents. Fine sand in all SMP and SP deep wells, difficult to remove.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stevenson 1 Apr 1996
CQC System Manager Date

Groundwater Technology
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 8 Date: 1 Apr 1996
Contract No.: DACW-45-94-D003
Project Title & Location: Remediation at HAFB officer's Club
Weather: clear Precipitation: none In.: – Temp.: 45 Min.: 75 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	Scientist	07:00-08:00 EF:08:45-17:30	GTI	O'Club - gauge wells, remove temp fence; mapping, etc.

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
PID					
3 gas meter	25 Mar 1996 / 1 Apr 1996		2.5 hrs		

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Ship Fri + Sat samples for Chem Anal.
Remove + store temporary fencing.
Site cleanup.
Gauge liquid levels and total depth in all wells.
Map site + measure radial distances.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Measured t.d. - all wells - to check completion notes + feel for any sand remaining after development.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

NONE

6. Material Received: (Note inspection results and storage provided).

NONE

7. Submittals Reviewed:
NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken:
NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).
Site Safety meeting: Confirmed that gas line was abandoned

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).
Dennis Miller enquired re: schedule; informed him. He said he was going to get grass going.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stewart 1 Apr 1996
CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 9 Date: 9 Apr 1996
Contract No.: DACW-45-94-D003
Project Title & Location: 5557 - Remed a O'Neill's Club DO8WAD35
Weather: ~~Cloudy~~ Clear Precipitation: none In.:___ Temp.:_____ Min.:_____ Max.:_

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	SCIENTIST	12:00-17:45	GTI	Sampling mon. wells @ O'Club.

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
H_2S, O_2, hydrocarb. meter	9 Apr 1996	—	2	—	—
ph, Temp, Cond. meter	"	—	2.5	—	—

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Meet @ FW office; Liquid levels & headspace at MW01-04, SMP-01-03, SP01.
~~Gather~~ Purge & sample MW-04, MW-02, MW-01

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Calib. check Gastech; Calib. pH meter; both OK.
Check headspace in wells

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

Liquid levels; headspace in monitoring wells.

6. Material Received: (Note inspection results and storage provided).

none.

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken:

NONE.

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Single safety sheet review; b.z. + head space readings at all new wells.

10. Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Note ~~high~~ low pH in MW 01.
Sponge monitor wells - middle + deep - are showing some signs of sand infiltration (formation, not gravel pack).

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stevenson 10 Nov 1996

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 10 Date: 10 Apr 1996
Contract No.: DACW-45-94-D003 D08WAD35
Project Title & Location: HAFB - Officers Club
Weather: p cloudy w/ wind Precipitation: none In.: Temp.: 70 Min.: 80 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	Scientist	07:00-09:00 13:00-17:50	GTI	Officers Club; ship samples. purge + sample wells
DM WARD	Assist.	07:00 13:00-17:50	IF&S	" " " "

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
ph, Cond, temp	9 Apr 1995	—	4		

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Packed & Shipped samples from MW04, MW02, MW01
Purged & sampled MW03, SP01-S, SP01-M.

Put IDW in drum labeled 960410-1 & 960409-1

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Recheck cal. on pH meter; esp. due to very low readings.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

ph, cond, temp on purge waters to ensure stabilization.

6. Material Received: (Note inspection results and storage provided).

NONE.

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken: NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Site Safety meeting review - particular mention of H_2S to assistant.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Surveyors on site @ 14:00 to locate wells. Provided them w/ base map; forgot to have SUE trench tagged, will do w/ tape off of SP01, SMP01, + MW01

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Turner 10 Apr 1996.

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 11 Date: 11 Apr 1996
Contract No.: DACW-45-94-D003
Project Title & Location: HAFB - O club - DOB WAD 35
Weather: windy Precipitation: — In.: - Temp.: 60 Min.: 80 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	Scientist	06:00-08:30 13:30-17:00	GTI/GSI	O'club - sampling/purge, etc. Coord of material for purge test.
GRIFFIN	Assist.	07:30-08:30 13:30-17:00	IF+S	Assist w/ sampling; purging; shipping.

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Intra Probe			1	—	—
pH, Cond, temp mtr.			4	—	—

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Pack & ship samples to GTEL under COC # 42287.
Purge & sample SP0138-40. Gauge #'s liquid levels and total depth in MW05, MW07, MW09.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

calib. check on ph meter.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

monitor ph, cond, temp for stabilization prior to sampling.

6. Material Received: (Note inspection results and storage provided).

NONE

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken: NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

(Site Safety meeting - prev. listed under LTM daily).

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

SP01-D is relatively clear, no odors.
Older monitoring wells have v little water.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stevens 12 Apr 1996

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 12 Date: 12 Apr 1996
Contract No.: DACW-45-94-D003
Project Title & Location: 5557-REMED. at O' Club - DOBWAD 35
Weather: clear Precipitation: — In.: Temp.: 50 Min.: 80 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	SCIENTIST	06:00-07:00 07:30-14:00	GTI/GSI	O Club/sampling
				IDW / pack + ship samples
		14:00-16:30.		coord. carbon + other supplies

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
ph, temp, cond.			3	—	—

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Sample wells at O'club - MW05 MW09, MW07
Pack & ship samples for Saturday delivery.
Track down Vapor phase carbon

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Calibrate ph meter @ 4, 7.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

Monitored ph, cond, & temp for stabilization prior to sampling.

6. Material Received: (Note inspection results and storage provided).

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken: NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Site Safety checklist review.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

MW 09 - slow recharge, went dry
MW07 - " " " "
MW 07 had PVC cuttings & sand in bottom.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Smith 12 Apr 1994

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 13 Date: 15 Apr 1996
Contract No.: DACW-45-94-D0083
Project Title & Location: HAFB - SS57 - Remed. @ O' club.
Weather: clear light wind Precipitation: none In.: Temp.: 35 Min.: 80 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	SCIENTIST	0800 - 17:30	GTI/GSI	O'Club/Set up SVE/SPARGE/ Baseline Monitor
WRIGHT	PG ENGINEER	0800 - 17:30	"	"

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
Water Level Meter,	15 Apr 1996	—	2	-	
H_2S Personal Mon. (2)		—	8	-	
GA-90		—	4	-	
GASTECH 302		-	4	-	
DO Meter		-	2	—	
Sparge/Vent train		14 Apr / 15 Apr	4	—	

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Set up sparge/vent trailer. Collect baseline soil gas, water level, and dissolved oxygen data. Recieve fuel for equip. operation. Rx. a connect carbon drums. Perform 1/2 hr equip. test, 1/2 hr operation of SVE at 6" H_2O vacuum, 1/2 hr. SVE operation at 15" H_2O.
Fence controlled area.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Calibrate gas meters, etc. Set alarm points on personal monitors
Check all trailer equip. Check gauges, replace one on SVE

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

Equip. test: Pressure flow "ramp-up" on SVE.
1/2 hr SVE op. at 6" H_2O (1/4 max) vacuum
" " 15" (~ 1/2 max) "

6. Material Received: (Note inspection results and storage provided).

4 Carbon drums; at equip. trailer
Summa Canisters; etc. for air sampling

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. **Off-site Surveillance Activities, Including Action Taken:**
NONE

9. **Job Safety: (List items checked, results, instructions and corrective actions taken).**

Site Safety Meeting. Installed fence to define controlled area.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee S. [illegible] 16 Apr 1996

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 14 Date: 16 Apr 1996
Contract No.: DACW-45-94-D0003
Project Title & Location: DOBWAD35 - SS57 - REMED. AT O' Club.
Weather: cloudy Precipitation: none In.: Temp.: 35 Min.: 75 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	SCIENTIST	07:20 - 19:30	GTI	officers Club / perform SVE/sparge pilot.
WRIGHT	ENGINEER	07:20 - 19:30	"	" " "

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
DO meter	15 Apr	-	8	-	
IP		-	8	-	
GA 90 - gas meter		-	8	-	
GT 302 "		-	8	-	
MiniRae - PID		-	8	-	
MK - He detector		-	8	-	
SVE/Sparge trailer.	do	16 Apr 1996	8	-	(1/2)*
(4) H_2S Personal Monitors	"	-	10	-	

* repaired idler pulley on sparge blower, SVE ops continued.

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

~~Collected~~ Calibrated all H_2S monitors. Ran SVE for several hours, w/ startup sampling + end of run sampling. Began sparge test into SP0118-20. Injected slug of He for tracer/recovery test. Collected Summa canister sample at end of run.
Monitored basement + SVE exhaust w/ H_2S alarms. (No H_2S detected).

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Calibrate all instruments. set alarm state limit on balance of H_2S monitors to 5ppm.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

SVE/sparge test per work plan - shallow zone.
Results on field sheets.

Increase in H_2S + CO_2 @ MW03 noted.
Water level rise in SMP01-5 (18-20) noted.
DO rise noted.

6. Material Received: (Note inspection results and storage provided).

Summa Canisters for air samples - all OK + intact.
Replacement pulley for SVE/sparge idler-tensioner - OK.
ORP - low bat. non-functional.

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. **Off-site Surveillance Activities, Including Action Taken:** NONE

9. **Job Safety: (List items checked, results, instructions and corrective actions taken).**

Site Safety Meeting; calib. personal H_2S monitors; place additional monitors in equip room & at SVE influent.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Water in ~~at~~ SMP03 18-20 reacted when sensed w/ ORP - black precipitate in water; sulfur deposit on electrode.

Repair of idler/tension pulley did not cause impacts on SVE. SVE stabilization rapid, within minutes.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stuman 17 Apr 1996.

CQC System Manager Date

Groundwater Technology
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 15 Date: ~~18~~ 17 Apr 1996
Contract No.: DACW-45-94-D0003
Project Title & Location: DOB WAD35 - 5557 Remediation at officers' clus.
Weather: cloudy, windy Precipitation: none In.: Temp.: 58 Min.: 82 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	SCIENTIST	07:45-17:30	GTI	O'club/Perform Sparge pilot in middle zone
WRIGHT.	Engineer	" "	"	" "

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
(4) H_2S monitors	15 Apr 96	-	9	-	
GA-90		-	9	-	
GT302		-	9	-	
IP		-	9	-	
DO meter		-	9	-	
Helium detector		-	9	-	
SVE/Sparge trailer		17 Apr 1996	8	-	0.15 *
Mini RAE PID		-	9	-	(replaced salt.)

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Collected daily baseline data after calibrating instruments. Started SVE, then sparge test into SP01 28-30. Performed Helium slug injection tracer test. Sampled SVE stream, shipped FedEx to lab.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Calibrated all instruments.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

SVE/SPARGE TEST per WORK PLAN, in SP01 28-30. DATA ON FIELD SHEETS.

Results indicate connection between 38-40' zone & 28-30' ZONE, shallow zone, to west of sparge point. Helium capture not as great as in shallow zone. Minor rise of soil water level, and some slight bubbling noted in sump outside of basement mech. equipment room. No H_2S or hydrocarbons detected in basement during the entire test period. No H_2S or hydrocarbons in breathing zone entire day.

6. Material Received: (Note inspection results and storage provided).

NONE

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. **Off-site Surveillance Activities, Including Action Taken:** NONE

9. **Job Safety: (List items checked, results, instructions and corrective actions taken).**

Daily Safety meeting; Daily SVE/sparge equip check; Continuous H_2S monitoring. No hydrocarbons or H_2S detected in breathing zone entire day.

10. **Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).**

STRONG WINDS IN AFT.
Brief discussions w/ Warren Neff & Steve Pearson re: possible remedial designs.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stevenson 18 Apr 1996.

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 16 Date: 18 Apr 1996
Contract No.: DACW-45-94-D0003
Project Title & Location: HAFB - REMED. AT O'CLUB - DOB WAD 35
Weather: clear, windy Precipitation: none In.: Temp.: 58 Min.: 80 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	SCIENTIST	07:45 - 17:15	GTI	O'Club / Perform Sparge test
WRIGHT	ENGINEER	07:45 - 17:15	GTI	" "

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
(4) H_2S Monitors	15 Apr 1996	-	9	-	
Mini Rae		-	9	-	
Helium Detector		-	9	-	
GT302		-	9	-	
GA 90		-	9	-	
SPAROC/SVE Trailer	15 Apr 1996.	18 Apr 1996	8	-	0.5 *
DO meter	"	-	9	-	
IP	"	-	9		

* replaced belt on SVE drive.

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Collected baseline data. Conducted sparge pilot test in SP01 38-40 per work plan. Collected SVE air samples, shipped to lab. Discussed results w/ Warren Neff. Checked pH rise in MW03.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Calibrate & check all instruments. Operation check on equip. trailer.

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

Sparge/SVE test per work plan.
pH, conductivity in select wells.

Sparge test showed effects on all wells; indicates that sparging into medium zone requires less energy than deep zone for affecting all zones. Helium slug injection shows strong direct channelling to SMP01-M (28-30).

6. Material Received: (Note inspection results and storage provided).

NONE.

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken: NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

Site Safety meeting; Equipment check; frequent monitor of basements showed no impacts.

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Low pH's at "hot" zone are of note. Attempts to move extraction to MW03 will be made on 19th while equipment loading is ongoing; sparge into SMP03S will be attempted if control is established by SVE above.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Freeman 19 Apr 1996.

CQC System Manager Date

GROUNDWATER TECHNOLOGY
(FIRM NAME)

DAILY QUALITY CONTROL REPORT

Daily Report No.: 17 Date: 19 Apr 1996
Contract No.: DACW-45-94-D0003
Project Title & Location: DOB WAD 35 - 5557 Remediation at officers club.
Weather: clear Precipitation: none In.: Temp.: 60 Min.: 80 Max.:

1. Contract/Subcontractors and Area of Responsibility:

NUMBER	TRADE	HOURS	EMPLOYER	LOCATION/DESCRIPTION WORK
STEVENSON	SCIENTIST	0800 - 14:00	GTI	Officers Club / clean up for test, SVE
WRIGHT	ENGINEER	0800 - 13:30	GTI	/ " " , SVE.

2. Operating Plant or Equipment. (Not hand tools)

Plant/Equipment	Date of Arrival/ Departure	Date of Safety Check	Hours Used	Hours Idle	Hours Repair
(4) Personal H_2S Monitors	15 Apr /	-			
GA 90		-			
GT 302		-			
SVE/Sparge trailer		19 Apr 1996	2	—	—
Helium Detector		—			
Mini RAE PID		—			

3. Work Performed Today: (Indicate location and description of work performed by prime and/or subcontractors. When network analysis is used, identify work by NAS activity number).

Collected baseline soil gas readings: Collection Connected SVE to MW03, tried SVE - (no flow/very low) - . SVE from MW01.

Removed all equipment, fencing, etc, from site. Portable toilet + propane remain on site.

4. Control Activities Performed:
Preparatory Inspections: (Identify feature of work and attached minutes).
Initial Inspections: (Identify feature of work and attach minutes).
Follow-Up Inspections: (List inspections performed, results of inspection compared to specification requirements, and corrective actions taken when deficiencies are noted).

Calibration of H_2S, GA-90, GT302, MiniRAE PID

5. Tests Performed and Test Results: (Identify test requirement by paragraph number in specifications and/or sheet number in plans).

SVE in MW03 - insufficient flow to provide control for sparge into SMP03-5. Did not try sparge. Obtained high H_2S concentrations at SVE influent, w/ complete capture in vapor phase carbon drums. ~~Dropped~~ H_2S levels dropped to zero.
SVE in MW01 - minor hit on H_2S - still v. low flow, minor control to VET-1

6. Material Received: (Note inspection results and storage provided). NONE

7. Submittals Reviewed: NONE

(a) Submittal No.	(b) Spec/Plan Reference	(c) By Whom	(d) Action

8. Off-site Surveillance Activities, Including Action Taken: NONE

9. Job Safety: (List items checked, results, instructions and corrective actions taken).

SITE SAFETY MEETING

10.Remarks: (Instructions received or given. Conflicts(s) in Plans and/or specifications. Delays encountered.).

Vertical extraction does not seem to provide sufficient air flow for control for sparging at SMPOS. Trenches may provide much better control.

Contractor's Verification: On behalf of the Contractor, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as may be noted above.

Lee Scott Stanmen 19 Nov 1998

CQC System Manager Date

TAILGATE MEETING FORM

Project Name: DOE WAD 35 D'CHUB

Date: 3-25-95

Project Number: ~~[illegible]~~ 03300122048

Presented by: Charles Nodeau

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [ ] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [x] portable tool safety and awareness
- [x] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [x] sharp object, rebar, and scrap metal hazards
- [x] safety is everyone's responsibility
- [ ] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [ ] work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%
- [x] slips, trips, and falls
- [x] directions to hospital
- [x] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [x] orderly site and housekeeping
- [x] smoking in designated areas
- [x] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [ ] decontamination procedures
- [x] daily work scope
- [x] emergency protocol
- [x] parking and laydown
- [ ] hot work permits
- [x] strains and sprains
- [ ] noise hazards
- [x] no horseplay
- [x] heat and cold stress
- [x] backing up hazards
- [x] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [ ] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	[signature]	GTI
Chuck Schick	[signature]	GTI
Joni Rhiner	[signature]	USACE
Don Kirsnis	[signature]	L.E.S.I.
William Foley	[signature]	FWENC
Tony Kent	[signature]	LESI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: DOS WAD35 O'club

Date: 3-27-96

Project Number: 830012208

Presented by: Charles Madewell

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [x] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [x] portable tool safety and awareness
- [x] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [x] sharp object, rebar, and scrap metal hazards
- [x] safety is everyone's responsibility
- [x] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [x] work stoppage at: FID/PID(___ eV) > 5 (H_2S) ppm, % LEL > 10%
- [x] slips, trips, and falls
- [x] directions to hospital
- [x] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [x] orderly site and housekeeping
- [x] smoking in designated areas
- [x] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [x] decontamination procedures
- [x] daily work scope
- [x] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [x] strains and sprains
- [x] noise hazards
- [x] no horseplay
- [x] heat and cold stress
- [x] backing up hazards
- [x] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [x] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	Scott Stevenson	GTI
Alejandro B Gomez	Alejandro B Gomez	INSITE ENVIRONMENTAL
D Kirsnis	D Kirsnis	LAYNE
D. Foley	D Foley	RUSAL
Tony Kent	Tony Kent	Layne Environmental

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: D08 WA035 O'Club

Date: 3-28-96

Project Number: 830012208

Presented by: Charles Madewell

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [x] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [x] portable tool safety and awareness
- [x] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [x] sharp object, rebar, and scrap metal hazards
- [x] safety is everyone's responsibility
- [x] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [x] work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%

H_2S - 5ppm

- [x] slips, trips, and falls
- [x] directions to hospital
- [ ] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [x] orderly site and housekeeping
- [x] smoking in designated areas
- [x] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [x] decontamination procedures

- [x] daily work scope
- [x] emergency protocol
- [x] parking and laydown
- [ ] hot work permits
- [x] strains and sprains
- [x] noise hazards
- [x] no horseplay
- [x] heat and cold stress
- [x] backing up hazards
- [x] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [x] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Abelardo B Gomez	[signature]	ON SITE ENVIRONMENTAL
Tony Kent	[signature]	CESI
William Foley	[signature]	FWENC
Don Kirsnis	[signature]	LAYNE
Scott Stevenson	[signature]	GTI
Charles Madewell	[signature]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: DOE WAD35 O'club

Date: 3-29-96

Project Number: 830012208.

Presented by: Charles Madewell

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [x] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [x] portable tool safety and awareness
- [x] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [x] sharp object, rebar, and scrap metal hazards
- [x] safety is everyone's responsibility
- [x] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) > ___ ppm
- [x] work stoppage at: FID/PID(___ eV) > 5 ppm, % LEL > 10%
  H_2S
- [x] slips, trips, and falls
- [x] directions to hospital
- [x] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [x] orderly site and housekeeping
- [x] smoking in designated areas
- [x] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [x] decontamination procedures
- [x] daily work scope
- [x] emergency protocol
- [ ] parking and laydown
- [x] hot work permits
- [x] strains and sprains
- [x] noise hazards
- [x] no horseplay
- [x] heat and cold stress
- [x] backing up hazards
- [x] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [x] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Charles Madewell	Charles Madewell	GTI
Don Kusnus	D Kusnus	LAYNE
Tony Kent	Tony Kent	LAYNE
Scott Stevenson	Scott Stevenson	GTI
Jesus Pinon	Jesus Pinon	Layne

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: DOE WA035 O'Club

Date: 3-30-96

Project Number: 830012208.35050

Presented by: Charles Madewell

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [x] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [x] portable tool safety and awareness
- [x] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [x] sharp object, rebar, and scrap metal hazards
- [x] safety is everyone's responsibility
- [x] latex gloves inner/nitrile gloves outer
- [x] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) > ___ ppm
- [x] work stoppage at: FID/PID(___ eV) > 5 ppm, % LEL > 10%

H_2S

- [x] slips, trips, and falls
- [x] directions to hospital
- [ ] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [x] excavator swing and loading
- [x] orderly site and housekeeping
- [x] smoking in designated areas
- [x] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [x] decontamination procedures

- [x] daily work scope
- [x] emergency protocol
- [x] parking and laydown
- [ ] hot work permits
- [x] strains and sprains
- [x] noise hazards
- [x] no horseplay
- [x] heat and cold stress
- [x] backing up hazards
- [x] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [x] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Charles Madewell	[signature]	GTI
Jesus Pinon	[signature]	Layne
Tony Kent	[signature]	Layne
Don Kiesnis	[signature]	LAYNE
Scott Stevenson	[signature]	GTI
Gilbert Smallwood	[signature]	Danley
Frank Rust	[signature]	Danley Const
Dave Hogan	[signature]	LAYNE
Ben Sepulveda	[signature]	Layne
Oscar Medrano	[signature]	Layne

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: D08 WAP35 O'Club

Date: 3-31-96

Project Number: 83001 2208.35050

Presented by: Charles Madewell

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [ ] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [x] portable tool safety and awareness
- [ ] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [ ] sharp object, rebar, and scrap metal hazards
- [x] safety is everyone's responsibility
- [x] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [x] work stoppage at: FID/PID(___ eV) > 5 ppm, % LEL > 10% (H_2S)
- [x] slips, trips, and falls
- [x] directions to hospital
- [ ] anticipated visitors
- [x] electrical ground fault
- [ ] public safety and fences
- [ ] excavator swing and loading
- [x] orderly site and housekeeping
- [x] smoking in designated areas
- [x] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [ ] decontamination procedures
- [x] daily work scope
- [ ] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [x] strains and sprains
- [x] noise hazards
- [x] no horseplay
- [x] heat and cold stress
- [x] backing up hazards
- [ ] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [x] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Charles Madewell	[signature]	GTI
Ben Segulveda	[signature]	Lagne
Oscar S Medrano	[signature]	Hayne
Scott Stevenson	[signature]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: DOBWAD35 - Remed. @ O'Club HAFB Date: 1 Apr 1996

Project Number: B3001220B.35050 Presented by: Scott Stevenson

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [x] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [ ] portable tool safety and awareness
- [ ] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [x] sharp object, rebar, and scrap metal hazards
- [x] safety is everyone's responsibility
- [ ] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [x] work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%
  5 ppm H_2S.
- [x] slips, trips, and falls
- [x] directions to hospital
- [ ] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [x] orderly site and housekeeping
- [ ] smoking in designated areas
- [ ] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [x] decontamination procedures
- [x] daily work scope
- [x] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [ ] strains and sprains
- [ ] noise hazards
- [ ] no horseplay
- [ ] heat and cold stress
- [ ] backing up hazards
- [ ] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [ ] flying debris hazards

Discussion/Comments/Follow-up Actions: Only intrusive activity today - bailing wells.

NAME	SIGNATURE	COMPANY
Scott Stevenson	S A Stevenson	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: _____ Date: 8 Apr 1996

Project Number: 830012208.35050 Presented by: Scott Stevenson

Check the Topics/Information Reviewed:

- ☑ safety glasses, hard hat, safety boots
- ☑ site safety plan review and location
- ☑ equipment and machinery familiarization
- ☐ employee Right-To-Know/MSDS location
- ☐ open pits, excavations, and site hazards
- ☐ vehicle safety and driving/road conditions
- ☐ portable tool safety and awareness
- ☑ overhead utility locations and clearance
- ☑ first aid, safety, and PPE location
- ☐ sharp object, rebar, and scrap metal hazards
- ☐ safety is everyone's responsibility
- ☑ latex gloves inner/nitrile gloves outer nitrile inner
- ☐ excavation/trenching inspections/documentation
- ☐ full face respirators with proper cartridges
- ☐ upgrade to level c at: FID/PID (___ eV) >___ ppm
- ☐ work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%

5 ppm H_2S

- ☑ slips, trips, and falls
- ☑ directions to hospital
- ☐ anticipated visitors
- ☐ electrical ground fault
- ☑ public safety and fences
- ☐ excavator swing and loading
- ☐ orderly site and housekeeping
- ☐ smoking in designated areas
- ☐ leather gloves for protection
- ☐ effects of the night before
- ☐ vibration related injuries
- ☑ fire extinguisher locations
- ☑ eye wash station locations
- ☑ decontamination procedures

- ☑ daily work scope
- ☐ emergency protocol
- ☐ parking and laydown
- ☐ hot work permits
- ☐ strains and sprains
- ☐ noise hazards
- ☐ no horseplay
- ☐ heat and cold stress
- ☐ backing up hazards
- ☐ accidents are costly
- ☐ dust and vapor control
- ☐ refueling procedures
- ☐ confined space entry
- ☐ flying debris hazards

Discussion/Comments/Follow-up Actions: Personal review

NAME	SIGNATURE	COMPANY
Scott Stevenson	[signature]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: HAFB - O'club

Date: 12 Apr 1996

Project Number: 83001 2208.

Presented by: L. S. Stevenson.

Check the Topics/Information Reviewed:

- ☒ safety glasses, hard hat, safety boots
- ☒ site safety plan review and location
- ☐ equipment and machinery familiarization
- ☐ employee Right-To-Know/MSDS location
- ☒ open pits, excavations, and site hazards
- ☐ vehicle safety and driving/road conditions
- ☐ portable tool safety and awareness
- ☐ overhead utility locations and clearance
- ☒ first aid, safety, and PPE location
- ☐ sharp object, rebar, and scrap metal hazards
- ☐ safety is everyone's responsibility
- ☒ latex gloves inner/nitrile gloves outer
- ☐ excavation/trenching inspections/documentation
- ☐ full face respirators with proper cartridges
- ☐ upgrade to level c at: FID/PID (___ eV) >___ ppm
- ☐ work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%
- ☒ slips, trips, and falls
- ☒ directions to hospital
- ☐ anticipated visitors
- ☐ electrical ground fault
- ☐ public safety and fences
- ☐ excavator swing and loading
- ☐ orderly site and housekeeping
- ☐ smoking in designated areas
- ☐ leather gloves for protection
- ☐ effects of the night before
- ☐ vibration related injuries
- ☒ fire extinguisher locations
- ☒ eye wash station locations
- ☐ decontamination procedures
- ☒ daily work scope
- ☒ emergency protocol
- ☐ parking and laydown
- ☐ hot work permits
- ☐ strains and sprains
- ☐ noise hazards
- ☐ no horseplay
- ☐ heat and cold stress
- ☐ backing up hazards
- ☐ accidents are costly
- ☐ dust and vapor control
- ☐ refueling procedures
- ☐ confined space entry
- ☐ flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	Lee S. of Stevenson	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: HAFB - O' Club

Date: 15 Apr 1996

Project Number: 830012208.35060

Presented by: Scott Stevenson

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [ ] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [ ] open pits, excavations, and site hazards
- [ ] vehicle safety and driving/road conditions
- [ ] portable tool safety and awareness
- [x] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [ ] sharp object, rebar, and scrap metal hazards
- [ ] safety is everyone's responsibility
- [ ] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) > ___ ppm
- [ ] work stoppage at: FID/PID(___ eV) > ___ ppm, % LEL > 10%

>5ppm H2S till clear.

- [x] slips, trips, and falls
- [x] directions to hospital
- [x] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [ ] orderly site and housekeeping
- [ ] smoking in designated areas
- [ ] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [ ] eye wash station locations
- [ ] decontamination procedures

- [x] daily work scope
- [ ] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [ ] strains and sprains
- [ ] noise hazards
- [x] no horseplay
- [ ] heat and cold stress
- [x] backing up hazards
- [ ] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [ ] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	Scott Stevenson	GTI/GSI
Curtis Wright	[illegible]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: HAFB-

Date: 16 Apr 1996

Project Number: 83001/2208.35060

Presented by: Scott Stevenson

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [x] open pits, excavations, and site hazards
- [ ] vehicle safety and driving/road conditions
- [ ] portable tool safety and awareness
- [x] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [x] sharp object, repair, and scrap metal hazards
- [ ] safety is everyone's responsibility
- [x] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [ ] work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%
- [x] slips, trips, and falls
- [x] directions to hospital
- [x] anticipated visitors
- [x] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [ ] orderly site and housekeeping
- [ ] smoking in designated areas
- [ ] leather gloves for protection
- [ ] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [x] decontamination procedures
- [x] daily work scope
- [ ] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [ ] strains and sprains
- [x] noise hazards
- [ ] no horseplay
- [ ] heat and cold stress
- [ ] backing up hazards
- [ ] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [ ] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	[signature]	GTI/GSI
Curtis Wright	[signature]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: Remed. @ HAFB - O'Club Date: 17 Apr 1996

Project Number: 83001 2208.35060 Presented by: Scott Stevenson

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [x] employee Right-To-Know/MSDS location
- [ ] open pits, excavations, and site hazards
- [ ] vehicle safety and driving/road conditions
- [ ] portable tool safety and awareness
- [ ] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [ ] sharp object, rebar, and scrap metal hazards
- [ ] safety is everyone's responsibility
- [ ] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at FID/PID (___ eV) >___ ppm
- [ ] work stoppage at FID/PID(___ eV) >___ ppm, % LEL > 10%

5 ppm H_2S.

- [ ] slips, trips, and falls
- [ ] directions to hospital
- [ ] anticipated visitors
- [ ] electrical ground fault
- [ ] public safety and fences
- [ ] excavator swing and loading
- [ ] orderly site and housekeeping
- [x] smoking in designated areas
- [ ] leather gloves for protection
- [x] effects of the night before
- [ ] vibration related injuries
- [ ] fire extinguisher locations
- [x] eye wash station locations
- [ ] decontamination procedures

- [x] daily work scope
- [ ] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [ ] strains and sprains
- [ ] noise hazards
- [ ] no horseplay
- [ ] heat and cold stress
- [ ] backing up hazards
- [ ] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [ ] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	[signature]	GTI
Curtis Wright	[signature]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: HAFB - O' Club

Date: 18 Aug 1996

Project Number: 830012208.35060

Presented by: Scott Stevenson

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [ ] equipment and machinery familiarization
- [ ] employee Right-To-Know/MSDS location
- [ ] open pits, excavations, and site hazards
- [ ] vehicle safety and driving/road conditions
- [ ] portable tool safety and awareness
- [ ] overhead utility locations and clearance
- [ ] first aid, safety, and PPE location
- [ ] sharp object, rebar, and scrap metal hazards
- [ ] safety is everyone's responsibility
- [ ] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [ ] work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%

- [x] slips, trips, and falls
- [x] directions to hospital
- [x] anticipated visitors
- [ ] electrical ground fault
- [ ] public safety and fences
- [ ] excavator swing and loading
- [ ] orderly site and housekeeping
- [ ] smoking in designated areas
- [ ] leather gloves for protection
- [ ] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [x] eye wash station locations
- [ ] decontamination procedures

- [x] daily work scope
- [ ] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [ ] strains and sprains
- [ ] noise hazards
- [ ] no horseplay
- [ ] heat and cold stress
- [ ] backing up hazards
- [ ] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [ ] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	[signature]	GTI
Steve Pearson	[signature]	USACE - Omaha Dist.
Curtis Wright	[signature]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

TAILGATE MEETING FORM

Project Name: HAFB - O'Club

Date: 18 Apr 1996

Project Number: 83001220B.35060

Presented by: Scott Stevenson

Check the Topics/Information Reviewed:

- [x] safety glasses, hard hat, safety boots
- [x] site safety plan review and location
- [x] equipment and machinery familiarization
- [ ] employee Right-To-Know/MSDS location
- [ ] open pits, excavations, and site hazards
- [x] vehicle safety and driving/road conditions
- [ ] portable tool safety and awareness
- [ ] overhead utility locations and clearance
- [x] first aid, safety, and PPE location
- [ ] sharp object, rebar, and scrap metal hazards
- [ ] safety is everyone's responsibility
- [ ] latex gloves inner/nitrile gloves outer
- [ ] excavation/trenching inspections/documentation
- [ ] full face respirators with proper cartridges
- [ ] upgrade to level c at: FID/PID (___ eV) >___ ppm
- [ ] work stoppage at: FID/PID(___ eV) >___ ppm, % LEL > 10%

Spot H_2S

- [ ] slips, trips, and falls
- [x] directions to hospital
- [ ] anticipated visitors
- [ ] electrical ground fault
- [x] public safety and fences
- [ ] excavator swing and loading
- [x] orderly site and housekeeping
- [ ] smoking in designated areas
- [ ] leather gloves for protection
- [ ] effects of the night before
- [ ] vibration related injuries
- [x] fire extinguisher locations
- [ ] eye wash station locations
- [ ] decontamination procedures

- [ ] daily work scope
- [ ] emergency protocol
- [ ] parking and laydown
- [ ] hot work permits
- [ ] strains and sprains
- [ ] noise hazards
- [ ] no horseplay
- [ ] heat and cold stress
- [ ] backing up hazards
- [ ] accidents are costly
- [ ] dust and vapor control
- [ ] refueling procedures
- [ ] confined space entry
- [ ] flying debris hazards

Discussion/Comments/Follow-up Actions:

NAME	SIGNATURE	COMPANY
Scott Stevenson	[signature]	GTI

Instructions:

- Conduct a daily safety meeting prior to beginning each day's site activities.
- Complete form by checking off specific topics and/or hazards.
- Obtain signatures from all GTI staff and GTI subcontractors.
- Follow-up on any noted items and document resolution of any action items.

25 MAR 1996

(1)

Holloman AFB - Officers Club
Pilot test preparations

07:15 Leave for HAFB - get base passes
assemble at FW Trailer -
on site - Chuck Schick
Charles Madewell
Scott Stevenson

09:00 Go to officers club:
inspect site, check utility
markings, erect temporary
fence around job area,
wind SW -

10:20 Drillers arrive: set down
plywood + drop off augers

Brief meeting w/
re: safety

Joni Reinn - COE on site:
discussed locations of
return to trailer

CS

(2)

25 Mar 1996

Safety Meeting w/ whole crew.
Names on DAILY TAILGATE FORM.

Discussed putting decon area in central location - Joni R concurs that O'club is not good area. Work plan calls for central staging area. Placed excess supplies, etc. east of IDW compound, will use that area for steam cleaning. Ch. Schick getting materials for forming berm.
Addl. drillers helper (temp) will not be on site till tomorrow.

12:40 C. Schick out for supplies
Mini RAE PID SN 201289
12:45 calibrated @ 100 ppm isobutylene read 99.4 - no adj made.

(3)

(3)

25 MAR 1996

Plan is to drill MW-03 first, move to SPM-03 for soil samples after completion of MW-03; then over drill to site for monitor point installation @ SPM-03.

13:15 Back @ O'club. Sprinklers on, but CGV is closing valve. Sprinklers ⊕

14:00 Set up on MW-03 w/ Failing F-10
1430 PID Readings 0.0 ppm
LEL 0%
O_2 20.8%
H_2S (0 ± 2) 0 ppm
Taken at MW-03 location

14:44 Hand auger to 5' @ MW-03
14:47 Collected soil samples - bulk
E. auger - 3'-4'
1500 Started Augering MW-3
PID 0 ppm; LEL 0% O_2 20.8% H_2S 0 ppm

(3)

25 MAR 1996

MW 03- 3'-4' - silty sand,
10 YR 7/2 - 0.1 ppm PID

1515 Task PID-0ppm, LEL-0%, H_2S-0ppm, O_2-20.8%
around MW-3 drilling area

1545 PID 45ppm LEL 0% O_2-20.4% well head opening

15:56 Waiting for water level
to rise @ ~13'

16:07 Instructed Drillers to
set well screen 7' to 17'
BLS. Agreed to in discussion
w/ J.R.

Sand is 12/20 rather than
10/20. Discussions ensued.
decided to accept. by J.R. for
this hole.

Sand to be placed to
6.5'.
*

17:04 Placed 6" lift of bentonite
in hole: hydrate w/ 1 gal H_2O
per J.R. - requested 1/2 hr
hydration 1st 6", then 1' lifts.

25 Mar 1996

* While Drillers were pouring in sand
work was stopped several times
due to air displacement in well brought
levels of H_2S in excess of 60ppm to
the wellhead. Work was closely monitored
during this process and after levels were
back to 0ppm did work continue

17:30 J.R. returns. Bentonite placement
concerns: decided to accept
6" - 1/2 hr, then 1 ft hydration,
1 ft water, to full lift.

18:30 Leave jobsite after cleaning up.

26 MAR 1996.

06:35 On site; meet drillers; get their passes; go to IDW yard.
Tailgate Safety meeting
Copy QCR, etc.
Meet w/ Jeff re: add'l H&S compliance documentation
Chuck Schick will work on change requests for use of 12/20 sand; and on stockpiling soils which show VOC's in PID/headspace.

07:45 Out to O club.
On site - Chuck Schick
Charles Madewell } GTI
Scott Stevenson
Don K
Tony } layne.
Abel Gomez
Steam cleaned large augers on site.

CS

26 MAR 1996

Preparing to drill SMP-03 - (note site plan labels "SPM") to 40'. Samples at 3-5, 8-10, 38-40'.

0800-0815 Calibration of PID/LEL 3 gas meter

0815 Began hand auger [illegible] Co. 1 [illegible] to 8' [illegible] soil sample

Initial monitoring
0835 PID - 0 ppm, LEL - 0%, O_2 - 20.8%, H_2S - 0 ppm CAM

0915 - PID 0 ppm, LEL 0%, O_2 20.8%, H_2S - 0 ppm CAM

1000 - PID - 0 ppm, LEL 0%, O_2 - 20.8%, H_2S - 0 ppm CAM

1045 PID 0 ppm, LEL, 0%, O_2 - 20.8%, H_2S - 0 ppm CAM

Measured DTW in MW-03 CAM 12.7 bgs

1130 PID - 0 ppm, LEL - 0%, O_2 - 20.8%, H_2S 0 ppm CAM

CS

26 Mar 1996

11:54 Crew out to [illegible] Club, to go do decon. Prepared samples for shipment

12:45 Crew returned for decon.

13:00 Begin cleaning SMP-03 w/ 15" Auger.
PID-0ppm, LEL-0%, O_2-20.8%, H_2S-0ppm

13:20 Sand - 10/20 Colorado Silica Sand - on site.

13:25 Joni Reimer - USACE at site - checked rec logs

13:30 JR offsite

14:00 JR back on site
PID-0ppm, LEL-0%, O_2-20.8%, H_2S-0ppm

14:15 Checked screen & casing sch 80 PVC, screen 0.020 slot.

1430 PID-0ppm, LEL-0%, O_2-20.8%, H_2S-0ppm

14:34 Trying to knock plug o/o base of auger. Wooden plug apparently split.

Adding water to keep

26 Mar 1996

hole open, pressure balanced. Used temp water fr. Officer's Club,

15:00 Sent samples to GTEL - Airborne 5561468065 COC GTEC 42278

15:20 Began placing sand, at least 41' to 37'; total depth of hole 42'; soft at bottom. 36.5' measured depth - 10 bags (50 lb) 10/20 colo. silica sand.

added 3 buckets bentonite - level to 34', Added one more - level to 29'. Bentonite needed much more time to hydrate.

Added 1' sand to 28' - Told drillers to install well 28' to 26'

(10)

26 MAR 1996

Sand to 25.5. Bentonite
-3 buckets.
Added another
half bucket.
Bentonite @ 21'.
Set 3" well
screen @ 20'-18'
Sand to 17' - 9 bags
17:44 Bentonite to 6' BGS.
add more water to hydrate.
18:30 Completed placing bentonite,
augers o/o hole, cleaning
up.

19:15 Out for O'club
p/u broom to clean sidewalk
20:00 @ Hotel

(11)

27 MAR 1996

07:00 on site
copy DQCR, etc. - give to
Bill Foley.
Site Safety meeting:
C. Maderell, } GTI
S. Stevenson
B. Foley FW
D. Kirsner
A. Kent } Layne
A. Gomez

Discussed needed forms:
Non-conf.
Procedures req.
?

for sand change in MW-03,
change in placement on
middle screen on SMP-03.

Discussed minimum power line clearance
w/ Dave (FW), Table showing
0-50 KVA (assume A")
Examined XFMRS @ O'club.
marked .5 KVA 230.
3Ø power into bldg. Single
line crossing o/o O'club to
across street. Apparent 11.2 KV

27 MAR 1996
Travel to XFMRS.

0845 Driller's finishing move to MW-01.

0855 Checked MiniRAE calibration. Cal gas - 100ppm isobutylene - reads 100.4 - no adjustment made.

Work Zone - PID - 0.0.

0910 Augering to 5' depth @ MW-01.

Hitting graded limestone gravel, (~2"x1" size). moved location of MW-01 ~1.5' South. There is a small ~(8" 12") wide depression in the grass - running ~E-W which may be associated w/ gravel - Suspect it may be French drain for roof runoff. Small piece black plastic sheeting found in initial auger

27 MAR 1996

0928 collected soil sample ~4' - very dense cemented gypsum fine grain

0945 check 3-gas meter calibration CAM
No adjustment

0950 Work Zone MW-01 CAM
PID-0ppm, LEL-0%, O_2 20.8%, H_2S-0ppm

Met w/ Diane, examined distance fr. power lines. May need to move SMP-02 to NW to give clearance.

1045-1100 PID-0ppm, LEL-0%, O_2-20.9% H_2S-0ppm

1100 waiting for 1st 6" lift bentonite to hydrate.
Retained sample SS57MW01145-13 for lab analyses. Placed on ice.
Met w/ Bill Foley, He picked up originator copy of C.O.C; says they need copy of those for dailies!

1100-1145 worked on logs & forms while MW 01 seal hydrating.

27 MAR 1996

11:00 - 11:45 Drilling moved to SP-01; hand augured to 4'; collected samples 4' - 5'

1145 PID-Øppm, LEL-0%, O_2-20.8%, H_2S-Øppm

11:45 Begin drilling w/ 8" HSA @ SP-01

1230 - PID-Øppm, LEL-0%, O_2-20.9%, H_2S-Øppm

13:15 Bill F + Joni R on site

13:55 Drill crew removing 8" HSA fr. hole. Sampling to 40' completed. Highest PID reading on samples was at 38.5' BLS. Very dense dry; gypsum/clay at ~39.5' BGS; grey, well sorted sand w/ tr. silt above

14:00 Discussed trenching w/ Dan Holmquist O.K. for Fri if our schedule

27 MAR 1996

14:05 Discussed whether to complete SP-01; decided to go for it.

14:30 called office; relayed O.K. re: trenching

15 15:00 Drillers return w/ 15" augers - They don't have 5' sections of sch 80 flush thread PVC. Will wait for proper length of PVC rather than cut + glue. Drillers out to decon 8" Augers.

15:15 J.R. at site; informed him of schedule + about material problem w/ 5'

Choose to use sample from 33'-35' @ SP 01 for full chemical analyses; section from 38'-40' spoon for TPH/sulfate only analysis.

Geotech samples from spange intervals

(16)

27 Mar 1996

Use 19 - 19.5 12:26
29 - 29.5 12:55 13:00
39 - 39.5 12:55 13:40

Chem. Samples 13:10
use 38.5 - 39 TOC + Sulfate
34 - 34.5 Full Chem suite

Noted ~~that~~, while adjusting location of SMP-01, that due to scale + inaccuracies on map, Fig 3, that placement of SMP-03 was ~30' from SP-01. Distance from SP-01 to SMP-01 after dodging underground utilities is 10'. (OK). Then noted that adjustments to SMP-02 to avoid overhead power lines had extended distance from it to SP-01 to near 30'. Called C. Schick, informed him I would need to adjust location of SMP-02 to stay within intents of

(17)

27 Mar 1996

sponge test. Placed call to Joni Rhine (COE) to discuss field changes, but no ans. Called FW trailer to speak w/ Bill Foley, (QC). He visited site + we discussed proposed relocation of SMP-02 from north of SP-01 to south of SP-01, and at a radial distance of 5'. Will discuss matter further tomorrow after more review. Probable PCR in am for approval.

Drillers set up on SMP-01 to start sample drilling in AM.

Cleaned up;

17:48 off site

(18)

28 MAR 1996

~~07~~ 06:05 On site; met drillers,
06:20 e O' club - safety meeting,
job set-up; Bill Foley took
daily & other paperwork for
copying; including PCR
(Procedure Change Request)

0700 Calibrated/ck calibration on monitoring equip. (CHM)

07:20 collected sample for
hand augur @ SMP-01 -
4'-5'

07:30 Began (HSA) augering & sampling
on SMP-01.
PID-0ppm, LEL-0%, O_2-20.8, H_2S-0ppm (CHM)

08:10 Wind picking up, blowing S/E
south.

0815 PID 0ppm, LEL 0%, O_2 - 20.8%, H_2S 0ppm (CHM)

0915 Reading around SMP-01 work area:
PID-0ppm, LEL-0%, O_2-20.8%, H_2S-0ppm
CHM

28 MAR 1996

(17)

09:25 Bill Foley at site.
There will be a conf call
to decide location SMP-02.
Possibly the field wires
to O' Club will be disabled,
to allow installation
20' N of SP-01.

09:35 Last sample for SMP-01
Drillers begin pulling
augers.

09:45 J.K. on site re: schedule for
completion of SP-01. Informed
him possible this afternoon late,
but not too probable.

10:00 Checked - highest PID reading
on SMP-01 was at time 18:30
interval. Will use SMP 19-19.5
for chem. analysis

10:30 Called office; spoke w/ C Schick
re: placement of SMP-02. Will
call back ~ 11:00 - 11:30

28 MAR 1996

10:53 Drilling out SMP-01 w/ 15" Augms. At 17', very slow.

11:43 at depth in SMP-01, preparing to knock out plug. Putting potable water inside HSA to provide hydrostatic pressure

12:00 plug out, Total depth 41'.

12:22 Deep well screen @ 38'-40' BLS
3 bags sand to 36 - added 6" bentonite pellets, ensured water to cover, kept bringing up bentonite in 1 ft. increments
4 buckets

12:28 Bentonite @ 31'. Waiting ½ hr for hydration before adding sand.

CS

28 MAR 1996

12:34 Bentonite level rising - suspected cause - flowing sands @ 38' to 42'. 41' level. Placed sand to hold down. Installed Intermediate well screen from 30'-28', Sand to 27'
4 bags

12:40 Bentonite to ~25.5', left to hydrate

13:00 Meeting w/ Joni Rhinen, Mike Beyer, Bill Foley, Scott Stevenson.
~~Process~~ Progress + Q A.
H&S - OK per B. Foley
Discussed pending move of SMP-02.
Discussed if there were any other problems.

13:10 Drill support truck tire hit landscape lamp housing - broke decorative ring. Will need to repair. Bentonite @ 21.5'.

CS

28 MAR 1996

Will be pressured for base pass: General site cleanup.

14:40 Completed bentonite 1'-21' BGS (was 20.5 after long hydration while getting passes, decanting augers, etc.

[4 buckets]

~~Sand~~ Installed well monitoring well, screen & 18' of Sch. 80

[Note; all screens there]

~~Sch~~ Sand 17'-21'

[8 Bags]

14:50 Helper A. Gomez out for day. Steam cleaner c/o fuel large augers not fully decanted

15:00 Called office; discussed SMP-02 location w/ C. Schick - concern that ~18' S of SP-01 is best location. He is handling PCR.

28 MAR 1996

Bentonite to 6' BGS [in 1' lifts; ensure water drain, increase, continue max lift]

Added addl potable water to hydrate addl bentonite 4' of cold deck.

[14 buckets total]

15:30 Continuing site cleanup. All augers o/o hole.

Schedule for tommorrow - complete SP-01, begin SMP-02 (pending approval of change request).

Set up drill rig on SP-01.

16:00 Drillers out to decon; prep for installing SP-01 in morning.

Continue site cleanup.

28 MAR 1996.

16:45 Harman + crew at site to p/u drill cuttings. Mixed small pile of surface cuttings with larger pile of stained cuttings.

17:30 Finished clean up + security fencing of work area.

Return to IDW area.
Notified Bill Foley that best time for camera crew is ~ 14:00.

Drillers continuing to decon augers.

18:15 offsite

29 Mar 1996.

06:55 at site
07:00 Drillers @ O'club after p/u trailer.
07:05 Tailgate Safety meeting
D Kersnis } Layne
A Kent }
C Madewell } GTI
S Stevenson }

07:20 Drillers offloading augers - Charles @ IDW yard to p/u plastic for lining drill cuttings storage area.
Review drillers daily's for Tues, Wed, + Thurs. Approved same noting need to deduct 8 brass rings from their consumption records - agreed by D. K.
0745 Calibration check Air monitoring equip.

07:58 Began cleaning SP-01 w/ 15" HSA.

29 Mar 1996

08:15 Diane at site, for short visit.

08:30 Auger @ ~30'. Cuttings were soupy, now becoming more thick, + grey, orange.

08:45 Drive-by by COE car. Met w/ drillers, reviewed scope for installation of sparge wells. Due to need to put top of galv. casing at 0.5' below grade, slight variations in exact location of screen interval will occur due to joint loss. Nominal depths will be as spec'd, but actual depths will vary by the total joint loss in flush threads (~0.2' per joint).

29 Mar 1996

09:00 CGV water stopped by to ask if we were close to his lines. I informed him we had stepped away from his main area of concern. He also noted that smell became worse when pool filled, and that the sump pumps in basement operated 24 hrs/day when pool up, + were not needed in when pool is drained. Also mentioned "culvert well" @ NE corner of building; possible old septic system. Said no water lines in prox. of proposed MW-04.

09:15 Informed by driller that Sch. 80 galvanized pipe had had been flush threads machined for sch. 40 flush thread. Will install wells w/ joint sections of PVC to unscreen when proper pieces arrive; add galv. section then.

09:21 Begin placing sand pack.

29 Mar 1996

10/20 Silica sand, for bottom screen section. Sand from 41' up to ~36.5'. Added 1 bucket bentonite. [7.5 bags]

09:34

Wind beginning to pick up o/o N W.

10:03 Place [2.5 buckets] bentonite to bring lift to 31' BGS.

Added sand to hold down while pulling auger flight.

10:10 Set intermediate well, sand 31'-27' [5.5 bags]

[5 buckets] Bentonite lift 27'-21'

10:45 Drillers helper on site - safety meetings w/ Charles Nadewell.

Set shallow well

10:56 sand - 21'-16.5' [10 bags]

bentonite 16.5' up to

- Drillers helper - Jesus Pinon -

CS

29 MAR 1996

11:15 Bringing bentonite up to ~10' BGS - using tap water to hydrate.

Charles M out to get PCR for SMP-02.

Augers out of hole.

11:30 Charles Returned - no one at trailer - no power, tried to call ABQ. - no phone, no power at O' club.

Went to FW trailer, met w/ B. Foley + Dan Holmquist

Discussed move of SMP-02

They had recieved PCR,

DH asked if Jon Rhim had been informed, we (B.F. + CSS) told him she had seen it in the field + was in agreement.

recieved verbal author. to move to 18' S of SP-01, still waiting for COC signature.

CS

(30)

29 MAR 1996

12:~~50~~ 20 Laid out location for SMP-02. 18' radial distance, south of SP-01. Prepped to move rig. When lowering rig off of jacks, noted that right rear tire set sank. When rig pulled out, noted sprinkler head near that spot. This location had been previously flagged for health & safety reasons due to large hole, trip hazard. May need repair, ~~Set~~ may just be subsided

Set up on SMP-02

12:40 Crew from FW at temp soil storage area to make better containment area.

(31)

29 MAR 1996

13:00 encountering gravel at ~6"-8" depth at location SMP-02. Hand augered, felt, & visually examined hole, dug w/ shovel. Rock to ~14", then red clayey fill to 18". Balance to end.

13:20 Done augering to 5'. Sample collected.

13:33 start hole w/ 8" HSA.

Cemma crew by, filmed fr. outside of fence.

Wind setting very strong o/o NW - 45-50 w/ stronger gusts. Barrels & equipment blowing over

15:50 Drilling out ~~SPM~~ SMP-02 w/ 15" augr. Wind very strong out of NW, backing to N.

29 MAR 1996

16:55 At depth of plug is pushed up ~ 3'. TD = 40.5'

17:12 Plug split; ½ of hole

17:24 Deep well in hole, starting to pull augers.
well set ~ 37'-39' to get out of extremely hard gyp. cemented clay.
Sand to 36'; [7 BAGS]
Bentonite to 31'. [3 Buckets]

18:00 Second well set-
screen 28'-30'
sand 31' to 27' [9 bags]
Put in [2 buckets] + [1 bucket] Bentonite - left 23' Auger to keep hole open.

18:10 Bentonite @ 24.5' BLS

Cleaned up around site.
Covered spoil pile

18:45 offsite

CS

30 MAR 1996

07:05 ON SITE
Safety meeting w/ Drillers.

07:30 Danley const. on site
Review location for trench.
Danley has brought 2' bucket on backhoe - specs call for 1' trench at bottom for rock fill

07:50 Dr. ~~Charles~~ Charles Maderwell giving safety meeting to Danley Crew.

Drillers pulling augers.
Added bentonite to bring level to 21' BLS. [2 Buckets]

Drillers installing shallow well w/ SMP-02. Screen 18'-20' BLS.
Sand 17'-21' [8 Bags]

08:25 Begin trench excavation.

CS

30 MAR 1996

Encountered sprinkler line: unmarked; shifted trench S to use line as n. edge.

Looking for elect. line from corner of bldg to lights.

08:40 Found void - 15' west of planter corner, 9½' south of retaining wall. ~ 1.5' dia. ~ 3.5'

Final bentonite lift in SMP-02 used 14 buckets

09:10 Broke PVC line near w end of trench; ~~1½~~ 1¼" gas PVC. Jeff fr. FW came by; got number for notification 475-5080 - no ans.

30 MAR 1996

09:50 Other crew fr. Layne on site, finishing safety meeting. Drillers setting up on MW-04. Rock fill for pavement subbase, hard.

Went to FW trailer, verbal notification to Dan Holmquist re: old gas line. Base util. still no ans.

Located another gas line under 1st. Left intact. Decision to place SVE riser pipe at east end of trench to avoid these lines.

Instructed Layne crew re: cutoff on wells - 6" below grade. Still waiting on galv. risers for SP-01

30 MAR 1996

11:00 MW-04 @ 14'. Cable to pull sampler ~~wire~~ @ clamps.

Trench crew waiting on parts (4" T's)

1130 4" parts arrive.

11:45 MW-02 set. Sand from 14' up to 2.5', screen interval 3'-13'. Bentonite 2.5' up to 2'. Hydrated w/ D.I.

9 bags

12:05 Set up on MW-02. Discussed vault placement on trench.

12:33 hand augered to 5' on MW-02, collecting split spoon sample 8'-10'

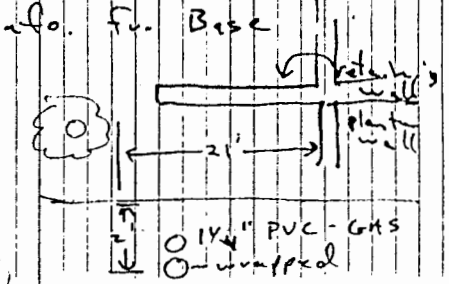
13:01 Setting MW 02, screen 4'-14'. Sand to 3.5 feet (8 bags).

30 MAR 1996

13:08 1st 6" lift bentonite in MW 02. Hydrated w/ DI water.

13:44 Well installs completed except for finishing SP-01. Still needs steel casing. Well development pending. Layne crew completing job of cement fill to 12" below grade.

Vault, trench, + assoc. SVE piping in place. Backfilled + compacted above Vapor Barrier in SVE Trench, covered broken gas pipe pending info. fr. Base utilities.



30 MAR 1996

Got 12 2" slip caps, 12 lab cocks fr. Layne, I informed them I will install.

Recieved -1 0-30" Hg Vacuum gauge fr. Layne.
-6 2" expando.

15:30 Jeff stopped by: told him we would copy H&S documentation for Layne Crew for him.

Finished well completions - Clean up, move sod, break down logging area.

Call C. Schick, - discuss progress. Notified re: gas lines - he relayed verbal from locators that the gas lines

CS

30 MAR 1996

in front were abandoned. Will confirm Monday. Well development set for tomorrow (Sun, 31 Mar 96). Will manually surge w/ teflon/SS surge/bailer, minimum 15 per FOP.

Test bailed intermediate well @ SP-01. Became clean except for very fine turbidity after 1 gal. Bailed H_2O settled rapidly (sediment settled, H_2O stayed same but cleared) (Clear to near bottom after ~5 min.)

Left temp fencing up till Sun aft or Mon morning.

Met crew fr. Layne near IDW yard, set to meet 07:00 Sun morn for completing SP-01, including pad; + well development.

CS

30 MAR 1996

Only known damages to date:

- 1 perimeter light.
- 1 sprinkler head - (note: large cavity under sprinkler head, was noted as trip hazard prior to work. Filled cavity w/ some excess trench material. ((Note: trench material had no VOC's by PID headspace)).
- 1 pvc pipe - labeled gas - no VOCs in pipe - reported abandoned but awaiting base utility locate.

offsite: (off work)
18:00

CS

31 MAR 1996

07:00 On site, met drillers
Lab-Mas.
Safety meeting
C. Madewell
S. Stevenson
B. Sepulveda
O. Medrano
Loaded pump, generator, & drums for development water.

07:40 Travel to Offsite.
Steel casing arrived, threads match
Shallow well @ SP 01 is off.
5' casing piece 1.5 feet too low

08:20 offsite to take CM to airport.

08:46 Returned.

09:00 Tried lifting SP-01 shallow
need ⅝ chain.
DTB 20.8 BLS, need to

CS

31 Mar 1996

bring up to match other wells. DTW 12.0 BLS.

B. Sepulveda out for chain to wrap well to use jack.

O. Medrano begin surging MW-03. Begin bailing. H_2S odor, stepped out of area. Dissipated. Waiting for breeze.

09:30 MW-01 DWT = 11.85' BTC
DTB = 14.63'

09:45 SMP-03 DTW DTB

S	12.46	18.9	soft
M	12.40	26.6	soft
D	12.44	23.35	sandy soft

10:00 Removed 4 gal MW-03
5 gal ~~MW~~ SMP-03-S
5 gal MW-01

31 Mar 1996

10:30 Raised SP-01-S ~ 1'.
Started pulling pump to MW-03 for devel.

5 gal removed fr. SMP-03-D,
4 gal removed fr. SMP-02-M.

10:40 SMP02 DTW DTB

S	10.92	19.51	firm
M	11.15	29.33	firm
D	11.55	36.5	soft.

10:50 SPM-01 DTW DTB

S	10.95	19.95	firm
~~M~~	~~10.98~~	~~35.9~~	~~soft~~
D	10.98	35.9	soft
M	11.00	29.0	soft

11:15 Finish pumping MW-01 MW03 31 Mar 1996

7 gal → dry wait 10:58 - 11:05
5 gal → dry 11:12 - 11:14

Sulfur odor - no impact @ breathing zone
ppm - 0.0, H_2S zero meter

31 MAR 1996

B. Sepulveda - finished adding Bentonite to SP-01 - 4.5 buckets to 6.5' BGS.

11:28 moved devel pump to SMP-03-S

11:29 - 11:33 - 3.5 gal to dry. grey, thick.

11:43 2 gal o/o SMP-03-S still grey, went dry.

11:51 Pumping SMP-03-M @ ~ 1.3 gpm.

12:02 ~23 gal removed - no settleable material - v. slight turbid.

Completed surging/bailing

12:05 SMP-02-S - 2.5 gal

31 MAR 1996

12:08 Setting Red-flo in SMP-03-D

12:12 Begin pumping SMP-03-D. Pumped 2.5 gal - went dry.

12:27 got another 1.5 gal o/o SMP-03-D. goes dry ~~da~~ quickly.

Begin surging/bailing SMP-02-M

12:34 removed ~0.75 gal f. SMP-03-D

12:40 SMP-03-D DTW DTB 30.4 R 38.1 soft.

Bailed sand + resurged well until hard bottom. Red-flo had sand locked

13:09 Removed 4 gal f. MW-01 w/ red. flo.

@ SMP-03-D

13:11 DTB = 39.78, still sl. soft - sandy.

31 MAR 1996

13:27 Continued bailing sand fr. SMP-03-D.
DTB = 39.85 (firm).
[3 more gal removed]

Set to move surge.
[2.5 gal removed fr. SMP-02-M]

Move to SMP-02-D to surge + bail.

	DTW	DTB		
MW-02	10.12	13.70		13:52
MW-04	8.53	12.25	soft	13:55
SP-01-S	11.54	19.40	firm	
M	11.60	29.2	firm	
D	11.80	39.0	firm	

14:05 Pumped [1 gal fr. MW 01]
move pump to SMP-02-S.
Begin surge/bail on
SMP-02-D

31 MAR 1996

14:10-14:14 Pump [6 gal fr.]
SMP-02-S, want dry.

14:17 [2.5 gal o/o SMP-02-D]
to "firm bottom"

Move bailer/surger to
SMP-01-S

Removed [2.5 gal SMP-01-S]
Pumped [5 gal fr. SMP-02-S]
in 2 min - dry.
Bailed [1.5 gal fr. MW01 -]
dark grey - no sands.

Moved pump to
SMP-02-M, began
14:34 end 14:48 [@ 19 gal] clear.

[2.5 gal o/o SMP-01-M]

[2.5 gal o/o SMP-01-D]
w/ lots of sand (1/2 gal)
Bailed [1.5 fr. MW01] clearing slightly

31 MAR 1996
Moved pump to
SMP-02-D
14:56 — 15:14 [20 gal removed]
cleaning, sl. turbid.

Bailed [2 gal fr.]
SMP-02-S, grey milky

Surging + bailing MW-02
15:16 [5 gal removed]

When removing pump fr.
SMP-02-D, it was
sanded in.
Began rebailing w/
surge/block-bailer,
removing sand. [2.5 gal]

SMP-02-D 38.3 DTB

SMP-01-D 37.9 DTB 15:29

Removed [3 gal fr.]
SMP-01-S w/ pump
went dry

31 MAR 1996
15:40 Removed ~~10~~ [7 gal] fr.
SMP-01-M S
went dry again.

Bailing sand fr.
SMP-02-D [2 gal liq]

SMP-01-D [5 gal liq]

15:58 Pumping SMP-01-M @
~ 1 gpm. Very dark
grey turbid (looks
like grout) 5ppm H_2S
in bucket headspace.
Breathing zones all clear.

	DTB	
SMP-01-D	39.4	16:00
SMP-02-D	38.3	from 16:02

16:03 Stop pumping
SMP-01-M [20 gal removed]
pump sanded in.

31 MAR 1996

16:18 Removed [1 gal] liq. w/ sand fr. SMP-01-D

Set pump in SMP-01-D

16:18 Began pumping.

[5 gal surged/bailed] fr. MW-04 - orange clay slurry, orange fine sand. [5 more gal - wont dry]

16:30 Finished pumping SMP-01-D - lots of sand but water clear [22 gal removed]

* Need to continue hand bailing w/ small sand bailer.

Begin surging/bailing SP-01-S removed [5 gal]

31 MAR 1996

16:44 - 16:47 Removed [6 gal fr. SP-01-S] w/ pump - wont dry

Begin surge/bail on SP-01-M - removed [2.5 gal]

16:55 Bailed SMP-01-M until no sand. [1 gal] removed

16:55 Pumped - [1 gal] fr. SP-01-S → dry

17:12 Pumped SP-01-M removed [22 gal.] fine sand stopped - 18 gal - clearing.

Surge/Bail SP-01-D [5 gal out]

17:27 Set pump - pump SP-01-D [2.5 gal removed] done @ 17:34.

31 MAR 1996

Cleaning up site

18:30 Leave o'club to go to IDW area.

18:40 Drop off trailer - Dillons out.

Labeled drums of development water - # 10, 11, 12, 13, 14

18:51 Depart IDW yard.

1 Apr 1996

07:00 Begin sorting & filing paperwork.

08:05 Done.

08:45 @ IDW yard/FW trailer.

09:00 Finish packing samples to ship to GTEL. COC 42289 Airborne Airbill 5361468463

09:15 Finish copying Dailies for Fri, Sat, Sun 29, 30, 31. Inquired re results for 28th - which originals were handed to Bill Foley on morn of 29th, not yet returned.

09:39 Called base utilities re: gas line. Was told only orange, black, & yellow poly lines are active, - all others steel, plastic - are abandoned.

1 Apr 1996

09:52 Done copying
H_2S docs for Jeff Thompson
out for O' Club.

10:00 At site: Joni Rhinn
pacing out well distances.
She asked about site
restoration.

Began removing security fence.
Dennis Miller asked re:
were we done drilling so
he could put in grass? Informed
him of schedule.

11:15 Done w/ fence
Noted power out in O' club.
11:25 Checked cal on PID
read 94.7 - recal'd @ 100 ppm isobutylene

1 Apr 1996

	DTW	DTB	PID	H_2S
MW 03	12.21	16.84	2.1	2
SMP-03-S	12.44	19.36	3.6	5
" M	12.38	27.44	76.4	7
" D	12.42	~~40.~~ 39.84	66.2	>200
MW01	11.86	14.61	15.1	3
SMP-02-S	10.86	19.56	13.6	31
M	10.99	29.32	1.8	6
D	10.99	38.26	25	5
SP-01-S	11.49	19.40	21.6	5
M	11.51	29.18	3.0	3
D	11.65	39.02	7.0	3
SMP-04-S	10.91	19.75	75.0	82
M	10.97	29.60	3.6	6
D	10.95	39.40	3.1	5
MW-02	10.01	13.70	101.5	5
MW-04	8.83	12.90	1.3	4

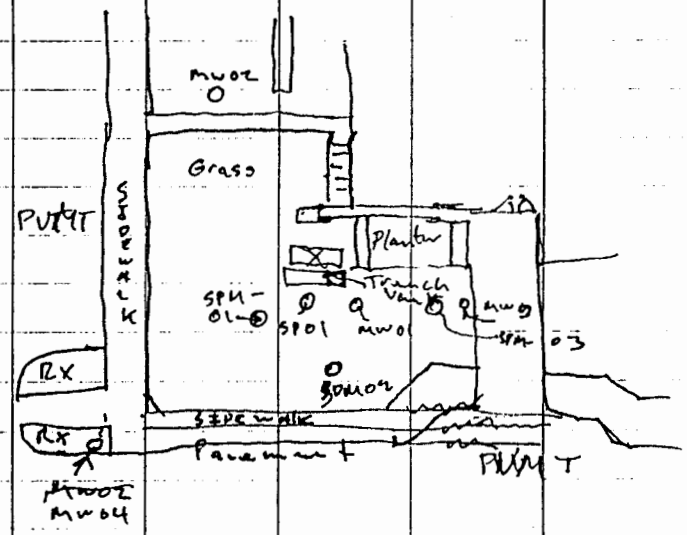
01 corrected to 10.99 ss

13:02 Finished gauging wells &
decomming meters. All vaults
sealed. Slip caps w/ valves
in GTCT truck.
13:18 Out to take fence to storage
yard.

(56)

1 Apr 1996

13:55 Back @ O'club after staking fence materials south of shed in FW/(OE) IDW compound.



1 plan north.

Sketch of well layout, no scale

(S)

(57)

1 Apr 1996

15:30 finished site map @ 1" = 20' scale.

Radial distances from SP-01 to:

MW-01	~~50.8~~ 71.9
MW-02	50.8
MW-03	35.3
MW-04	68.6 + 0.8 = ~~67~~ 69.4
SMP-01	10.0
SMP-02	18.8
SMP-03	29.5

15:42 leave O'club for Trailer. Start work on draft well location map. Notice cooler w/ samples still @ trailer - out to deliver to World Wide Shipping.

16:30 Dropped off samples @ World Wide

Rtn, do DQCR, other paperwork, copy.

(S)

9 Apr 1996

12:15 On site: copied forms, met w/ site personnel,

13:10 @ O' Club.
preparing to purge & sample MW-04.
Occasional H_2S, CS_2 odors in air.

13:25 Done calibrating GTZ 0 302
@ 4800 ppm Hexane - reads 4690
& 25 ppm H_2S reads 24

Gauge wells in sparge test area, including H_2O, hydrocarbons, + O_2 in headspace.

14:55 Done

14:25 Called Jim Fox Mosely re: access to west ramp. Meet at his office ~ 09:30 on Wed, 10 Apr

9 Apr 1996

15:00 Calibrated hydac @ pH = 7, 4.

15:00 - 17:30
Sampled MW04, MW02, MW01.
MW04 filter cake - orange slime
02 - grey
01 - black
Note that MW01 - pH very low - ? dissolved H_2S ?

17:45 Cleaned up area, off site

Sample times:
MW04 - 15:45
MW02 - 16:45
MW01 - 17:15
COC - GTZ # 45102

10 Apr 1996

07:00 Onsite - copy forms, check @ O'club.
Pack samples, etc.
Ship airborne -
556146 8566

09:00 - 13:00 prep for ⊕ @
SS56 - West Ramp
DEL MACK WARD - ASSISTING

13:00 - 13:30 Coord. materials order for sponge test

13:53 Back @ O'club to restart sampling. w/ Del Mack Ward.

Wind 20 o/o west.

14:00 Surveyors on site.
Located & shot elevations for all newly installed wells.

Continued sampling.

SS

10 Apr 1996.

Note very low pH MW03!
pH @ SP-01 S also low, then rose, then fell.
SP01 S water grey turbid, occasional odor. Filters on (diss. Iron) filter units slimy.

SP01 M much more clear. Sampling bailers do not bring up sand. Both deeper SP wells may need cleaning prior to sponge installation.

Done Sampling - still need SP01-D, MW 5, 7, 9.

17:40 return to trailer.
put purge water in drum #960410

17:50 out to get more ice for samples

SS

11 Apr 1996

08:00 - 07:15 - Paperwork + filing to maintain records

07:15 - 0:830 Pick-up ship samples from MW03, SP01S, SP01M.
Hal Griffin of IF+S assisting.

08:30 - work on LTM.
done 13:30

13:30 - 14:30 Coordination for sponge test - fuel, logistics, etc.

14:30 @ O' club to start purging SP01-38-40 (Deep).

15:55 Sampled SP01 38-40

16:30 Gauged MW 5, MW 7, MW 9 for sampling on 12th.

17:00 Done, offsite.

12 Apr ~~1993~~ 1996

06:00 - 07:00 Documentation

07:30 @ trailer to copy notes, etc.

08:00 @ O club to sample MW-05.
Calibrate pH meter @ 7, 4.

Purged + sampled MW05
Moved to MW-09,
purged, went dry. Very slow recovery. Started sampling @ 1' water col. height, done @ 09:40, done 10:35.

returned to FW yard; note no carbon yet, call C. Schick to work on tracking down.

11:00 return to O'club - set to purge + sample MW-07.
Well dry @ ~ 0.5 gal.
Also - lots of PVC cuttings + sand in bottom.
Sampled 11:40. Done collecting @ 12:25.

12 Apr 1996

12:40 return to trailer

pack & ship samples under

13:00 COC 42285 (GTEL).

Check w/ office re: Carbon

- sched. for deliv. @ ~~~15:00 this aft.~~

1 File & copy documentation.

Check site for possible piping config.

Do Contaminated Materials Log

check - all drums located.

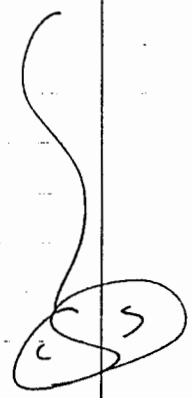
on trailer @ IDW area.

Confirmed schedules w/ C. Schick.

Called re: Carbon drums,

will p/u Mon Morning.

16:30 out for ABQ.



15 Apr 1996

08:00 on site; meet @ FM trailer.

at O' club, set trailer;

Portable toilet arrived.

Site Safety Meeting w/ Curtis Wright

Review of HASP.

Plan Scope for work.

Set up calibrate instruments.

Installed trailer to SVE,

Sparge; put adapters,

flush to pipe thread,

on SP01-S, M, D.

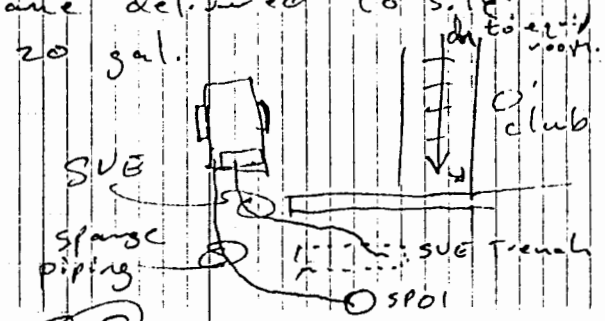
Put sample valves on all

wells in vicinity of

Sparge/SVE.

Propane delivered to site:

120 gal.



15 Jan 1996

Instr. calibra.

PM 7429 - alarm @ 9 ppm.

PM 5156 - set alarm to 5 ppm.

adjusted span to 25 ppm

7429 span max @ 21.

gastech GT 302

0 Oxygen - OK.

reads 16 ppm on H_2S

w/ 25 span gas

GA-90

Span Gas - 15% CH_4, 15% CO_2,

0 Oxygen.

Set cal - CH_4 - 15,

CO_2 - 15

O_2 - 0, 20.8.

Collected soil gas.

15 Jan 1996

(26.1 "Hg)	H_2S	ppm	O_2	CH_4	CO_2	O_2
SMP01S	~~120~~ 0	~~70~~ 120	20.9	0	0	20.4
SMP01M	0	700	20.9	0	0	20.4
SMP01D	0	220	20.8	0	0	20.4
SMP02S	0	260	20.8	0	0	20.8
SMP02M	0	260	20.7	0	0	20.9
SMP02D	0	270	20.8	0	0	20.8
SMP03S	>200	1440	20.2	0	0.1	20.7
SMP03M	0	0	20.8	0	0	20.7
SMP03D	~~12~~ 0	120	20.5	0	0.2	20.0
MW03	0	120	20.1	0	0.3	19.5
MW01	0	180	19.6	0	0.5	19.3
SVE-01	0	260	16.7	0	2.4	15.9
MW-02	0	0	20.9	0	0.2	19.6
MW-04	0	40	20.7	0	0.2	19.3

Dissolved O_2

YSI 57

Hach # 3037 Calibrated to pressure .87 x 9.87 = 8.6

	DO mg/l	DTW	DTB
SMP01S	~~0.4~~ 0.35	10.84	19.74
SMP01M	~~0.5~~ 0.25	10.89	29.65
SMP01D	~~0.5~~ 0.25	10.89	39.40

all 21°C

15 Apr 1996

	DO	DTW	DTB	T	
SMP02S	0.25	10.72	19.51		
M	0.25	10.88	29.34	21°C	
D	0.20	10.89	37.7	21	soft
SMP03S	0.75	12.26	19.35	21	
M	0.30	12.19	27.42	21.5	
D	0.45	12.28	39.88	21.	
MW01	0.70	11.74	14.62	20.	
MW03	0.65	11.86	16.81	—	
MW02	0.75	10.41	13.69	19.5	
MW04	0.80	8.45	12.89	20.5	

13:00 Done w/ Baseline
Barometer 30.51

Removed 2 bailers of clayey slurry from bottom of SMP02-D.

Put up fence; dropped off 3 bottles He.

14:54 Setting up to test equipment while waiting for carbon

15 Apr 1996
wind S 10-15
Put vac. gauges on
MW 01, MW 03,
~~SP01~~ SVE-01

Flow	Vac	WHVAC	MW03	MW01
100SCFM	~~15"~~	15"	0.02	0.15
115		17.5"		
150		25"	0.06	0.2
165		27"		

Rx 4 Drums vapor phase carbon -
#'s TX250 88 VP
89
90
91

Attached exhaust to #88

16:02 set wellhead vac to 6" H_2O vac

(70)

15 Apr 1996

16:04 Gastech

		ppm	O_2	H_2S	
inf.		200	21.1	0	
	GA-90	CH_4 0	CO_2 0.2	O_2 19.5	
		ppm	O_2	H_2S	
Carbon exhaust		0	20.9	0	GT302

Vac @ MW03 MW01
-0- -0-

airflow - less than 25SCFM (gauge minimum).

Barometer 30.41 "Hg.

Recalibrated GA-90 -

16:10 O_2 went to 20.2 %

Atmos. @ 26.0" Hg on GA-90.

	CH_4	CO_2	O_2	press.	
GA90	0.1	0.2	20.2	26.0	16:14
GT302	ppm 1100	O_2 21.1	H_2S 0.		16:15
	ppm	O_2	H_2S		
Carbon exhaust	940	20.7	0	GT302	16:16
	940	20.8	0	"	16:27
I (GA-90 Gastech	0.2	0.1	20.3	26.0	16:28
n & GT302	ppm 2000	20.1	0		16:29

(CS)

(71)

15 Apr 1996

MW03 - Vac = -0-
MW01 - Vac = 0
VES01 - 6"

16:30 Set VES01 to 15" H_2O Vac

16:32 CH_4 0.5, 0.4, 19.9 GA-90 } inf.
3580, 21.1, 0. GT-302 }

Flow 105 SCFM

	ppm	O_2	H_2S
exhaust	2120,	20.4,	0

no effective vacuum @ 16:35
MW03, MW01

Barometer ~~30.4~~ 30.32 "

16:45 flow from well 105 scfm

	CH_4	CO_2	O_2	ppm	O_2	H_2S
inlet	0.2	0.3	20.3	2060	21.4	0

	ppm	H_2S	O_2
exhaust	1,760	0	20.5

	CH_4	CO_2	O_2	
(CS) at wellhead	0.2	0.4	19.9	vacuum
	0.1	0.3	19.9	pumped air

15 Apr 1996

17:00

	CH_4	CO_2	O_2	ppm	H_2S	O_2
Influent	0.2	0.2	20.3	1960	0	21.7

	ppm	H_2S	O_2
Exhaust (after carbon)	1720	0	20.7

at MW-01 0.1 " H_2O
at MW-02 0

17:30 left O'club for FW trailer.

S

16 Apr 1996

07:30 On site - copied DCR, etc. Picked up Summa canisters, etc.

07:45 @ O'club - site safety meeting
S. Stevenson, Curtis Wright.
Discussed daily work scope.
Began instrument calibration.
Calibrated MiniRae @ 100 ppm iso butylene. S/N 000822
GMI - Gasmeyer - factory cal.
Set alarms & checked cal. on (4) Personal Monitors.
Calibrate GA-90 - reads 14.5, 14.4 O @ 15%, 15%, 0, after cal.

//

Set H_2S monit. by sump in equip. room. Heat mat w/ maint., will monitor sump @ base of stairs.

Weather - wind N 5, Temp 58°F
Atm. pressure - 25.7 " Hg Abs.
Barometer 30.42" Hg.

09:00 Started SVE - wellhead Vac 22" H_2O @ 140 SCFM

S

16 Apr 1996

MW01 = 0.15" H_2O vacuum. 09:05
MW03 = 0.02" H_2O vacuum.

other op. data on field sheets.

collected startup air samples VET-01-1

09:47 unit off to replace belt tensioner.

removed belt tensioner, bearing failed.
restarted VES @ 10:00.

Sample VET-01-2 collected 12:07

System down @ 12:15
Replaced Idler pulley on Sparge blower.
Restarted SVE @ 13:00
Flow 130 SCFM @ 20" H_2O wellhead Vacuum

CSS

16 Apr 1996

GT302 2340 ppm HC's
20.7% O_2
0 ppm H_2S. } inf. 13:07

2300
20.5
0 } exh.

MINIRAE 0.9 IN, 0.0 out.

	ppm	O_2	H_2S
SMP01S	160	20.6	0
M	280	20.5	0
D	340	20.4	0
SMP02S	120	20.1	0
M			
D			
SMP03S			
M			
D			
MW01			
MW03			

CSS

16 Apr 1996

Ready to start sparge into SP01B-20(S)

14:20 5 psi - some flow but below gauge min.

14:34 7 psi - still no flow

14:35 8 psi -

14:36 10 psi - ~5 CFM.

14:37 Vacuum → pressure @ MW01

H_2S Monitor on SVE infl. - 0 -
PID - 0.8 ppm

14:42 Flow up to 7 CFM.
@ 10 PSI.

14:43 MW01 showing sl. vacuum.
Barometer 30.29" Hg

16 Apr 1996.

CH_4	CO_2	O_2	HC ppm	O_2	H_2S

Operational Data on field sheets

Began He slug injection, used 270 ft^3 in ~ 35 min.

Cleaned up area, off site 19:30

17 Apr 1996

07:45 on site - copied DAQR, etc.

08:00 @ O' Club

Safety meeting - S. Stevenson
C. Wright.

Began calibration of instruments;
Safety check on SUE/sparge trailer.
fuel = 7270; oil, OK,
belts & tensioners, OK visual.
pressure relief valves clear.
hoses OK.

Met w/ mech. for sump insp.
@ equip. room. He was inquiring if we had shut off breaker.
Told him no.

Collected subset for soil gas samples. Prepared to collect

09:04 DO & water level.

09:39 Done w/ DO & LL's.
Preparing to start SUE for stabilization prior to sparge into SP01 28-30.

17 Apr 1996

09:55 changed carbon drum - switched to TK2509 / VP from "088".

Started sparge to SP01M.

10:10	DTW	SP01S	11.72
	Slight vacuum on MW01		
10:12	DTW	SP01S	9.98
10:14		"	9.87
10:16		"	9.69
10:17		SP01S	11.57
10:18		SMP02S	9.94
10:19		SMP02M	9.80
10:20		SMP02D	9.85
10:22		SMP03S	11.49
10:22:30		M	9.71
10:23		D	11.09
10:25		SP01S	11.56
10:26		SMP01S	9.09

Collected field data on field sheets.

11:00 checked basement - no hydrocarbons no H_2S

17 Apr 1996

11:07 Belt broke on SVE - unit turned off.
Interrupted LL gauging.
Gauge DO will continue.
Water level falling fast in SP-SMP03-M.
from 9.5 -> 10.5 in 10-20 seconds

11:18 SVE back on, 150 SCFM.
11:25 Restart sparge blower.

Note that prior to system interruption - SMP01-M showed strong bubbling, airlifted some H_2O out of well casing.

Allowing system to stabilize

11:35 Sparge flow 4 cfm @ 8.8 PSI
11:56 Raised sparge flow to 5 CFM @ 9.3 PSI.

CS

~12:30-13:00 DO data + soil gas data collected.

13:30 Start He injection.

13:31 He @ SVE exhaust 0.14%
water level rising in sump.
small trickle fr. SE corner of "vault". No H_2S or hydrocarbons in Equip. Room

13:36 He in SMP01 vault 0.32%

14:08 Check basement - no He, no H_2S; Sump is still seeping, few to occasional bubbles, black

14:11 Sparge back on.
14:15 Checked sump, no H_2S

CS

17 Apr 1996

17:00 Checked sump, still some bubbles, nothing by GT302 or GA-90.

Cleaned up - ran SVE to maintain capture.

17:30 off site

CS

18 Apr 1996.

08:00 @ trailer to copy notes.

08:10 @ O Club - Curtis calibrating.

Safety meeting w/
S. Stevenson
C. Wright
S. Pearson.

Checked sump, water level has dropped back down.

Safety Check on SVE/sparge trailer ok

DTW in SP01 - 38.40 - 11.89.

DTB in " " - 39.3.

Barometer 30.29

09:17 Started SVE

He @ exhaust 0.10%

09:57 Done w/ DO & C.L.S.

Start Sparge into SP01 38.40

10:00 START SPARGE @ 10 PSI for stabilization

10:04	SP01 M	~~11.77~~ 11.57
10:04:30		11.55
10:05		11.60

CS

18 Apr 1996

10:06 Raise Sparge pressure to 12 psi.

10:07	SP01M	11.55
10:08	"	11.44
10:09		11.43
10:10:30		11.45
10:11:30		11.47
	SMP01S	10.80

10:18 Flow @ 3 CFM @ 12.6
water level rising @ SMP01

10:24	SMP02S	10.61
	M	10.39
	D	10.39

Water levels rising in all wells

10:30 Checked basement sump
No water, No H_2S, no hydrocarbons

Collected field data

CS

18 Apr 1996

SVE down again.
Replaced Volt on SVE pump.
11:28 SPMG01/SVE back in svc.

11:30 Checked basement & sump - no water, H_2S, or hydrocarbons.
Continued w/ collection of field data.

Wind rising - occasional dust cloud. Barometer 30.38

Attached last Helium bottle in prep. for tracer test.

12:45 Upped sparge pressure to 11 psi; checked SMP01 - occas. bubbles in deep & middle wells.

13:00 Start He; stop sparge.
13:03 He 3.87% in SP01 vault

CS

18 Apr 1996

13:23 Done w/ round of soil gas samples.

13:26 Checked basement + sump. No water, no H_2S, no hydrocarbons

13:45 No He or hydrocarbons in sump or basement.

14:00 + 14:30 Doa LL readings

Air samples collected
Soil Gas reading taken.
DTW + DO readings.
system check.

~~14:0~~ 16:05 Calib. ph @ 7.0, 4.0.
@ 4.0 Buffer, reads 4.2 @ max span

		Temp	cond	pH
16:15	MW03	77.9	3000	2.25
	SMP035	68.4	3550	0.95

ESS

18 Apr 1996

Checked for He in shallow wells,
Checked DO in select wells
Cleaned up site.
17:05 unit off.
17:15 offsite

ESS

19 Apr 1996

0800 On site, copied DACR & filed @ FW trailer. C. weight calibrating. finished calibration, site safety meeting.

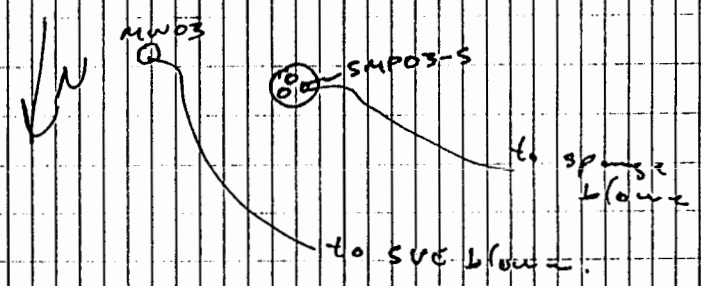
Prepared to read gases

08:33	CH_4 %	CO_2 %	O_2 %	He %	H_2S ppm
SMP01-S	0	0	20.2	0.08	0
SMP01-M	0	0.1	18.9	1.2	0
SMP01-D	0	0	20.4	0.18	0
SMP02-S	0	0	20.2	-0-	0
SMP02-M	0	0	20.1	-0-	0
SMP02-D	0	0	20.2	-0-	0
SMP03-S	0	0.1	20.2	-0-	>200
SMP03-M	0	0	20.1	-0-	0
SMP03-D	0	0	19.9	-0-	0
MW03	0	3.1	14.2	-0-	0
MW01	0	0	20.4	0.12	0

Performed safety checks on SVE/sparge - OK

Set up equip. for vapor extraction from MW03; possible air inj. into SMP03-S.

19 Apr 1996



09:38 Started SVE
H_2S @ pre carbon - 18
post carbon - 0
H_2S climbing
minirae - ~~zero in~~ 34, 48
0 out.

09:42 H_2S 137

flow fr. MW03 below gauge minimum.
MW3 wellhead 60" ~~H~~ H_2O
vac.

09:45 SVE - 158 ppm H_2S in (steady)

09:55 H_2S in 38
out 0

0 out

Minirae - 8 in
0 out

19 Apr 1996

75" H_2O vac @ MW03,
no vac. @ VET-1 or MW01

10:02 H_2S in SMP03S - >200

10:15 MMIRAC 1.4 in, 0 out.
H_2S 1 in, 0 out.

10:16 Unit off.
Move SVE to MW01

10:26 Moved eq. to MW01,
10:29 Started SVE-
no H_2S in SVE infl.
0.05" Vac @ MW03 w/
40" Vac @ MW01.
0.05" Vac @ MW03 w/
55" Vac @ MW01.

No measurable flow
10:34 0.05" Vac @ VET-1.
H_2S - 2 in, 0 out
PID - 4.6 in, 0.0 out @10:36

19 Apr 1996

10:52 No H_2S in SVE sys.
Vac @ MW01 50" H_2O
VET1 0.06" H_2O
MW03 0.03" H_2O

10:54 - System off
fuel off. - 62% in horiz
tank.

~11:30 M. Jaffe fr. COE-MSO-
H_2S on site. Equipment
breakdown in progress

13:17 Out fr. O' Club.
Portable toilet to be picked up
Monday. Propane to be picked
up Mon or Tues.
4 carbon drums need to be
moved to IDW. 2 used,
2 unused.
14:00 moved carbon drums to IDW
yard. + offsite

APPENDIX A-5
MONITORING WELL PURGING RECORDS

MONITORING WELL PURGING RECORD

JOB NAME: Holloman AFB - O'Club.
LOCATION:
EQUIPMENT: Disp. bailer, pH, temp, cond. meter
DATE: 12 Apr 1996
SAMPLER(S): L. S. STEVENSON

WELL ID: MW-05 14.60 - 12.59 = 2.01' ≈ 1 gal / 3 vol purge

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
08:32	0.5	6.87	2160	60.1	
08:37	1.0	7.20	2430	61.2	essentially dry, <0.3*
08:41	1.25	7.20	2430	60.7	
			Sampled by/at 08:50		

WELL ID: MW-09 15.25 - 8.69 = 6.56 ⇒ 3.5 gal / 3 vol purge

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
09:28	1	7.83	2610	64.3	
09:30	1.25 dry				
		Sampled 09:40			

MONITORING WELL PURGING RECORD

JOB NAME: Holloman AFB - O'Clubs
LOCATION: O'Club
EQUIPMENT: Disp. bailer, ph, temp, cond. meter

DATE: 12 Apr 1996
SAMPLER(S): L. S. Stevenson

WELL ID: MW 07 15.14 - 12.72 = 2.42 ⇒ 1.2 gal/3 vol purge,

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
1131	0.5	7.80	2270	66.3	1st recov. after dry event

WELL ID:

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS

Note: pvc shavings + local formation fine sand @ bottom of well. Has it ever been developed? (MW-07)

MONITORING WELL PURGING RECORD

JOB NAME: 5557 Remed. @ O'Club
LOCATION: HAFB
EQUIPMENT: Disp. bailer, hydac combo pH, temp, Cond.
DATE: 9 Apr 1995
SAMPLER(S): Scott STEVENSON

WELL ID: MW04 @ Officers Club 12.89 - 8.47 = 4.42

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
15:25	1	6.57	2920	75.5	
15:30	1.5	6.63	2830	72.7	
15:32	2.0	6.55	2960	72.1	
15:34	2.5	6.60	2910	72.1	
					SAMPLED @ 15:45

4.42 x 0.5 = 2.21 gal for 3 Vol

WELL ID: MW-02

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
16:19	0.75	6.83	2930	72.0	
16:22	1.25	6.77	2740	71.2	
16:25	2.00	6.70	2790	70.0	
					sampled @ 16:45

MONITORING WELL PURGING RECORD

JOB NAME:
LOCATION:
EQUIPMENT:

DATE: 9 Apr 1996
SAMPLER(S): S. Stevenson

WELL ID: MW 01 14.61 − 11.62 = 3.0 3.0 x 0.5 = 1.5 gal.

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
17:01	0.5	5.69	2890	79.8	Iust. hot?
17:04	1.25	4.97	2880	70.9	
17:08	2.00	4.89	2880	70.8	
		sampled @ 17:15			

WELL ID:

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS

MONITORING WELL PURGING RECORD

JOB NAME: HAFB O' Club
LOCATION: Holloman AFB NM
EQUIPMENT: Disp. Bailer
DATE: 11 Apr 1996
SAMPLER(S):

WELL ID: SP01-D (38-40) 39.00 - 11.56 = 27.44 => 13.7 / 3 vol purge

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
15:10	5	7.27	3160	73°	-
15:22	7.5	7.10	3000	69.4°	-
15:30	10	7.17	3000	69°	-
1540	12	7.23	2910	68.1°	-
1545	13	7.20	2900	67	-
1547	14	7.20	2900	67	-
		Sampled 15:55			

WELL ID:

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS

MONITORING WELL PURGING RECORD

JOB NAME: HAFB OC LUB
LOCATION:
EQUIPMENT: Disp. bailer, pH, COND, Temp meter
DATE: 10 Apr 1996
SAMPLER(S): Scott STEVENSON

WELL ID: MW-03 16.86 - 11.95 = 4.91 ⇒ 2.5 gal purge

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
14:15	1 gal	< 0.0	3780	74.5°	rechecked cal to 4.0
14:20	2 gal	0.40	3430	71.2°	
14:22	2.5 gal	1.05	3400	70.2	
14:24	3.0 gal	0.90	3450	69.6	
14:25	3.5 gal	1.02	3370	68.5	
		Sampled @ 14:30			

WELL ID: SP-01S 19.40 - 11.30 = 8.10 ⇒ 4.05 gal / 3 vol purge

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
14:58	1.0 gal	4.78	3520	72.5	
15:00	2.0 gal	5.97	3480	70.4	
15:08	3.0 gal	5.68	3970	70.2	
15:14	4.0 gal	6.0	3620	70.0	
15:18	4.5 gal	5.48	3480	69.3	
15:28	6.5 gal	5.18	3480	70.3	
15:30	7.0 gal	5.16	3490	71.8	
		Sampled @ 15:35			

MONITORING WELL PURGING RECORD

JOB NAME: HAFB O'CLUB
LOCATION: HAFB
EQUIPMENT: DISP. BAILER; pH, Conductivity, Temp meter
DATE: 10 Apr 1996
SAMPLER(S): Scott STEVENSON, DEL MARCHWARD

WELL ID: SP01 M (28-30) # 29.20 - 11.30 = 17.90 ≈ 9 gal / 3 vol purge.

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS
16:46	4.5 gal	7.23	3180	74.7	
16:56	7.0 gal	7.43	2970	70.4	
17:05	8.0 gal	7.33	2480	69.8	
17:08	8.5 gal	7.37	2520	68.5	
17:10	9.0 gal	7.33	2580	67.5	
		Sampled @ 17:20			

WELL ID:

TIME	GALLONS PURGED	pH	CONDUCTIVITY (us/cm)	TEMPERATURE (°F)	COMMENTS

APPENDIX A-6
WELL GAUGING DATA FORMS

WELL GAUGING DATA FORM

CLIENT: Holloman AFB - Officers Club Remediation

SITE: Site SS-57 Officers Club

PROJECT NO.: Officers Club 830012208.35

DATE: 9 Apr 1996

RECORDED BY: Scott Stevenson

INTERFACE PROBE NO.:

INTERFACE PROBE CORRECTION: None FT.

WEATHER: Hot, light SW breeze.

WELL NUMBER	WELL DIAMETER (INCH)	WELL DEPTH (FEET)	TOP OF CASING ELEVATION (FEET)	DEPTH OF WELL FROM TOP OF CASING (FEET)	DEPTH TO WATER FROM TOP OF CASING (FEET)	DEPTH TO PRODUCT FROM TOP OF CASING (FEET)	PPM as Hexane PRODUCT THICKNESS (FEET)	H_2S PPM GALLONS OF PRODUCT BAILED	COMMENTS (WATER IN MANHOLE/ LOCK OR CAP MISSING, PURGE AMOUNT)
MW-01	2		4069.41	14.61	11.62	~~18.8~~	340	0	
MW-02	2		4067.88	13.70	10.37	20.1	260	0	
MW-03	2		4069.91	16.86	11.95	~~20.8~~	~~240~~ 340	~~2~~	Sand
MW-04	2		4065.19	~~8.~~ 12.89	8.47	18.4	280	0	firm bot.
MW-05				14.60	12.59		located wells, gauged on 11 Apr 1996 (Stevenson)		
MW-07				15.14	12.72				
MW-09				15.25	8.69				
SP-01 18-20	2		4063.73	~~11.40~~	11.30	19.4	1900	1	
SP-01 20	2		4066.75	29.20	11.38	19.7	600	0	
SP-01 38-40	2		4068.85	39.00	11.56	19.9	640	0	
SMP-01 18-20	2		4068.13	19.73	10.68	20.4	260	0	firm
SMP-01 28-30	2		4068.12	29.60	10.85	20.7	240	0	slightly soft
SMP-01 38-40	2		4068.12	39.39	10.84	20.8	260	0	firm
SMP-02 18-20	2		4068.13	19.56	10.67	20.6	240	0	firm
SMP-02 28-30	2		4068.13	29.32	10.86	20.5	240	0	slightly soft
SMP-02 38-40	2		4068.13	39.80	10.80	20.7	280	0	sand
SMP-03 18-20	2		4069.85	19.34	12.22	20.8	360 ~~60~~	>200	
SMP-03 28-30	2		4069.90	27.40	12.15	20.8 ~~20.5~~	180 ~~220~~	0 ~~0~~	
SMP-03 38-40	2		4069.86	39.84	12.25	~~20.8~~ 20.5	180 220	~~0~~ 0	
							TOTAL GALLONS BAILED		

REMARKS:

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

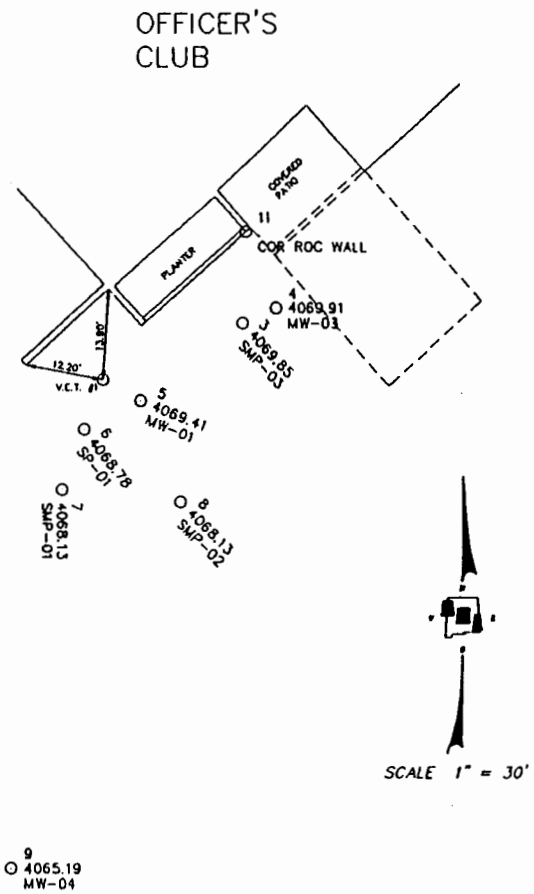
(1)
(2) (3)

TYPICAL SMP SITE DETAIL
NOT TO SCALE

Project: 96160

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1	667586.7000	550481.8000	4064.01	2-92-2
2	667938.8400	550869.9400		2-92-1
3	667750.4863	550499.9608	4069.85	SMP-03(1)
			4069.90	SMP-03(2)
			4069.86	SMP-03(3)
4	667752.8406	550505.4106	4069.91	MW-03
5	667738.5447	550484.3053	4069.41	MW-01
6	667734.1570	550475.5859	4068.78	SP-01(1)
			4068.75	SP-01(2)
			4068.85	SP-03(3)
7	667724.8262	550472.1600	4068.13	SMP-01(1)
			4068.12	SMP-01(2)
			4068.12	SMP-01(3)
8	667722.8817	550490.4791	4068.13	SMP-02(1)
			4068.13	SMP-02(2)
			4068.13	SMP-02(3)
9	667665.8902	550464.2592	4065.19	MW-04
10	667749.8552	550427.3390	4067.88	MW-02
11	667764.6097	550500.4924		COR ROC WALL



I HEREBY CERTIFY THAT I AM A REGISTERED PROFESSIONAL SURVEYOR UNDER THE LAWS OF THE STATE OF NEW MEXICO, THAT THIS PLAT WAS PREPARED FROM FIELD NOTES MADE BY ME OR UNDER MY DIRECTION, THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF MEETING OR EXCEEDING THE MINIMUM REQUIREMENTS OF THE STANDARDS FOR LAND SURVEYING IN THE STATE OF NEW MEXICO.

NEW MEXICO 8081 PROFESSIONAL SURVEYOR

WALTER C. BLACK, RPS #8081 DATE 5/01/96

SOUTHWEST ENGINEERING INCORPORATED
475 ARCHULETA ROAD, LAS CRUCES, NEW MEXICO 88005

OFFICER'S CLUB – HAFB
CLIENT: GROUNDWATER TECH.
223 WILLMINGTON, 2nd FLOOR
WEST CHESTER, PA 19317

FIELD BOOK	DATA.COL
DATA FILE	OFFCLUB.CR5
DRAWING #	96160ST1
PROJECT #	96160
DATE	16APR96
	1 of 1

FILE: D:\DWG\96160\96160.DWG
BY: MEGG DATE: 29APR96 TIME: 15:00

BDR85-11S 091494

APPENDIX A-7
CONTAINERIZED MATERIALS LOGS

Page 1 of ____

CONTAINERIZED MATERIALS LOG

PROJECT DO 8 WAD 35 O'Club

CITY HAFB STATE NM

Drum Number	Well or Boring Number	Material Type	Date Filled		Location Moved to	Final Disposition	Signatures of Movers
			First	Last			
1	5557	Decon Water	27Mar96	27Mar96	IDW Yard		
2		Decon Water	27Mar96	27Mar96			
3		Decon Water	28Mar96	28Mar96			
4		Decon Water	28Mar96				
5		"		30Mar			
6		"		30Mar			
7		"		30Mar			
8		"		30Mar			
9		"		30Mar.			
10		well deval. water	31Mar	31Mar			
11							
12							
13							
14							
960409-1	5557	purge water	4/9/96		"		
960410-1	5556 / 5557	"	4/10/96	4/10/96	"		
960111-1	LTM-LF01	"	4/11/96	4/11/96	"		

GEOPURE CONTINENTAL
SYSTEMS & SERVICES

CORPORATE/SOUTHEAST OFFICE
2300 NW 71ST PLACE
GAINESVILLE, FL 32653-1699
(800) 342-1103 • FAX (904) 373-7660

REQUEST FOR EXHAUSTED CARBON RETURN NUMBER

Requesting Party Information

Company Name: GROUNDWATER TECHNOLOGY GOVT SERVICES

Contact Person: SCOTT STEVENSON

Address: 2501 YALE, SE. #204
ALBUQUERQUE, NM ~~87108~~ 87106

Phone: (505) 242-3113 FAX: (505) 242-1103

Site On Which the Carbon Was Used

Site Name: SSS7-Officer's Club

Location: HOLLOMAN AIR FORCE BASE,
NEW MEXICO

Source Of The Contamination

Type of petroleum product: Diesel

Other (list):

If other, all released compounds must be listed.

Number of carbon vessels to return: 4

Size of vessels: 55 gallon - Vapor

Manufacturer of units: GEOPURE

Also include untreated water analysis from the site. This can be from monitoring wells or the inlet of the system before any treatment.

All information must be completely filled out or the request for return numbers will be denied.

UNIT #S TX 25088 VP
" " 89
RDN " " 90
" " 91 90

#89, 90 not used.

AIR TOXICS LTD.

Total Petroleum Hydrocarbons by Modified EPA Method TO-3
GC/FID

Field Sample I.D.	Lab Sample I.D.	File Name	Sample Date	Analyzed For	Dilution Factor	Det. Limit (ppmv)	Det. Limit (µG/L)	Amount (ppmv)	Amount (µG/L)
SP01-18-20-AS	9604175A-01A	6042007	4/16/96	TPH*	24.3	0.24	1.0	48	200
SP01-28-30-AS	9604175A-02A	6042008	4/17/96	TPH*	24.8	0.25	1.0	42	170
SP01-28-30-DS	9604175A-03A	6042009	4/17/96	TPH*	24.8	0.25	1.0	67	280
SP01-28-30-EFF	9604175A-04A	6042010	4/17/96	TPH*	26.8	0.27	1.1	31	130
Lab Blank	9604175A-05A	6042003	NA	TPH*	1.00	0.010	0.042	Not Detected	Not Detected

Analysis Date: 4/20/96
Container Type: 6 Liter Summa Canister

COMMENTS: *Total Petroleum Hydrocarbons referenced to Gasoline (MW = 100).
NA = Not Applicable

Spent Activated Carbon Return Policy

effective 12/1/94

GeoPure Continental Systems & Services instituted its spent carbon return policy in 1983. It was and is our intent to streamline and simplify the remediation of petroleum hydrocarbons and pesticides from groundwater.

GeoPure Continental makes every effort to work with the unique requirements of each client. We have prepared this policy statement to clarify GeoPure Continental's and clients' rights and responsibilities.

GeoPure Continental will accept the shipment of and will take responsibility for proper disposal of all drums and tanks of spent granular activated carbon provided that:

- The vessel does not contain any free product or foreign material such as gravel.
- The vessel and granular activated carbon originated from GeoPure Continental Systems & Services.
- The drum tracking number that is applied to every drum upon shipment to the client's site is visible upon shipment back to GeoPure Continental.
- Before authorization to return is granted by GeoPure Continental, the client must forward EPA 601, 602, 610 or other appropriate analyses of the contaminated stream to GeoPure Continental, 2300 NW 71st Place, Gainesville, FL 32653-1699. (Or FAX at 904-373-7660)
- GeoPure Continental will accept analyses already performed and in client's files. However, the analyses must be current, and analyses for each site is required.
- The client must call for a return number. Please have ready each drum serial number. GeoPure Continental will issue a routing number (display on each drum) and authorize the return of the spent carbon provided GeoPure Continental has received client's analyses for each site, and provided that the contaminated stream is a non-hazardous substance as defined in CFR 40, Part 261. This includes application of the USEPA regulatory levels for the Toxicity Characteristic Leaching Procedure (TCLP).
- The spent carbon and vessel may be returned to GeoPure Continental only upon our authorization, and when the above conditions are met.
- **Unless other arrangements have been made, all freight, lift gate charges, and other expenses are the sole responsibility of the client.** F.O.B. is our nearest service center.

GeoPure Continental retains the right to refuse any spent carbon. This right includes, but is not limited to, spent carbon that is unacceptable to our reactivator, or has not been proven to our standards to be non-hazardous. If after receiving a drum we determine the drum is not acceptable for any reason, we retain the right to return the drum freight collect.

GeoPure will accept all other manufacturer's drums at no charge when GeoPure drums are purchased as replacements. Otherwise, a $200 disposal fee per drum for other than GeoPure drums will be applied.

GeoPure Continental prepares and ships its spent carbon product via D.O.T.-approved freight carriers. The product is received by a certified reactivation company. It is thermally reactivated then redistributed as reactivated carbon. GeoPure Continental's spent carbon is NEVER landfilled. GeoPure Continental recognizes the proper disposal of contaminated spent carbon is vital to our drinking water resources. GeoPure Continental provides the means for proper disposal of this contaminated substance for all clients without discrimination. Provided the above conditions are met, this program offers a safe and economical solution to the environmental hazards of improper disposal.

- Fax Cover Sheet -

Date: 4/24/96

Pages: 1 of 3

To: Scott Stephenson

Fax Phone: 505-242-1103

From: Monty Guiles

Subject: Drum return number request, fill out the following and fax to the attention of Kathy Jasper at (904) 373-7660.

Kathy
ext. 310
about
nitrogen returns

GEOPURE
CONTINENTAL
SYSTEMS & SERVICES

Marty Guides (Lukas)
~~C.J. SAUNDERS~~
Technical Representative
512-392-0081

2300 N.W. 71st Place
Gainesville, FL 32653-1699
(904) 376-7833, ext. 314
(800) ~~342-1103~~ 893-5937
Fax: (904) 373-7660

Was Continental Carbon

RM2087.

called 9 AM
10:00
[illegible]

4105 HUNTERTRED
#10
SAN MARCOS
78666

- Fax Cover Sheet -

Date: 4/4/96

Pages: 1 of 2

To: Scott Stephenson

Fax Phone: 505-242-1103

From: Monty Guiles

Subject: Carbon price

Thursday, April 4, 1996

Scott Stephenson
GTI
2501 Yale Blvd. SE Ste. 204
Albuquerque, NM 87106

Dear Scott:

Cost for Reactivated carbon drum 200# 4 @ $399.00
ea. $1596.00
Shipping cost is 140.00

Sincerely,

Monty Guiles
Southwest Technical Representative

830017208.35,060

RM2087

need Address —
Phone # —
Business classification —

TELEPHONE LOG

GROUNDWATER TECHNOLOGY

GTI Contact: Scott Stevenson

Date:

Contact/Company:

Time:

Phone/Fax No.:

Project Name:

Address:

Project No:

Subject:

( ) Made Call
( ) Received Call
( ) Returned Call

Summary of Conversation re: returning drums -
need influent stream. ~~influent~~ analysis.
to corporate office.
we pay return shipping. via common carrier.
P.O. 4 Vapor phase - reactiv - shipped to:

Concerns/Issues

Action Taken/Required

cc: Distribution

WINDOWS\TELE_LOG.MST\PLT110795

SUN FREIGHTWAYS, INC. (SNFW)

DESTINATION TERMINAL	PRO NUMBER
[illegible]	[illegible]-0145380

CONSIGNEE [illegible]	SHIPPER [illegible]
P.O. NO. [illegible] SPECIAL INSTRUCTIONS	B/L NUMBER [illegible] BILL TO [illegible]

INTERLINE I/L FWD [illegible]
DATE [illegible] PRO# [illegible]
I/L BYD

TRAILER NO.	F/B DATE	ORIGIN TERMINAL	DEST. TERMINAL
[illegible]	[illegible]	[illegible]	[illegible]

PIECES	H/M	DESCRIPTION	WEIGHT	RATE	EXTENDED
[illegible]		[illegible] [illegible] [illegible] * [illegible] PURCHASE ONLY * * [illegible] BILLING ONLY * [illegible] [illegible] 50% [illegible]	[illegible]	32.54	335.40 [illegible] [illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]

CUSTOMER COPY	DRIVER'S SIGNATURE [illegible]	RECEIVED IN GOOD CONDITION EXCEPT AS NOTED CONSIGNEE NAME [illegible]	TOTAL PIECES
	DATE [illegible]	BY (COMPLETE CUSTOMER SIGNATURE) [illegible]	

TO:
Chuck Schick.

To:
Ms Kathy Jasper
Geopure Continental

Fax (904) 373-7660

re: Request for carbon drum return numbers

We received vapor drums TX25088VP through TX25091VP without shipping papers. I assume they were misplaced by one of the forwarding agents. Monty Guiles sent me the attached form to complete to obtain return numbers.

The drums were used during pilot testing at a diesel contaminated site. Only two drums were used. Attached are some TO-3 analyses for the inlet vapor stream. These represent a cross sectional sample of the entire test. TO-14 analyses are also available if you need them.

What other paperwork is required for shipping these drums back? I can be contacted at (505) 242-3113 if you have any questions or need further information.

Thanks.

Scott Stevenson
Groundwater Technology
2501 Yale, SE, Albuquerque, NM 87106
fax (505) 242-1103

called Monty 17 May
returned call
return #'s
put on drums
w/ magic
marker

~~RG~~ 3855
3856
RG 3857

Ship back to
Geopure Continental
4105 HUNTER DR
#10
SAN MARCOS, TX
78666
Attn Monty Guiles

TELEPHONE LOG

GROUNDWATER TECHNOLOGY

GTI Contact: Scott Stevenson

Date: 11 June 1996

Contact/Company: Monty Guiles
GEOPURE CONTINENTAL

Time:

Phone/Fax No.:

Project Name: Hollomon AFB - O'club.

Address:

Project No:

Subject: Carbon drums

( ) Made Call
(X) Received Call
( ) Returned Call

Summary of Conversation Monty recieved returned carbon drums freight collect. They were shipped fr. HAFB via Sun Freight with the understanding it would be billed to us.

Concerns/Issues

Action Taken/Required Gave PO # (existing) that was orig. given to Sun Freight to Monty. He will bill us direct at cost for shipping bill. (#272)
RM 2122

cc: Distribution
Madewell
Schick
file.

WINDOWS\TELE_LOG.MST\PLT110795

Groundwater Tech. Govern. Services

PURCHASE ORDER

2501 Yale Blvd. SE, Suite 204
Albuquerque, NM 87106

Phone Number
(505) 242-3113

PM Employee ID No.: 773231
Business Class: _____
Project Name: _____
Project Location: _____
Project No.: _____
Project Task: _____

The following number must appear on all invoices, bills of lading, and acknowledgments relating to this PO:
Purchase Order: RM2122

TO:
Name:
Company: SUN FREIGHTWAYS
Address: EL PASO
Phone: (915) 778-4243

P.O. DATE	
TERMS	N/45
F.O.B.	–
SHIP VIA	–

QTY	UNIT	DESCRIPTION	UNIT PRICE	AMOUNT
1	SVC	RETURN FREIGHT CHARGES FOR CARBON DRUMS.	334.90	334.90

Please notify us immediately if this order cannot be shipped complete on or before:

SUBTOTAL	0.00
SHIPPING	
TAX	
OTHER	
	$0.00
	TOTAL

Ship To:

Send Correspondence To:
Chuck Schick
Groundwater Techn. Gov. Services
2501 Yale Blvd., SE, Suite 204
Albuquerque, NM 87106
(505) 242-3113

Chuck Schick
APPROVED BY

DATE

1A

7657-0923-4306 Moore® Speedset® MCP® - Patented 0305

STRAIGHT BILL OF LADING - SHORT FORM - Original-Not Negotiable

PO # RM 2122

RECEIVED, subject to the classifications and tariffs in effect on the date of issue of this Original Bill of Lading.

SUN FREIGHTWAYS, INC. SCAC (SNFW)

(NAME OF CARRIER)

SHIPPER NO

CARRIER NO.

DATE 8 June, 1998

TO CONSIGNEE GEOFORE CONTINENTA	FROM: SHIPPER GROUNDWATER TECHNOLOGY
STREET 4501 HUNTER RD	STREET 2501 YALE SE, ALBUQUERQUE
DESTINATION SAN MARCOS, TX ZIP 78666	ORIGIN ZIP
ROUTE:	VEHICLE NUMBER

NO. SHIPPING UNITS	*	KIND OF PACKAGING, DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS	Weight (Subject to Correction)	Rate	CHARGES (for Carrier use only)
4		55 gal Drums, Activated Carbon - Non-Haz.	800.		
		# RG 3854, 3855, 3856, 3857			

REMIT C.O.D. TO: ADDRESS

COD AMT. $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

Note--Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding.

$ _____ per _____

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

TOTAL CHARGES: $

☐ COLLECT ☐ PREPAID

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and conditions of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of the shipment.

Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

This is to certify that the above-named articles are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportation.

SHIPPER [signature]	CARRIER [signature]
PER	PER
	DATE

* Mark with "X" to designate Hazardous Material as defined in Title 49 of the code of Federal Regulations

APPENDIX A-8
PRELIMINARY INCIDENT REPORTS

GROUNDWATER TECHNOLOGY, INC.
PRELIMINARY INCIDENT REPORT

Check Incident Type:
Class I: X
Class II: _____
Class III: _____

Completing Report Charles Madewell Office ABQ Date 3-28-96 Incident Date 3-28-96

Incident Time: 1330 Location HAFB, N.M Home Dept. # 05335 Visiting Dept. # _____

Person Involved in Incident Layne Env. Services - Anthony Kent Telephone ___-___-____

Driver Name (if motor vehicle accident) _____ Telephone ___-___-____

Type of Incident:

- ☐ Near Miss Event
- ☐ Unsafe Condition/Action
- ☐ Equipment Damage
- ☐ Theft
- ☒ Property Damage
- ☐ Permit/Code Compliance
- ☐ Personal Injury/Illness
- ☐ Chemical Exposure
- ☐ Fire/Explosion
- ☐ Spill/Release
- ☐ Customer Incident
- ☐ Newspaper/Radio/TV
- ☐ Other
- ☐ Motor Vehicle Accident

Assoc. Leasing Vehicle #: _____

VIN # _____

If GTI vehicle, call Associates Leasing at 800-255-2607.

Circle one based on initial findings: Preventable/Non-preventable

---

Personal Injury ☐ Yes ☒ No (If no, go to next section)

- ☐ First Aid Only
- ☐ Hospitalization
- ☐ Medical Treatment
- ☐ Possible Injury, Not Confirmed

Person Injured:

- ☐ GTI Employee (If GTI employee, complete First Report of Injury)
- ☐ Subcontractor
- ☐ Customer/Public/Other

Nature of Injury, Illness or Exposure: _____

Describe nature of incident, how it occurred, who was involved, witnesses and possible causal factors: (Attach additional sheets if necessary)

While subcontractor was backing up to align trailer for driving off site, the vehicle ran over a parameter light fixture. There was only 1 spotter when accident happen and they were on the other side of the vehicle. Enough clearance was not ensured from the light at time of incident

☐ First Report of Injury Attached ☐ Police Report Attached

Describe immediate actions taken and persons notified: (Attach additional sheets if necessary)

Pulled vehicle off and using an additional spotter removed trailer/vehicle from property and checked light fixture. Repair possible but will need fixture base replaced.

Line Manager (Responsible for Follow-up) Chuck Schick Office ABQ

DISTRIBUTION

Provide this report to the line manager immediately. The line manager is responsible for the proper distribution of the PIR form per the Incident Reporting Guide (see reverse side). Notify Corporate of all Class II and III incidents immediately by phone at (800) 876-0647, Mailbox 11911, and fax a copy of the PIR to Norwood at (617) 769-9861 .

GROUNDWATER TECHNOLOGY, INC.
PRELIMINARY INCIDENT REPORT

Check Incident Type:
Class I _____
Class II _____
Class III _____

Person Completing Report Charles Maldewell Office AGQ Date 3/30/96 Incident Date 3/30/96

Incident Time: 0945 Location _____ Home Dept. # 05335 Visiting Dept. # _____

Person Involved in Incident _____ Telephone ___-___-____

Driver Name (if motor vehicle accident) _____ Telephone ___-___-____

Type of Incident:

- ☐ Near Miss Event
- ☐ Unsafe Condition/Action
- ☐ Equipment Damage
- ☐ Theft
- ☒ Property Damage
- ☐ Permit/Code Compliance
- ☐ Personal Injury/Illness
- ☐ Chemical Exposure
- ☐ Fire/Explosion
- ☐ Spill/Release
- ☐ Customer Incident
- ☐ Newspaper/Radio/TV
- ☐ Other
- ☐ Motor Vehicle Accident

Assoc. Leasing Vehicle #: _____
VIN # _____
If GTI vehicle, call Associates Leasing at 800-255-2607.
Circle one based on initial findings: Preventable/Non-preventable

---

Personal Injury ☐ Yes ☒ No (If no, go to next section)

- ☐ First Aid Only
- ☐ Hospitalization
- ☐ Medical Treatment
- ☐ Possible Injury, Not Confirmed

Person Injured:

- ☐ GTI Employee (If GTI employee, complete First Report of Injury)
- ☐ Subcontractor
- ☐ Customer/Public/Other

Nature of Injury, Illness or Exposure: _____

Describe nature of incident, how it occurred, who was involved, witnesses and possible causal factors: (Attach additional sheets if necessary)

Excavating 12' long trench (2' deep) hit PVC 1¼" Gas line (abandoned) at END of trench length and broke it.

Immediately shut off backhoe.

☐ First Report of Injury Attached ☐ Police Report Attached

checked area w/ CGS, no flameable gas noted (0% LEL).

Describe immediate actions taken and persons notified: (Attach additional sheets if necessary)

Cleared soil from line by hand and inspected, Tried calling base utilities. Spoke with Foster Wheeler Safety Rep. Called Line Manager Chuck Schick

Line Manager (Responsible for Follow-up) _____ Office _____

DISTRIBUTION

Provide this report to the line manager immediately. The line manager is responsible for the proper distribution of the PIR form per the Incident Reporting Guide (see reverse side). Notify Corporate of all Class II and III incidents immediately by phone at (800) 876-0647, Mailbox 11911, and fax a copy of the PIR to Norwood at (617) 769-9861 .

INCIDENT REPORTING GUIDE

Incident Class	Class I: A minor incident that is dealt with at the local level	Class II: A serious incident that requires notification to Corporate within 24 hours	Class III: A highly significant incident requiring immediate notification and assistance from Business Unit and Corporate
Examples of Incidents	o First Aid injury o Minor damage <$200 o Non-reportable quantity spill o Near miss event o Unsafe condition or action Note: If there is a question as to Class I or II, follow Class II notification actions.	o Personal injury (more than first aid to employee, subcontractor or public) o Any motor vehicle accident o Damage to property greater than $200 but less than $10,000 o Near miss incident that could have been very serious o Fire/Explosion o Non-emergency notification of regulatory agency is required o Served with subpoena (DO NOT ACCEPT, have delivered to CT Corporation System, Registered Agent. Contact Legal Dept. in Norwood for assistance.)	o Hospitalization (of one or more persons) o Multiple injury of employees, sub-contractors or public o Unprotected chemical exposure o Death o Damage to property greater than $10,000 o Reportable quantity spill release o Emergency notification of regulatory agency o Regulatory agency response to incident site (inspection) o Contact or appearance of news or public media
Notification Actions	1. On-scene person notifies Line Manager* immediately by phone 2. Provide PIR form to Line Manager and H&S Representative(s)** immediately following the incident 3. Line Manager investigates and follows up within 30 days *Line management = reporting manager, project manager, operations/office manager and district hub, or area manager **H&S = includes district H&S representatives and business unit H&S manager	1. On-scene person notifies Line Manager* immediately by phone 2. Line Manager notifies the Business Unit Manager, District, Hub or Area Manager; H&S Representative(s)**, Human Resources Representative; and Corporate H&S Director with PIR form immediately following the incident 3. Manager provides a detailed final investigation report within 30 days to Business Unit Manager, H&S Representative and Corporate Director H&S Note that all lost-time injury events will be investigated by the respective Business Unit Manager with a final report to the CEO.	1. On-scene person notifies Line Manager* immediately by phone 2. Manager immediately notifies Business Unit Manager, H&S Representative(s)**, Human Resources and Corporate Director H&S (800-876-0647, Mailbox #11911) by phone. PIR form is provided by fax immediately to (617-769-9861) addressed to Corporate Director H&S 3. Incident management team conferences by phone and formulates an action plan

Rev. 10/95

APPENDIX A-9
WORK CLEARANCE PERMITS

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

(See Instructions on Reverse)

DATE PREPARED: 15 FEB 96

1. Clearance is requested to proceed with work at SS-57 (BASE CLUB)

on Work Order No. 38767, Contract No. DACW-45-94-D0003, involving excavation or utility disturbance per attached sketch. This area [X] has [ ] has not been staked or clearly marked.

2. TYPE OF FACILITY/WORK INVOLVED

	A. PAVEMENTS		D. FIRE DETECTION & PROTECTION SYSTEMS				G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW
	B. DRAINAGE SYSTEMS		E. UTILITY	OVERHEAD		UNDERGROUND	H. SECURITY
	C. RAILROAD TRACKS		F. COMM	OVERHEAD		UNDERGROUND	[X] I. OTHER EXCAVATION / INSTALL SIGNS

3. DATE CLEARANCE REQUIRED: 4 March 96

4. DATE OF CLEARANCE: 5 April 96

5. SIGNATURE OF REQUESTING OFFICIAL: FOSTER WHEELER ENV. CORP.

6. TELEPHONE NO.: 479-2668

7. ORGANIZATION: USACE / FWENC

8. BASE CIVIL ENGINEERING	ORGANIZATION	REMARKS *(Use Reverse for additional comments)*	REVIEWER'S NAME AND INITIALS
	A. ELECTRICAL DISTRIBUTION		
	B. STEAM DISTRIBUTION	NA	NA
	C. WATER DISTRIBUTION		
	D. ~~FUEL~~ GAS DISTRIBUTION	AS indicated	
	E. SEWER DISTRIBUTION		
	F. ENVIRONMENTAL	clearance granted.	R Johnson 22 Feb 96
	G. PAVEMENTS/ GROUNDS	SPOTTER / REPAIRED BY Contractor — Cleared	K. Walker
	H. FIRE PROTECTION	Cleared	E. Pietrylo
	I. ZONE _____		
	J. OTHER *(Specify)* RADAR x 3395 / METNAV X 7916	CLEARED BY K.C. 20 FEB 96 / CLEARED BY W.W. 20 FEB 96	
9. SECURITY POLICE		[illegible]	[illegible]
10. SAFETY		ENSURE ALL OSHA REQUIREMENTS ARE COMPLIED WITH	20 FEB 96
11. COMMUNICATIONS		CALL BLUE STAKE 72 hrs prior 437-7700	SRA Edwards
12. BASE OPERATIONS		Not affected	
13. CABLE TV			
14. COMMERCIAL UTILITY COMPANY [X] TELEPHONE [ ] GAS [ ] ELECTRIC		BLUE STAKE (AS MARKED)	USW

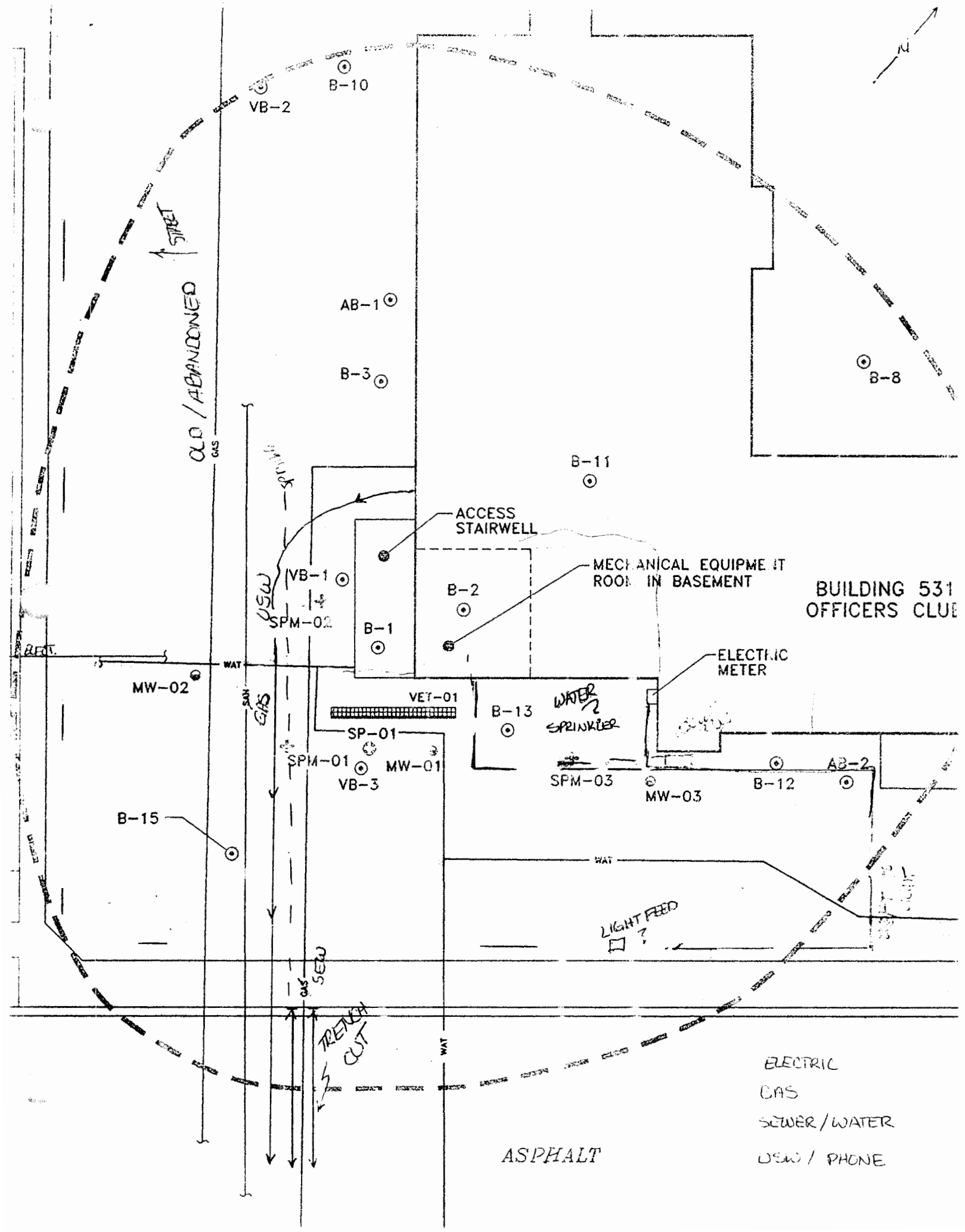
15. OTHER *(Specify)* _____

16. REQUESTED CLEARANCE [X] APPROVED [ ] DISAPPROVED

17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER *(Chief of Operations Flight or Chief of Engineering Flight)*

17. DATE SIGNED: 960222

AF FORM 103, AUG 94 *(EF-V1)* *(PerFORM PRO)* PREVIOUS EDITIONS ARE OBSOLETE.


N
B-10
VB-2
STREET
OLD / ABANDONED
GAS
AB-1
B-3
B-8
B-11
SPRINKLER
ACCESS STAIRWELL
MECHANICAL EQUIPMENT ROOM IN BASEMENT
BUILDING 531 OFFICERS CLUB
VB-1
USW
SPM-02
B-2
B-1
RFT.
WAT
MW-02
ELECTRIC METER
VET-01
B-13
WATER ?
SPRINKLER
SAN
GAS
SP-01
SPM-01
MW-01
VB-3
SPM-03
MW-03
B-12
AB-2
B-15
WAT
LIGHT FEED ?
GAS
SEW
TRENCH CUT
WAT
ELECTRIC
GAS
SEWER / WATER
USW / PHONE
ASPHALT

APPENDIX A-10
EXCAVATION CHECKLISTS

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DAILY EXCAVATION INSPECTION CHECKLIST
To be completed by a "Competent Person"

Site location: O'Club

Date: 3-30-96 Time: 0830 Competent Person: Charles Ma

Soil Type(s): Silty, clayey, sand

Soil Classification(s): Excavation depth: 4.5' Excavation width: 2'-1' x 12' long

Type of protective system used:

Indicate for each item by circling "Yes" or "No" - Address in Comments. Not Applicable (N/A).

I. General Inspection of Site

A. Surface encumbrances removed or supported — Y N N/A

B. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation — Y N N/A

C. Hard hats worn by all employees — Y N N/A

D. Spoils, materials and equipment at back of least 2 feet from the edge of the excavation — Y N N/A

E. Barriers provided where necessary to protect employees from holes, wells, pits, shafts, etc. — Y N N/A

F. Walkways and bridges over excavations 7 feet or more in depth are equipped with standard guardrails — Y N N/A

G. Warning vests or other high visibility clothing worn and worn by all employees exposed to public vehicular traffic — Y N N/A

H. Warning system established and utilized when mobile equipment is operated near the edge of an excavation — Y N N/A

I. Employees prohibited from working on faces of sloped or benched excavations that have not been properly [illegible] — Y N N/A

II. Utilities

A. Utility companies notified [illegible] — Y N N/A

B. Exact location of underground utilities known and marked [illegible] — Y N N/A

C. Underground installations [illegible] — Y N N/A

III. Means of Access and Egress

A. Lateral travel to means of egress not more than 25 feet in excavations where [illegible] Y N N/A

B. Ladders used in excavations [illegible] and extended 3 feet above the edge of the trench Y N N/A

C. Structural ramps used by employees designed by a competent person Y N N/A

D. Structural ramps used for equipment designed by a registered professional engineer (RPE) Y N N/A

E. Ramps constructed of materials of uniform thickness, fastened together on the bottom, equipped with non-slip surface Y N N/A

F. Employees protected from cave-ins when entering or exiting the excavation Y N N/A

IV. Wet Conditions

A. Precautions taken to protect employees from the accumulation of water Y N N/A

B. Water removal equipment monitored by a competent person Y N N/A

C. Surface water or runoff diverted or controlled to prevent accumulation in the excavation Y N N/A

D. Inspections made after every rainstorm or other hazard increasing occurrence Y N N/A

V. Hazardous Atmospheres

A. Atmosphere within the excavation test where there is a reasonable possibility of an oxygen deficiency, combustible or other harmful contaminant exposing employees to a hazard Y N N/A

B. Ventilation Y N N/A

C. Testing conducted often to ensure that the atmosphere remains safe Y N N/A

D. Emergency equipment, such as breathing apparatus, safety harness and line, and basket stretcher readily available where hazardous atmospheres could or do exist Y N N/A

E. Safety harness and life line used and individually attended when entering deep confined excavation Y N N/A

VI. Support Systems

A. Materials and/or equipment for support systems selected based on soil analysis, trench depth, and expected loads Y N N/A

B. Materials and equipment used for protective systems inspected and in good condition Y N N/A

C. Materials and equipment that is damaged or deteriorated has been removed from service Y N N/A

D.	Damaged materials and equipment used for protective systems inspected by a Registered Professional Engineer (RPE) after repairs and before being placed back into service	Y	N	N/A
E.	Protective systems installed without exposing employees to the hazards of cave-ins, collapses or from being struck by materials or equipment	Y	N	N/A
F.	Members of support system securely fastened to prevent failure	Y	N	N/A
G.	Support systems provided to insure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.	Y	N	N/A
H.	Excavations below the level of the base or footing approved by an RPE	Y	N	N/A
I.	Removal of support systems progresses from the bottom and members are released slowly as to note any indication of possible failure	Y	N	N/A
J.	Backfilling progresses with removal of support system	Y	N	N/A
K.	Excavation of material to a level no greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth	Y	N	N/A
L.	Shield system placed to prevent lateral movement	Y	N	N/A
M.	Employee are prohibited from remaining in shield system during vertical movement	Y	N	N/A

VII. Comments

APPENDIX A-11
DRILLERS DAILY REPORTS

LAYNE ENVIRONMENTAL SERVICES, INC.

DRILLER'S DAILY DRILL REPORT

DRILLING /PROJECT INFORMATION

"SATURDAY"

CLIENT: GROUNDWATER TECH — Date 3-30 199 6

DRILLING LOCATION: HOLLOMAN AFB — ALAMAGORDO — JOB NO. 50 5044

PERSONNEL EMPLOYED		TOTAL HOURS
DRILLER/OPER.	DON VIRSNIS	13.0
HELPER	TONY KELLY	13.0
LABORER	JESUS	
GROUTER		
DEV. RIG OPER.		
LABORER		
PROJECT MAN.	DAVE HAGAN	
FIELD SUPER.	D. VIRSNIS	

EQUIPMENT EMPLOYED		
DESCRIPTION	UNIT NO.	
Drill Rig (F-10)	468	
Pipe Truck		
Crew Truck (FLATBED)	LIC# PT1-600	
Grout Plant		
Steam Cleaner	YES	
Development Rig		
Generator	YES	
Compressor		
Booster		
Mud Pump		
Water Truck		
Supply [redacted]/Trailer (BIL TEX)	YES	
Backhoe/Forklift		

ACCOUNTING FOR DAILY ACTIVITY BY ITEM

ITEM #	DESCRIPTION OF ITEM	HOURS
1.	Mob: ☐ Demob: ☒ 108 miles to EL PASO	2.0
2.	Daily travel to the field _____ miles	
3.	Orientation/Safety Mtg. [redacted] TAIL GATE	.25
4.	Drilling (hammer) (_____ hrs. Rotary Conversion).	
5.	Drilling (rotary).	
6.	Drilling (auger). DRILL & SAMPLE & PULL	[redacted]
7.	Drilling (coring).	1.5
8.	Sampling (S.SPN., Shelby, etc.)	
9.	Pull out drill pipe.	
10.	Abandon hole.	
11.	Water testing.	
12.	Clean out hole.	
13.	Well construction (below grade). SET WELLS	3.25
14.	Decontamination. & PUMP OFF PIT	2.25
15.	Site clean-up/Spoils handling.	.25
16.	Move between holes. & SET UP	1.0
17.	Water hauling. _____ gallons	
18.	Suface completion.	
19.	Alignment test.	
20.	Development.	
21.	Work on stuck pipe.	
22.	Stand by with crew.	
23.	Standby without crew.	
24.	LOAD & UNLOAD	1.25
25.	HAUL AUGERS	0.5
26.	FINAL JOB WALK & PREPARATION	.25
27.		
28.		
29.	Yard time (EL PASO SHOP & LUNCH)	0.5
30.	Scheduled Maintenance & P.M. Service.	
31.	Unscheduled repairs.	

EVENTS / CONDITIONS CHANGES: (6:45 — TOTAL HOURS 13.0

(6:45 to 7:00 - LOAD SUPPLIES) (7:00 to 7:15 - TAIL GATE) (7:15 to 7:30 - GET SET UP) → (7:30 to 9:30 FINISH SECTION 30' OF WELL SMP 03) (9:30 to 9:45 - CLEAN UP) (9:45 to 10:00 - MOVE OFF MW-04) (10:00 to 10:30 - GET TRAILER & AUGERS) (10:30 to 10:45 - HAUL AUGERS) (10:45 to 11:00 - DRILL to 14') (11:00 to 11:45 - SET WELL AT 13') (11:45 to 12:00 - MOVE UP ON MW-03) (12:00 to 12:15 - HAUL AUGERS) (12:15 to 1:15 - DRILL & SAMPLE to 15' & SET WELL AT 14') (1:15 to 1:45 - MOVE OFF SITE & LOAD RIG UP) (1:45 to 2:00 - DRIVE AREA & → UNLOAD AUGERS & PUMP TANK) (2:00 to - DRIVE AUGERS & TOOL V-11 LOAD UP TRAILER & LUNCH) / - MEET @ CLIENT & CHECK SITE & PREPARE - DRIVE TO EL PASO - EL PASO SHOP)

FROM	TO	ITEM #
5:00 AM	5:30 AM	
5:30 AM	6:00 AM	
6:00 AM	6:30 AM	
6:30 AM	7:00 AM	
7:00 AM	7:30 AM	
7:30 AM	8:00 AM	
8:00 AM	8:30 AM	
8:30 AM	9:00 AM	
9:00 AM	9:30 AM	
9:30 AM	10:00 AM	
10:00 AM	10:30 AM	
10:30 AM	11:00 AM	
11:00 AM	11:30 AM	
11:30 AM	12:00 N	
12:00 N	12:30 PM	
12:30 PM	1:00 PM	
1:00 PM	1:30 PM	
1:30 PM	2:00 PM	
2:00 PM	2:30 PM	
2:30 PM	3:00 PM	
3:00 PM	3:30 PM	
3:30 PM	4:00 PM	
4:00 PM	4:30 PM	
4:30 PM	5:00 PM	
5:00 PM	5:30 PM	
5:30 PM	6:00 PM	
6:00 PM	6:30 PM	
6:30 PM	7:00 PM	
7:00 PM	7:30 PM	
7:30 PM	8:00 PM	
8:00 PM	8:30 PM	
8:30 PM	9:00 PM	
9:00 PM	9:30 PM	
9:30 PM	10:00 PM	
10:00 PM	10:30 PM	
10:30 PM	11:00 PM	
11:00 PM	11:30 PM	
11:30 PM	12:00 PM	
12:00 PM	12:30 AM	
12:30 AM	1:00 AM	
1:00 AM	1:30 AM	
1:30 AM	2:00 AM	
2:00 AM	2:30 AM	
2:30 AM	3:00 AM	
3:00 AM	3:30 AM	
3:30 AM	4:00 AM	
4:00 AM	4:30 AM	
4:30 AM	5:00 AM	

HOLE #		SMP 03	MW-03	MW-04			TOTALS
PREVIOUS FOOTAGE DRILLED		40'	Ø	Ø			40'
FOOTAGE DRILLED THIS DATE		Ø	2	2		SAMPLES TAKEN	16
SAMPLES TAKEN THIS DATE		Ø	14'	15'		DRILLED	29'
PROTECTIVE CASING	FROM						
	TO						
CONDUCTOR CASING	FROM						
	TO						
CEMENT SEAL	FROM						
	TO						
BENT. SEAL	FROM						
	TO						
SANO PACK	FROM						
	TO						
BLANK CASING	FROM						
	TO						
SCREEN	FROM						
	TO						
WATER LEVEL		9'	8'	9'			
FORMATION DESCRIPTION	FROM						
	TO						
	FROM						
	TO						
	FROM						
	TO						

FINISH SECTION LAST 30' WELL & SEAL — DRILL & SAMPLE & SET WELL 3" AT 13' — DRILL & SAMPLE & SET 3" WELL AT 14'5"

DRILLING SUPPLIES • CONSTRUCTION MATERIALS SAFETY EQUIPMENT • MISCELLANEOUS

QTY.	DESCRIPTION
	____"X____' Steel Well Protector
	____"X____' Steel Guard Posts
	Bags: Concrete Mix
	Flush Traffic Vault: Size
	Padlock: Keyed
	Bags: Portland Type II Cement
	Bags: Grout-Volclay/Enviroplug
16	Pails: Bentonite Pellets-Size 1/4"
	Bags: Bentonite Chips-Size
	Bags: Bentonite Gel Powder
20	Bags: Sand-Grade 10/20
	Bags: Sand-Grade
3	Top Cap/Plug: Type LOCKING CAPS
	Low-Carbon Steel Casing: Size
	____"X 5' Casing: PVC/S.S.
20	2 "X 10' Casing: PVC/~~S.S.~~ SCH 40
USE BELOW	____"X 5' Screen-Slot Size
	____"X 10' Screen-Slot Size
	Centralizers-Size
	____"X ____' Sump
3	Bottom Caps
	55 Gal. Drums-17H Rated
	____" ____ Sample Liners
	____"X ____' Split Spoon Bodies
	____" Blunt Spoon Shoes
	____" Steel Finger Baskets
	Visqueen Tarps 6 mil.
	Drill Bits-Size
10	2"x6" BRASS TUBES
20	2" END CAPS
20	TEFLON SQUARES
1	2"x 2'-020 SCREEN (SCH 80)
20	2"x 10' CASING (SCH 40)
20	2" x 10' SCREEN (SCH 40)
9	COCK VALVES

ALL APPLICABLE HOURS, FOOTAGE, SUPPLIES, ETC. SUPPLIED ARE TO BE CONSIDERED CHARGEABLE

DRILLER/OPER. REMARKS & APPROVAL D. VIRSNIS

FIELD SUPER. REMARKS & APPROVAL

CLIENTS REMARKS:

CLIENTS APPROVAL [signature]

OF CREW WITH CHARAGEABLE PER DIEM THIS DATE 2

OF CREW UNDER LEVEL _____ PERSONAL PROTECTION THIS DATE

LAYNE ENVIRONMENTAL SERVICES, INC.

DRILLER'S DAILY DRILL REPORT

DRILLING /PROJECT INFORMATION

"MONDAY"

CLIENT: GROUNDWATER TECH

Date 3-25 199 6

DRILLING LOCATION: HOLLOMAN AFB ALAMOGORDO JOB NO. 50-5044

EMPLOYEE'S NAMES		TOTAL HOURS
PERSONNEL EMPLOYED	DRILLER/OPER. DON KIESNIS	12.75
	HELPER TONY KENT	12.75
	LABORER	
	GROUTER	
	DEV. RIG OPER.	
	LABORER	
	PROJECT MAN. DALE HOGAN	
	FIELD SUPER.	

EQUIPMENT EMPLOYED DESCRIPTION	UNIT NO.
Drill Rig. (F-10)	468
Pipe Truck	
Crew Truck (FLATBED)	YES
Grout Plant	
Steam Cleaner	YES
Development Rig.	
Generator	
Compressor	
Booster	
Mud Pump.	
Water Truck	
Supply [redacted]/Trailer	YES
Backhoe/Forklift	

ACCOUNTING FOR DAILY ACTIVITY BY ITEM

ITEM #	DESCRIPTION OF ITEM	HOURS
1.	Mob: ☒ Demob: ☐ 109 miles	2.0
2.	Daily travel to the field. _____ miles	
3.	Orientation/Safety Mtg. [redacted]	0.5
4.	Drilling (hammer) (_____ hrs. Rotary Conversion).	
5.	Drilling (rotary).	
6.	Drilling (auger). DRILL & SAMPLE	1.25
7.	Drilling (coring).	
8.	Sampling (S.SPN., Shelby, etc.)	
9.	Pull out drill pipe.	
10.	[redacted] HAND AUGER TO 5'	.25
11.	Water testing.	
12.	Clean out hole.	
13.	Well construction (below grade). SET WELL	.75
14.	Decontamination. & LOAD TRUCK	0.5
15.	Site clean-up/Spoils handling. DUMP CUTTINGS	0.5
16.	Move between holes. & SET UP	1.25
17.	Water hauling. _____ gallons	
18.	Suface completion.	
19.	[redacted] SET BENTONITE SEAL	.75
20.	Development.	
21.	Work on stuck pipe.	
22.	Stand by with crew. WAITING WATER LEVEL	0.5
23.	Standby without crew.	
24.	CHECK INTO BASE & WAITING	0.5
25.	SITE WALK	0.5
26.	LAY PLYWOOD	.25
27.	SET UP STANDING & DECON	1.0
28.	BUILD SOIL DUMP AREA	.25
29.	Yard time (FINISH LOADING UP)	2.0
30.	Scheduled Maintenance & P.M. Service.	
31.	Unscheduled repairs.	
	TOTAL HOURS	12.75

EVENTS / CONDITIONS CHANGES: (6:00 TO 6:45)

FROM	TO	ITEM #
5:00 AM	5:30 AM	
5:30 AM	6:00 AM	
6:00 AM	6:30 AM	
6:30 AM	7:00 AM	
7:00 AM	7:30 AM	
7:30 AM	8:00 AM	
8:00 AM	8:30 AM	
8:30 AM	9:00 AM	
9:00 AM	9:30 AM	
9:30 AM	10:00 AM	
10:00 AM	10:30 AM	
10:30 AM	11:00 AM	
11:00 AM	11:30 AM	
11:30 AM	12:00 N	
12:00 N	12:30 PM	
12:30 PM	1:00 PM	
1:00 PM	1:30 PM	
1:30 PM	2:00 PM	
2:00 PM	2:30 PM	
2:30 PM	3:00 PM	
3:00 PM	3:30 PM	
3:30 PM	4:00 PM	
4:00 PM	4:30 PM	
4:30 PM	5:00 PM	
5:00 PM	5:30 PM	
5:30 PM	6:00 PM	
6:00 PM	6:30 PM	
6:30 PM	7:00 PM	
7:00 PM	7:30 PM	
7:30 PM	8:00 PM	
8:00 PM	8:30 PM	
8:30 PM	9:00 PM	
9:00 PM	9:30 PM	
9:30 PM	10:00 PM	
10:00 PM	10:30 PM	
10:30 PM	11:00 PM	
11:00 PM	11:30 PM	
11:30 PM	12:00 PM	
12:00 PM	12:30 PM	
12:30 AM	1:00 AM	
1:00 AM	1:30 AM	
1:30 AM	2:00 AM	
2:00 AM	2:30 AM	
2:30 AM	3:00 AM	
3:00 AM	3:30 AM	
3:30 AM	4:00 AM	
4:00 AM	4:30 AM	
4:30 AM	5:00 AM	

HOLE #		MW-03					TOTALS
PREVIOUS FOOTAGE DRILLED		Ø					Ø
FOOTAGE DRILLED THIS DATE		18'					18'
SAMPLES TAKEN THIS DATE		2					2
PROTECTIVE CASING	FROM						
	TO	TOTAL 2" WELL					
CONDUCTOR CASING	FROM						
	TO						
CEMENT SEAL	FROM						
	TO						
BENT. SEAL	FROM						
	TO						
SAND PACK	FROM						
	TO						
BLANK CASING	FROM						
	TO						
SCREEN	FROM	DRILL & SAMPLE					
	TO						
WATER LEVEL		13'					
FORMATION DESCRIPTION	FROM						
	TO						
	FROM						
	TO						
	FROM						
	TO						

DRILLING SUPPLIES • CONSTRUCTION MATERIALS
SAFETY EQUIPMENT • MISCELLANEOUS

QTY.	DESCRIPTION
	____"X____' Steel Well Protector
	____"X____' Steel Guard Posts
	Bags: Concrete Mix
	Flush Traffic Vault: Size
	Padlock: Keyed
	Bags: Portland Type II Cement
	Bags: Grout-Volclay/Enviroplug
2	Pails: Bentonite Pellets-Size
	Bags: Bentonite Chips-Size
	Bags: Bentonite Gel Powder
4	Bags: Sand-Grade 12/20
	Bags: Sand-Grade
	Top Cap/Plug: Type
	Low-Carbon Steel Casing: Size
	____"X 5' Casing: PVC/S.S.
10'	2 "X 10' Casing: PVC/S.S.
	____"X 5' Screen-Slot Size
10'	2 "X 10' Screen-Slot Size
	Centralizers-Size
	____"X ____' Sump
1	Bottom Caps
	55 Gal. Drums-17H Rated
	____" ____ Sample Liners
	____"X ____' Split Spoon Bodies
	____" Blunt Spoon Shoes
	____" Steel Finger Baskets
	Visqueen Tarps 6 mil.
	Drill Bits-Size
8	2" x 6" BRASS TUBES
16	2" END CAPS
10	SHEETS OF PLYWOOD

ALL APPLICABLE HOURS, FOOTAGE, SUPPLIES, ETC. SUPPLIED ARE TO BE CONSIDERED CHARGEABLE

DRILLER/OPER. REMARKS & APPROVAL D. KIESNIS

FIELD SUPER. REMARKS & APPROVAL

CLIENTS REMARKS:

CLIENTS APPROVAL: [illegible]

OF CREW WITH CHARAGEABLE PER DIEM THIS DATE 2

OF CREW UNDER LEVEL _____ PERSONAL PROTECTION THIS DATE

CLIENT'S COPY

LAYNE ENVIRONMENTAL SERVICES, INC.

DRILLER'S DAILY DRILL REPORT

DRILLING /PROJECT INFORMATION

"TUESDAY"

CLIENT: GROUNDWATER TECH

Date 3-26 1996

DRILLING LOCATION: HOLLOMAN AFB ALAMOGORDO

JOB NO. SD-5044

EMPLOYEE'S NAMES		TOTAL HOURS
PERSONNEL EMPLOYED	DRILLER/OPER. DOU KIESUS	12.75
	HELPER TONY KELIT	12.75
	LABORER ABEL GOMEZ	12.75
	GROUTER	
	DEV. RIG OPER.	
	LABORER	
	PROJECT MAN. DAVE HOGAN	
	FIELD SUPER. DOU KIESUS	

EQUIPMENT EMPLOYED DESCRIPTION	UNIT NO.
Drill Rig. (F-10)	4168
Pipe Truck	
Crew Truck (FLATBED)	LICA PFI-6082
Grout Plant	
Steam Cleaner	YES
Development Rig.	
Generator	YES
Compressor	
Booster	
Mud Pump.	
Water Truck	
[redacted]/Trailer (BIG TEX'S)	5 WHEEL
Backhoe/Forklift	

ACCOUNTING FOR DAILY ACTIVITY BY ITEM

ITEM #	DESCRIPTION OF ITEM	HOURS
1.	Mob: ☐ Demob: ☐ _____ miles	
2.	Daily travel to the field. _____ miles	
3.	Orientation Safety Mtg. [redacted] (SAFETY SHEET)	.25
4.	Drilling (hammer) (_____ hrs. Rotary Conversion).	
5.	Drilling (rotary).	
6.	Drilling (auger) DRILL & SAMPLE & REIM	4.25
7.	Drilling (coring).	
8.	Sampling (S.SPN., Shelby, etc.)	
9.	Pull out drill pipe.	
10.	Abandon hole.	
11.	Water testing.	
12.	Clean out [redacted] WOOD PLUG, THEN SIDEWALK	1.0
13.	Well construction (below grade). SET WELL	3.5
14.	Decontamination.	1.5
15.	Site clean-up/Spoils handling.	0.5
16.	Move between holes. SET UP	.75
17.	Water hauling. _____ gallons	
18.	Suface completion.	
19.	Alignment test.	
20.	Development.	
21.	Work on stuck pipe.	
22.	Stand by with crew.	
23.	Standby without crew.	
24.	LOAD & UNLOAD - AUGERS & SUPPLIES	
25.	HAND AUGER	.25
26.	GET 1 DAY PASS & TEMP	0.5
27.	BUILD DECON PAD	.25
28.		
29.	Yard time	
30.	Scheduled Maintenance & P.M. Service.	
31.	Unscheduled repairs.	
	TOTAL HOURS	12.75

FROM	TO	ITEM #
5:00 AM	5:30 AM	
5:30 AM	6:00 AM	
6:00 AM	6:30 AM	
6:30 AM	7:00 AM	
7:00 AM	7:30 AM	
7:30 AM	8:00 AM	
8:00 AM	8:30 AM	
8:30 AM	9:00 AM	
9:00 AM	9:30 AM	
9:30 AM	10:00 AM	
10:00 AM	10:30 AM	
10:30 AM	11:00 AM	
11:00 AM	11:30 AM	
11:30 AM	12:00 N	
12:00 N	12:30 PM	
12:30 PM	1:00 PM	
1:00 PM	1:30 PM	
1:30 PM	2:00 PM	
2:00 PM	2:30 PM	
2:30 PM	3:00 PM	
3:00 PM	3:30 PM	
3:30 PM	4:00 PM	
4:00 PM	4:30 PM	
4:30 PM	5:00 PM	
5:00 PM	5:30 PM	
5:30 PM	6:00 PM	
6:00 PM	6:30 PM	
6:30 PM	7:00 PM	
7:00 PM	7:30 PM	
7:30 PM	8:00 PM	
8:00 PM	8:30 PM	
8:30 PM	9:00 PM	
9:00 PM	9:30 PM	
9:30 PM	10:00 PM	
10:00 PM	10:30 PM	
10:30 PM	11:00 PM	
11:00 PM	11:30 PM	
11:30 PM	12:00 PM	
12:00 PM	12:30 AM	
12:30 AM	1:00 AM	
1:00 AM	1:30 AM	
1:30 AM	2:00 AM	
2:00 AM	2:30 AM	
2:30 AM	3:00 AM	
3:00 AM	3:30 AM	
3:30 AM	4:00 AM	
4:00 AM	4:30 AM	
4:30 AM	5:00 AM	

HOLE #		JMP D3						TOTALS
PREVIOUS FOOTAGE DRILLED		Ø						Ø
FOOTAGE DRILLED THIS DATE		41'						41'
SAMPLES TAKEN THIS DATE		8						8
PROTECTIVE CASING	FROM							
	TO	SET						
CONDUCTOR CASING	FROM	4"						
	TO	10'						
CEMENT SEAL	FROM	REIM @						
	TO							
BENT. SEAL	FROM	1/4"						
	TO							
SAND PACK	FROM	SAMPLE @						
	TO							
BLANK CASING	FROM							
	TO							
SCREEN	FROM	DRILL						
	TO							
WATER LEVEL		9'						
FORMATION DESCRIPTION	FROM							
	TO							
	FROM							
	TO							
	FROM							
	TO							

DRILLING SUPPLIES • CONSTRUCTION MATERIALS SAFETY EQUIPMENT • MISCELLANEOUS

QTY.	DESCRIPTION
	____"X____' Steel Well Protector
	____"X____' Steel Guard Posts
	Bags: Concrete Mix
	Flush Traffic Vault: Size _____
	Padlock: Keyed _____
	Bags: Portland Type II Cement
	Bags: Grout-Volclay/Enviroplug
19	Pails: Bentonite Pellets-Size 1/4"
	Bags: Bentonite Chips-Size _____
	Bags: Bentonite Gel Powder
25	Bags: Sand-Grade 10/20
	Bags: Sand-Grade _____
	Top Cap/Plug: Type _____
	Low-Carbon Steel Casing: Size _____
	____"X 5' Casing: PVC/S.S. _____
90'	2 "X 10' Casing: PVC/[redacted] _____
LOCK BELOW	1 "X 5' Screen-Slot Size _____
	1 "X 10' Screen-Slot Size _____
	Centralizers-Size _____
	____"X ____' Sump
2	Bottom Caps
	55 Gal. Drums-17H Rated
	____" ____ Sample Liners
	____"X ____' Split Spoon Bodies
	____" Blunt Spoon Shoes
1	2 " Steel Finger Baskets
1	Visqueen Tarps 6 mil. (20' x 100')
	Drill Bits-Size _____
32	2" BRASS TUBES
64	2" END CAP
64	TEFLON SQUARES
2	2'x2'- OSB SCREEN
1	10/4 WOOD PLUG

EVENTS / CONDITIONS / CHANGES: (6:30 TO 7:15)

(6:30 TO 7:00 MEET & GET 1 DAY PASS)(7:00 TO 7:15 - BUILD DECON PAD)(7:15 TO 7:30 - DEDOU AUGERS)(7:30 TO 7:45 - FILL OUT SAFETY SHEET)(7:45 TO 8:00 - TAKE STEAMER OVER TO SITE)(8:00 TO 8:15 - SPRAY OFF 10/4)(8:15 TO 8:30 - SET UP ON SMP-03)(8:30 TO 8:45 - HAND AUGER TO 5')(8:45 TO 11:45 - D&S TO 40' @ 4/4 + ADJ)(11:45 TO 12:45 - DECON AUGERS 4/4)(12:45 TO 3:00 - D. DRILL @ 10/4 TO 41')(3:00 TO 3:00 - GET PLUG KNOCK OUT)(3:00 TO 6:30 - SET TRIPLE NESTED AIR SPARGE WELLS)(6:30 TO 7:00 - CLEAN UP SITE)(7:00 TO 7:15 - DROP TRAILER OFF AT DECON AREA)

ALL APPLICABLE HOURS, FOOTAGE, SUPPLIES, ETC. SUPPLIED ARE TO BE CONSIDERED CHARGEABLE

DRILLER/OPER. REMARKS & APPROVAL D. KIESUS

FIELD SUPER. REMARKS & APPROVAL

CLIENTS REMARKS:

CLIENTS APPROVAL: [signature]

OF CREW WITH CHARAGEABLE PER DIEM THIS DATE 2

OF CREW UNDER LEVEL _____ PERSONAL PROTECTION THIS DATE

CLIENT'S COPY

FORM NO. LES-3-37

LAYNE ENVIRONMENTAL SERVICES, INC.

DRILLER'S DAILY DRILL REPORT

DRILLING / PROJECT INFORMATION

"WEDNESDAY"

CLIENT: GROUNDWATER TECH

Date 3-27 1996

DRILLING LOCATION: HOLLOMAN AFB ALAMOGORDO JOB NO. 50-5044

EMPLOYEE'S NAMES		TOTAL HOURS
PERSONNEL EMPLOYED	DRILLER/OPER. DON KIRSUIS	14.75
	HELPER TOLLY KELT	14.75
	LABORER ABEL GOMEZ	9.0
	GROUTER	
	DEV. RIG OPER.	
	LABORER	
	PROJECT MAN. DAVE HOGAN	
	FIELD SUPER. D KIRSUIS	

EQUIPMENT EMPLOYED: DESCRIPTION	UNIT NO.
Drill Rig. (F-10)	4168
Pipe Truck	
Crew Truck (FLATBED)	UC # 011-6021
Grout Plant	
Steam Cleaner	YES
Development Rig	
Generator	YES
Compressor	
Booster	
Mud Pump	
Water Truck	
Supply [redacted] Trailer (BILTEX)	YES
Backhoe/Forklift	

ACCOUNTING FOR DAILY ACTIVITY BY ITEM

ITEM #	DESCRIPTION OF ITEM	HOURS
1.	Mob: ☐ Demob: ☐ ____ miles	
2.	Daily travel to the field. DOD miles TO & FROM EL PASO	0.75
3.	Orientation/Safety Mtg. Rig Up/Dn. TAIL GATE	.25
4.	Drilling (hammer) (____ hrs. Rotary Conversion).	
5.	Drilling (rotary).	
6.	Drilling (auger). DRILL & SAMPLE & DRIL	3.25
7.	Drilling (coring).	
8.	Sampling (S.SPN., Shelby, etc.)	
9.	Pull out drill pipe.	
10.	Abandon hole.	
11.	Water testing.	
12.	Clean out hole.	
13.	Well construction (below grade). SET WELL	1.25
14.	Decontamination.	1.75
15.	Site clean-up/Spoils handling.	0.5
16.	Move between holes. & SET UP	1.25
17.	Water hauling. ____ gallons	
18.	Suface completion.	
19.	[redacted] DRILLER EL PASO (7:30 TO 9:00)	NIC
20.	[redacted] ON SITE EARLY	.25
21.	Work on stuck pipe.	
22.	Stand by with crew. WAITING ON LOCATION	1.0
23.	Standby without crew.	
24.	LOAD & UNLOAD AUGERS & SUPPLIES	0.5
25.	HAUL AUGER.	.75
26.	BUILD CONTAINMENT PIT	.25
27.	CALLS TO LAYNE & MEET @ CLIENT	1.0
28.	GET MORE TIMBERS	0.5
29.	Yard time AIRPORT & PART STORE	0.5
30.	Scheduled Maintenance & P.M. Service.	
31.	Unscheduled repairs.	
	TOTAL HOURS	14.75

FROM	TO	ITEM #
5:00 AM	5:30 AM	
5:30 AM	6:00 AM	
6:00 AM	6:30 AM	
6:30 AM	7:00 AM	
7:00 AM	7:30 AM	
7:30 AM	8:00 AM	
8:00 AM	8:30 AM	
8:30 AM	9:00 AM	
9:00 AM	9:30 AM	
9:30 AM	10:00 AM	
10:00 AM	10:30 AM	
10:30 AM	11:00 AM	
11:00 AM	11:30 AM	
11:30 AM	12:00 N	
12:00 N	12:30 PM	
12:30 PM	1:00 PM	
1:00 PM	1:30 PM	
1:30 PM	2:00 PM	
2:00 PM	2:30 PM	
2:30 PM	3:00 PM	
3:00 PM	3:30 PM	
3:30 PM	4:00 PM	
4:00 PM	4:30 PM	
4:30 PM	5:00 PM	
5:00 PM	5:30 PM	
5:30 PM	6:00 PM	
6:00 PM	6:30 PM	
6:30 PM	7:00 PM	
7:00 PM	7:30 PM	
7:30 PM	8:00 PM	
8:00 PM	8:30 PM	
8:30 PM	9:00 PM	
9:00 PM	9:30 PM	
9:30 PM	10:00 PM	
10:00 PM	10:30 PM	
10:30 PM	11:00 PM	
11:00 PM	11:30 PM	
11:30 PM	12:00 PM	
12:00 PM	12:30 AM	
12:30 AM	1:00 AM	
1:00 AM	1:30 AM	
1:30 AM	2:00 AM	
2:00 AM	2:30 AM	
2:30 AM	3:00 AM	
3:00 AM	3:30 AM	
3:30 AM	4:00 AM	
4:00 AM	4:30 AM	
4:30 AM	5:00 AM	

HOLE #		MW-01	SP 01	SMP-01			TOTALS
PREVIOUS FOOTAGE DRILLED		Ø	Ø				Ø
FOOTAGE DRILLED THIS DATE		16'	41'				57
SAMPLES TAKEN THIS DATE		2					10
PROTECTIVE CASING	FROM						
	TO	15'					
CONDUCTOR CASING	FROM						
	TO						
CEMENT SEAL	FROM						
	TO						
BENT. SEAL	FROM						
	TO						
SAND PACK	FROM						
	TO						
BLANK CASING	FROM						
	TO						
SCREEN	FROM						
	TO						
WATER LEVEL		9'	9'				
FORMATION DESCRIPTION	FROM						
	TO						
	FROM						
	TO						
	FROM						
	TO						

DRILL & SAMPLE & SET 3" WELL TO 15'

DRILL & SAMPLE TO 40' & PULL & BOXED HOLE

MOVE RIG OVER & SET UP ONLY

DRILLING SUPPLIES • CONSTRUCTION MATERIALS SAFETY EQUIPMENT • MISCELLANEOUS	
QTY.	DESCRIPTION
	____"X ____' Steel Well Protector
	____"X ____' Steel Guard Posts
	Bags: Concrete Mix
	Flush Traffic Vault: Size
	Padlock: Keyed
	Bags: Portland Type II Cement
	Bags: Grout-Volclay/Enviroplug
1	Pails: Bentonite Pellets-Size 1/4"
	Bags: Bentonite Chips-Size
	Bags: Bentonite Gel Powder
7	Bags: Sand-Grade 10/20
	Bags: Sand-Grade
1	Top Cap/Plug: Type LOCKING CAP
	Low-Carbon Steel Casing: Size
5	2 "X 5' Casing: PVC/S.S.
	____"X 10' Casing: PVC/S.S.
	____"X 5' Screen-Slot Size
10'	2 "X 10' Screen-Slot Size
	Centralizers-Size
	____"X ____' Sump
1	Bottom Caps
	55 Gal. Drums-17H Rated
	____" ____ Sample Liners
	____"X ____' Split Spoon Bodies
	____" Blunt Spoon Shoes
	____" Steel Finger Baskets
	Visqueen Tarps 6 mil.
	Drill Bits-Size
40	8"x16" BRASS TUBES
80	8" ELB CAPS
80	TEFLON SQUARES

EVENTS / CONDITIONS / CHANGES: (10:45 TO 11:00)

(10:45 TO 7:00 - ON SITE)(7:00 TO 7:15 - SAFETY MEETING)(7:15 TO 7:30 - START DECON)(7:30 TO 8:00 - GET TIMBERS)(8:00 TO 8:15 - FINISH CONTAINMENT PIT)(8:15 TO 8:45 - MOVE RIG OFF HOLE)(8:45 TO 9:00 - CLEAN LAST AREA)(9:00 TO 9:30 - HAUL AUGER & MOVE HAUL AUGER AGAIN)(9:30 TO 9:45 - GET TRAILER & SUPPLIES)(9:45 TO 10:30 - D&S TO 15')(10:30 TO 10:45 - SET WELL AT 15')(10:45 TO 11:00 - CLEAN UP)(11:00 TO 11:15 - M&S UP ON SP 01)(11:15 TO 11:30 - HAUL AUGER)(11:30 TO 3:00 - D&S TO 40')(3:00 TO 3:15 - DECON TO UNLOAD)(3:15 TO 3:15 - CALL TO LAYNE & MEET @ CLIENT WEST SIDE OF 3')(3:15 TO 3:45 - DROP OFF 4" AUGER & PUMP PIT)(3:45 TO 4:45 - WAITING FOR NEW LOCATION - CALLS)(4:45 TO 5:15 - M&S UP ON SMP-01 & UNLOAD AUGERS)(5:15 TO 7:30 - TRAVEL TO EL PASO)(7:30 TO 9:00 - DRIVER NIC)(9:00 TO 9:30 - AIRPORT)(9:30 TO 11:00 - TRAVEL TO ALAMOGORDO)

TOTAL HOURS 14.75

ALL APPLICABLE HOURS, FOOTAGE, SUPPLIES, ETC. SUPPLIED ARE TO BE CONSIDERED CHARGEABLE

DRILLER/OPER. REMARKS & APPROVAL D Kirsuis

FIELD SUPER. REMARKS & APPROVAL

CLIENTS REMARKS:

CLIENTS APPROVAL: S. Etsa

# OF CREW WITH CHARAGEABLE PER DIEM THIS DATE	2
# OF CREW UNDER LEVEL PERSONAL PROTECTION THIS DATE	

FORM NO. LES 4-90

LAYNE ENVIRONMENTAL SERVICES, INC.

DRILLER'S DAILY DRILL REPORT

DRILLING /PROJECT INFORMATION

"THURSDAY"

CLIENT: GROUNDWATER TECH

Date 3-28 1996

DRILLING LOCATION: HOLLOMAN AFB ALAMOGORDO JOB NO. 50-5044

EMPLOYEE'S NAMES	TOTAL HOURS
DRILLER/OPER. DON KIRSNIS	12.25
HELPER JOHN KELT	12.25
LABORER ABEL GOMEZ	8.0
GROUTER	
DEV. RIG OPER.	
LABORER	
PROJECT MAN. DAVE HOGAN	
FIELD SUPER. D KIRSNIS	

EQUIPMENT EMPLOYED: DESCRIPTION	UNIT NO.
Drill Rig. (F-10)	468
Pipe Truck	
Crew Truck (FLATBED)	LIC # PTI-602
Grout Plant	
Steam Cleaner	YES
Development Rig.	
Generator	YES
Compressor	
Booster	
Mud Pump.	
Water Truck	
Supply [redacted] Trailer (BIG TEX)	YES
Backhoe/Forklift	

ACCOUNTING FOR DAILY ACTIVITY BY ITEM

ITEM #	DESCRIPTION OF ITEM	HOURS
1.	Mob: ☐ Demob: ☐ _____ miles	
2.	Daily travel to the field. _____ miles	
3.	Orientation/Safety Mtg. [redacted] TAILGATE	.25
4.	Drilling (hammer) (_____ hrs. Rotary Conversion).	
5.	Drilling (rotary).	
6.	Drilling (auger). DRILL & SAMPLE & PULL	4.0
7.	Drilling (coring).	
8.	Sampling (S.SPN., Shelby, etc.)	
9.	Pull out drill pipe.	
10.	Abandon hole.	
11.	Water testing.	
12.	Clean out hole.	
13.	Well construction (below grade). SET WELLS	2.0
14.	Decontamination. & PUMP OFF PIT	2.0
15.	Site clean-up/Spoils handling.	.25
16.	Move between holes. & SET UP	.25
17.	Water hauling. _____ gallons	
18.	Suface completion.	
19.	[redacted] ON SITE EARLY - GET DRILL	.25
20.	Development.	
21.	[redacted] TEST SEAL SET UP	0.5
22.	Stand by with crew. WAIT FOR GEO'S [illegible]	0.5
23.	Standby without crew.	
24.	LOAD & UNLOAD	.75
25.	HAND AUGER	0.5
26.	GET 3 DAY PASSES	0.5
27.	GO GET GAS CAN & GAS	0.5
28.		
29.	Yard time	
30.	Scheduled Maintenance & P.M. Service.	
31.	Unscheduled repairs.	

TOTAL HOURS 12.25

FROM	TO	ITEM #
5:00 AM	5:30 AM	
5:30 AM	6:00 AM	
6:00 AM	6:30 AM	
6:30 AM	7:00 AM	
7:00 AM	7:30 AM	
7:30 AM	8:00 AM	
8:00 AM	8:30 AM	
8:30 AM	9:00 AM	
9:00 AM	9:30 AM	
9:30 AM	10:00 AM	
10:00 AM	10:30 AM	
10:30 AM	11:00 AM	
11:00 AM	11:30 AM	
11:30 AM	12:00 N	
12:00 N	12:30 PM	
12:30 PM	1:00 PM	
1:00 PM	1:30 PM	
1:30 PM	2:00 PM	
2:00 PM	2:30 PM	
2:30 PM	3:00 PM	
3:00 PM	3:30 PM	
3:30 PM	4:00 PM	
4:00 PM	4:30 PM	
4:30 PM	5:00 PM	
5:00 PM	5:30 PM	
5:30 PM	6:00 PM	
6:00 PM	6:30 PM	
6:30 PM	7:00 PM	
7:00 PM	7:30 PM	
7:30 PM	8:00 PM	
8:00 PM	8:30 PM	
8:30 PM	9:00 PM	
9:00 PM	9:30 PM	
9:30 PM	10:00 PM	
10:00 PM	10:30 PM	
10:30 PM	11:00 PM	
11:00 PM	11:30 PM	
11:30 PM	12:00 PM	
12:00 PM	12:30 AM	
12:30 AM	1:00 AM	
1:00 AM	1:30 AM	
1:30 AM	2:00 AM	
2:00 AM	2:30 AM	
2:30 AM	3:00 AM	
3:00 AM	3:30 AM	
3:30 AM	4:00 AM	
4:00 AM	4:30 AM	
4:30 AM	5:00 AM	

HOLE #		SMP-01						TOTALS
PREVIOUS FOOTAGE DRILLED		0						0
FOOTAGE DRILLED THIS DATE		42'						42
SAMPLES TAKEN THIS DATE		8						8
PROTECTIVE CASING	FROM	SET WELLS						
	TO							
CONDUCTOR CASING	FROM							
	TO							
CEMENT SEAL	FROM	REIM & SET WELLS						
	TO							
BENT. SEAL	FROM	PULL						
	TO							
SAND PACK	FROM							
	TO							
BLANK CASING	FROM	DRILL & SAMPLE						
	TO							
SCREEN	FROM							
	TO							
WATER LEVEL		9'						
FORMATION DESCRIPTION	FROM							
	TO							
	FROM							
	TO							
	FROM							
	TO							
	FROM							
	TO							

DRILLING SUPPLIES • CONSTRUCTION MATERIALS
SAFETY EQUIPMENT • MISCELLANEOUS

QTY.	DESCRIPTION
	____"X____' Steel Well Protector
	____"X____' Steel Guard Posts
	Bags: Concrete Mix
	Flush Traffic Vault: Size
	Padlock: Keyed
	Bags: Portland Type II Cement
	Bags: Grout-Volclay/Enviroplug
20	Pails: Bentonite Pellets-Size 1/4"
	Bags: Bentonite Chips-Size
	Bags: Bentonite Gel Powder
15	Bags: Sand-Grade 10/20
	Bags: Sand-Grade
3	Top Cap/Plug: Type LOCKING CAPS
	Low-Carbon Steel Casing: Size
	____"X 5' Casing: PVC/S.S.
90'	3 "X 10' Casing: PVC/S.S.
	____"X 5' Screen-Slot Size
	____"X 10' Screen-Slot Size
	Centralizers-Size
	____"X ____' Sump
3	Bottom Caps
	55 Gal. Drums-17H Rated
	____" ____ Sample Liners
	____"X ____' Split Spoon Bodies
	____" Blunt Spoon Shoes
	____" Steel Finger Baskets
	Visqueen Tarps 6 mil.
	Drill Bits-Size
30	2"x6" BRASS TUBES
64	2" END CAPS
64	TEFLON SQUARES
3	3"x3' - 10# SCREEN
1	10'/4 WOOD PLUG

EVENTS / CONDITIONS / CHANGES: (5:45 TO 6:00)

(5:45 TO 6:00 - ON SITE - GET SET UP)(6:00 TO 6:30 - PUMP OFF PAD)(6:30 TO 6:45 → LOAD AUGERS & SUPPLIES)(6:45 TO 7:00 - TAIL GATE)(7:00 TO 7:30 - HAND AUGER)(7:30 TO 10:00 - DRILL TO 40' & PULL)(10:00 TO 11:30 - REIM & 10'/4 TO 42')(11:30 TO 12:45 - SET 2 WELLS)(12:45 TO 1:15 - GET SEAL SET UP)(1:15 TO 1:30 - DROP TRAILER OFF AT DEPOT)(1:30 TO 2:00 - WAITING FOR GEO TO RETURN - REPORT)(2:00 TO 2:30 - GET 3 DAY PASS)(2:30 TO 3:30 - FINISH SETTING LAST WELL & 11' SEAL)(3:30 TO 3:45 - CLEAN UP)(3:45 TO 4:00 - RESET UP ON SP-01)(4:00 TO 4:30 - GO GET GAS CAN & GAS → (4:30 TO 5:45 - DEPOT & LOAD SUPPLIES)(5:45 TO 6:00 - PUMP OFF PAD)

TOTAL HOURS 12.25

ALL APPLICABLE HOURS, FOOTAGE, SUPPLIES, ETC. SUPPLIED ARE TO BE CONSIDERED CHARGEABLE

DRILLER/OPER. REMARKS & APPROVAL D KIRSNIS

FIELD SUPER. REMARKS & APPROVAL

CLIENTS REMARKS:

CLIENTS APPROVAL: [signature]

OF CREW WITH CHARAGEABLE PER DIEM THIS DATE 2

OF CREW UNDER LEVEL _____ PERSONAL PROTECTION THIS DATE

LAYNE ENVIRONMENTAL SERVICES, INC.

DRILLER'S DAILY DRILL REPORT

EMPLOYEE'S NAMES		TOTAL HOURS
PERSONNEL EMPLOYED	DRILLER/OPER. DAN KIRSNIS	12.0
	HELPER TONY KENT	12.0
	LABORER JESUS	
	GROUTER	
	DEV. RIG OPER.	
	LABORER	
	PROJECT MAN. DAVE HOMAN	
	FIELD SUPER. D. KIRSNIS	

EQUIPMENT EMPLOYED DESCRIPTION	UNIT NO.
Drill Rig. (E-10)	468
Pipe Truck	
Crew Truck (FLATBED)	LIC # P11-1602
Grout Plant	
Steam Cleaner	YES
Development Rig.	
Generator	YES
Compressor	
Booster	
Mud Pump.	
Water Truck	
Supply [redacted]/Trailer (BIL TEX)	YES
Backhoe/Forklift	

ACCOUNTING FOR DAILY ACTIVITY BY ITEM

ITEM #	DESCRIPTION OF ITEM	HOURS
1.	Mob: ☐ Demob: ☐ _____ miles	
2.	Daily travel to the field. _____ miles	
3.	Orientation Safety Mtg. [redacted] TAIL GATE	.25
4.	Drilling (hammer) (_____ hrs. Rotary Conversion).	
5.	Drilling (rotary).	
6.	Drilling (auger). DRILL & SAMPLE & PULL	4.25
7.	Drilling (coring).	
8.	Sampling (S.SPN., Shelby, etc.)	
9.	Pull out drill pipe.	
10.	Abandon hole.	
11.	Water testing.	
12.	Clean out hole. GET PULL KNOCK OUT	0.5
13.	Well construction (below grade). SET WELLS	3.25
14.	Decontamination. & PUMP OFF PIT	
15.	Site clean-up Spoils handling.	1.0
16.	Move between holes. & SET UP	.75
17.	Water hauling. _____ gallons	
18.	Sulace completion.	
19.	Alignment test.	
20.	[redacted] LET SEN. SET UP	0.5
21.	Work on stuck pipe.	
22.	Stand by with crew.	
23.	Standby without crew.	
24.	LOAD & UNLOAD	.75
25.	HAND AUGER	.25
26.	SET ANOTHER CONTAINMENT PIT	0.5
27.		
28.		
29.	Yard time	
30.	Scheduled Maintenance & P.M. Service.	
31.	Unscheduled repairs	

EVENTS / CONDITIONS / CHANGES: (6:45 TO 6:45) TOTAL HOURS 12.0

(6:45 TO 7:00 - HOOK UP TRAILER & AUGERS)(7:00 TO 7:15 - TAIL GATE)(7:15 TO 7:30 - GET SET UP SP-01)(7:30 TO 8:00 - PERMIT & CONTAINMENT PIT)(8:00 TO 9:00 - S-DRILL TO 41')(9:00 TO 9:30 - SET WELL AT 40' & SEAL 30' TO 10:00 - LET SEAL SET UP)(10:00 TO 11:45 - SET LAST 2 WELLS 30' & 20' & SEAL)(11:45 TO 12:00 - CLEAN UP)(12:00 TO 12:15 - DROP TRAILER AT DRILL AREA)(12:15 TO 12:45 - MOVE UP ON SMP 02)(12:45 TO 1:15 - CLEAN UP GRASS AREA)(1:15 TO 1:30 - FINISH HAND AUGER)(1:30 TO 3:30 - D&S TO 40' & PULL)(3:30 TO 4:45 - S-DRILL @ 10'/4 TO 41')(4:45 TO 5:15 - GET WOOD PLUG OUT (CAME UP 3')(5:15 TO 6:15 - SET WELLS AT 40' & 30' & STOP)(6:15 TO 6:30 - CLEAN UP)(6:30 TO 6:45 - DROP OFF TRAILER & DUMP TRASH)

CLIENTS COPY

FROM	TO	ITEM #
5:00 AM	5:30 AM	
5:30 AM	6:00 AM	
6:00 AM	6:30 AM	
6:30 AM	7:00 AM	
7:00 AM	7:30 AM	
7:30 AM	8:00 AM	
8:00 AM	8:30 AM	
8:30 AM	9:00 AM	
9:00 AM	9:30 AM	
9:30 AM	10:00 AM	
10:00 AM	10:30 AM	
10:30 AM	11:00 AM	
11:00 AM	11:30 AM	
11:30 AM	12:00 N	
12:00 N	12:30 PM	
12:30 PM	1:00 PM	
1:00 PM	1:30 PM	
1:30 PM	2:00 PM	
2:00 PM	2:30 PM	
2:30 PM	3:00 PM	
3:00 PM	3:30 PM	
3:30 PM	4:00 PM	
4:00 PM	4:30 PM	
4:30 PM	5:00 PM	
5:00 PM	5:30 PM	
5:30 PM	6:00 PM	
6:00 PM	6:30 PM	
6:30 PM	7:00 PM	
7:00 PM	7:30 PM	
7:30 PM	8:00 PM	
8:00 PM	8:30 PM	
8:30 PM	9:00 PM	
9:00 PM	9:30 PM	
9:30 PM	10:00 PM	
10:00 PM	10:30 PM	
10:30 PM	11:00 PM	
11:00 PM	11:30 PM	
11:30 PM	12:00 PM	
12:00 PM	12:30 AM	
12:30 AM	1:00 AM	
1:00 AM	1:30 AM	
1:30 AM	2:00 AM	
2:00 AM	2:30 AM	
2:30 AM	3:00 AM	
3:00 AM	3:30 AM	
3:30 AM	4:00 AM	
4:00 AM	4:30 AM	
4:30 AM	5:00 AM	

DRILLING /PROJECT INFORMATION

"FRIDAY"

CLIENT: LOCKHEED MARTIN TECH Date 3-29 199 10

DRILLING LOCATION: HOLLOMAN AFB ALAMOGORDO JOB NO. 50-5044

HOLE #		SP-01	SMP-02					TOTALS
PREVIOUS FOOTAGE DRILLED		40'	Ø					40'
FOOTAGE DRILLED THIS DATE		41'	41'					82'
SAMPLES TAKEN THIS DATE		Ø	7					7
PROTECTIVE CASING	FROM	WELLS	SET					
	TO							
CONDUCTOR CASING	FROM							
	TO							
CEMENT SEAL	FROM	3.3"	TO 41'4					
	TO							
BENT. SEAL	FROM	SET	& PULL & REAM					
	TO							
SAND PACK	FROM	41'4 TO						
	TO							
BLANK CASING	FROM	REAM @ 10'/4						
	TO							
SCREEN	FROM	DRILL & SAMPLE						
	TO							
WATER LEVEL		9'	9'					
FORMATION DESCRIPTION	FROM							
	TO							
	FROM							
	TO							
	FROM							
	TO							

DRILLING SUPPLIES • CONSTRUCTION MATERIALS SAFETY EQUIPMENT • MISCELLANEOUS	
QTY.	DESCRIPTION
	____"X____' Steel Well Protector
	____"X____' Steel Guard Posts
	Bags: Concrete Mix
	Flush Traffic Vault: Size
	Padlock: Keyed
	Bags: Portland Type II Cement
	Bags: Grout-Volclay/Enviroplug
22	Pails: Bentonite Pellets-Size 1/4"
	Bags: Bentonite Chips-Size
	Bags: Bentonite Gel Powder
39	Bags: Sand-Grade 10/20
	Bags: Sand-Grade
5	Top Cap/Plug: Type LOCKING CAPS
	Low-Carbon Steel Casing: Size
	____"X 5' Casing: PVC/S.S.
160'	2 "X 10' Casing: PVC/S.S.
100% PULLED	____"X 5' Screen-Slot Size
	____"X 10' Screen-Slot Size
	Centralizers-Size
	____"X ____' Sump
5	Bottom Caps
	55 Gal. Drums-17H Rated
	____" ____ Sample Liners
	____"X ____' Split Spoon Bodies
	____" Blunt Spoon Shoes
	____" Steel Finger Baskets
	Visqueen Tarps 6 mil.
	Drill Bits-Size
20	2"x 6" BRASS TUBE
40	2" END CAPS
40	TEFLON SQUARES
5	2"x 2'-020 SCREEN
2	10'/4 WOOD PLUGS
1	BOX XL THERS
1	BOX NITRILE GLOVES

ALL APPLICABLE HOURS, FOOTAGE, SUPPLIES, ETC. SUPPLIED ARE TO BE CONSIDERED CHARGEABLE

DRILLER/OPER. REMARKS & APPROVAL D. KIRSNIS

FIELD SUPER. REMARKS & APPROVAL

CLIENTS REMARKS:

CLIENTS APPROVAL:

# OF CREW WITH CHARAGEABLE PER DIEM THIS DATE	2
# OF CREW UNDER LEVEL PERSONAL PROTECTION THIS DATE	

APPENDIX B
SOIL TESTING RESULTS

APPENDIX B-1
LABORATORY ANALYTICAL RESULTS

NEI/GTEL
ENVIRONMENTAL LABORATORIES, INC.

Midwest Region
4211 May Avenue
Wichita, KS 67209
(316) 945-2624
(800) 633-7936
(316) 945-0506 (FAX)

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031

April 19, 1996

Charles Schick
Groundwater Technology, Inc.
2501 Yale Blvd., SE, #204
Albuquerque, NM 87106

Dear Charles Schick:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on 04-02-96 under chain of custody record 42289.

A formal quality control/quality assurance 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.

NEI/GTEL is certified by the United States Army Corps of Engineers Laboratory Validation Program. Validation is from September 18, 1995 to March 18, 1997.

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

Sincerely,

John O. Sattler
QA/QC Manager for

Terry R. Loucks
Laboratory Director

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
Login Number: W6040031
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Method: GC
Matrix: Solids

GTEL Sample Number	W6040031-01	W6040031-02	W6040031-03	W6040031-04
Client ID	SMP02 19-19.5	SMP02 19.5-20	SMP02 38.5-39	MW04 9-9.5
Date Sampled	03/29/96	03/29/96	03/29/96	03/30/96
Date Prepared	04/03/96	04/03/96	04/03/96	04/03/96
Date Analyzed	04/04/96	04/04/96	04/04/96	04/04/96
Dilution Factor	25.0	1.00	1.00	1.00

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
TPH as Diesel	10.	mg/kg	3700	55.	< 10.	< 10.
Percent Solids	--	%	73.3	76.0	81.0	75.2

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3550 (sonication). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
ogin Number: W6040031
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/DO8 WAD 35/HOLLOMAN/NM

Method: GC
Matrix: Solids

GTEL Sample Number	W6040031-05	--	--	--
Client ID	MW02 13.5-14	--	--	--
Date Sampled	03/30/96	--	--	--
Date Prepared	04/03/96			
Date Analyzed	04/04/96	--	--	--
Dilution Factor	25.0	--	--	--

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
TPH as Diesel	10.	mg/kg	2400	--	--	--
Percent Solids	--	%	81.3	--	--	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3550 (sonication). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-15-96

QA NONCONFORMANCE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Surrogate Compound Recoveries

2.1 The recovery limits were exceeded for **0** surrogate compounds as shown in Table 2.

3.0 Matrix Spike (MS) Accuracy

3.1 The recovery limits were exceeded in the matrix spike for **1** compound as shown in Table 3 because of sample inhomogeneity and matrix interferences from gasoline hydrocarbons. System control is demonstrated by the laboratory control sample.

4.0 Sample Duplicate Precision

4.1 The maximum percent difference (RPD) was exceeded for **0** compounds in the duplicate samples as shown in Table 3.

5.0 Method Blanks

5.1 **Zero** target compounds were found in the method blank as shown in Table 4.

6.0 Laboratory Control Sample Accuracy

6.1 The recovery limits were exceeded in the laboratory control sample for **0** compounds as shown in Table 5.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-15-96

Table 2

SURROGATE COMPOUND RECOVERY
ortho-Terphenyl

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Acceptability Limits[a]: 34.5-132%

GTEL No.	Surrogate Recovery %
Method Blank 04-03-96	89.6
LCSS 04-03-96	84.9
W6040034-01MS	74.6
W6040034-01MSD	75.3
W6040031-01	96.0
W6040031-02	71.8
W6040031-03	72.6
W6040031-04	75.7
W6040031-05	95.0

a Acceptability limits are derived from statistical analysis of laboratory samples.

* Indicates surrogate recovery outside of acceptability limits.

MS: Matrix Spike
MSD: Matrix Spike Duplicate
LCSS: Laboratory Control Sample Spike
LCSSD: Laboratory Control Sample Spike Duplicate

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-15-96

Table 3

MATRIX SPIKE AND MATRIX SPIKE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked:W6040034-01

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	65.6	31.9	88.9	86.9	32.1-97.5

Analyte	Spike Added, mg/Kg	MSD Concentration, mg/Kg	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Diesel Fuel	66.5	105	110*	23.5	56.8	32.1-97.5

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

RPD: 0 out of 1 outside limits.
Spike Recovery: 1 out of 2 outside limits.

Table 4

METHOD BLANK RESULTS

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Date Extracted 04-03-96

Analyte	Concentration, mg/kg
Diesel Fuel	<3

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-15-96

Table 5

LABORATORY CONTROL SAMPLE SPIKE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked: Clean Sand 04-03-96

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	66.7	<3	51.3	77.5	32.1-97.5

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

Spike Recovery: 0 out of 1 outside limits.

ANALYTICAL RESULTS
Metals

GTEL Client ID: 830012208
Login Number: W6040031
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Method: EPA 6010A
Matrix: Solids

GTEL Sample Number	W6040031-01	W6040031-02	W6040031-04	W6040031-05
Client ID	SS57SMP02 19-19.5	SS57SMP02 19.5-20	SS57MW04 9-9.5	SS57MW02 13.5-14
Date Sampled	03/29/96	03/29/96	03/30/96	03/30/96
Date Prepared	04/08/96	04/08/96	04/08/96	04/08/96
Date Analyzed	04/08/96	04/08/96	04/08/96	04/08/96
Dilution Factor	1.00	1.00	1.00	1.00

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
Iron	10.	mg/kg	2400	3000	2300	3600
Percent Solids	--	%	73.3	76.0	75.2	81.3

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

EPA 6010A:

Digestion by EPA Method 3050A. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including Update 1.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

QA NONCONFORMANCE SUMMARY

Iron in Soil

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for zero samples.

2.0 Initial Calibration Verification

2.1 The validity for the calibration verification was exceeded for zero samples as shown in Table 2.

3.0 Method Blanks

3.1 Zero target elements were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike and matrix spike duplicate for zero elements as shown in Table 4.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for zero elements in the matrix spike and matrix spike duplicate samples as shown in Table 4.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for zero elements for the laboratory control samples as shown in Table 5.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

Table 2

INITIAL CALIBRATION VERIFICATION,
QC CHECK SAMPLE REPORT

Iron in Soil

Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	QC Limits, %[a]
Iron	0.997	1.01	101	90-110

a Acceptability limits as per EPA Contract Laboratory Program

Table 3

BLANK REPORT

Iron in Soil

Analyte	Initital Calibration Blank, mg/L	Preparation Blank, mg/Kg
Iron	<0.100	<10

<# Not detected at the indicated detection limit(#)

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

Table 4

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Iron in Soil
EPA Method 6010A

Sample Spiked: W6040031-01

Analyte	Spike Added, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, %[a]
Iron	252	2400	2410	NA	80-120

Analyte	Spike Added, mg/kg	MSD Concentration, mg/kg	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Iron	216	2760	NA	13.5	20.0	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

b Value outside acceptability limits.

NA Not applicable; initital sample concentration greater than four times spike amount.

Table 5

LABORATORY CONTROL SAMPLE RESULTS

Iron in Soil

Analyte	Expected Result, mg/Kg	Observed Result, mg/Kg	Recovery, %	Acceptability Limits, %[a]
Iron	200	188	94.1	80-120

a Acceptability limits established by laboratory practice

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	01	02	03	04
		Client Identification	SS57SMP02 19-19.5	SS57SMP02 19.5-20	SS57SMP02 38.5-39	SS57MW04 9-9.5
		Date Sampled	03-29-96	03-29-96	03-29-96	03-30-96
		Date Analyzed	04-02 to 04-11-96	04-02 to 04-11-96	04-02 to 04-11-96	04-02 to 04-11-96
Analyte	Method	QL* & Units	Concentration Dry Weight			
Total Alkalinity	Modified EPA 310.1	250 mg/Kg	**40000**	**20000**	---	**51000**
pH	EPA 9045A	NA	**7.6[b]**	**7.5[b]**	---	**7.2[b]**
Soluble Sulfate	Modified EPA 375.4	250 mg/Kg	**24000**	**39000**	**20000**	**61000**
Total Kjeldahl Nitrogen	Modified EPA 351.2	1.2 mg/Kg	**52**	**50**	---	**44**
Total Organic Carbon	CFA 18.0[a]	100 mg/Kg	**4500**	**690**	---	**850**
Total Phosphorus	Modified EPA 365.4	4.0 mg/Kg	**82**	**68**	---	**66**
Moisture Content	ASTM D2216-80	% by Weight	**26.7**	---	---	**24.8**
Percent Solids			73.3	76.0	81.0	75.2

a California Fertilizer Association, Soil Testing Procedures for California, CFA-SIC Publication, 1980.

b pH measured in 0.01M$CaCl_2$
* Quantitation Limit

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	05			
		Client Identification	SS57SMW02 13.5-14			
		Date Sampled	03-30-96			
		Date Analyzed	04-02 to 04-11-96			
Analyte	Method	QL* & Units	Concentration Dry Weight			
Total Alkalinity	Modified EPA 310.1	250 mg/Kg	**32000**			
pH	EPA 9045A	NA	**7.2[b]**			
Soluble Sulfate	Modified EPA 375.4	250 mg/Kg	**55000**			
Total Kjeldahl Nitrogen	Modified EPA 351.2	1.2 mg/Kg	**71**			
Total Organic Carbon	CFA 18.0[a]	100 mg/Kg	**3800**			
Total Phosphorus	Modified EPA 365.4	4.0 mg/Kg	**96**			
Moisture Content	ASTM D2216-80	% by Weight	**18.7**			
Percent Solids			81.3			

a California Fertilizer Association, Soil Testing Procedures for California, CFA-SIC Publication, 1980.

b pH measured in 0.01 $MCaCl_2$

* Quantitation Limit

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

QA NONCONFORMANCE SUMMARY

Inorganics

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Initial Calibration Verification

2.1 The criteria for the calibration verification QC Check Sample was exceeded for **0** samples as shown in Table 2.

3.0 Method Blanks

3.1 **Zero** target analytes were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike for **0** analyte as shown in Table 4.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for **0** analytes in the duplicate samples as shown in Table 5.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for 0 analytes in the Laboratory Control Sample as shown in Table 6.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Soluble Sulfate	20.0	19.5	mg/L	97.5	90-110
Total Kjeldahl Nitrogen	1.00	1.01	mg/L	101	90-110
Total Phosphorus	2.50	2.48	mg/L	99.2	90-110

a Acceptability limits established by laboratory practice.

Table 3

BLANK REPORT

Inorganics

Analyte	Initial Calibration Blank	Units	Preparation Blank	Units
Sulfate	<5	mg/L	<250	mg/Kg
Total Kjeldahl Nitrogen	<0.06	mg/L	NA	mg/Kg
Total Organic Carbon	<100	mg/Kg	<100	mg/Kg
Total Phosphorus	<0.2	mg/L	NA	mg/Kg

NA - Not Applicable

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

Table 4

MATRIX SPIKE (MS) RECOVERY SUMMARY

Inorganics

Sample Spiked: Sulfate W6030516-01
Sample Spiked: Total Kjeldahl Nitrogen W6040031-04
Sample Spiked: Total Organic Carbon W6030566-02
Sample Spiked: Total Phosphorus W6030501-01

Analyte	MS Sample Result	Sample Result	Amount Added	Units	MS, % Recovery	Acceptability Limits, %[a]
Sulfate	144000	59400	100000	mg/Kg	84.6	80-120
Total Kjeldahl Nitrogen	57.4	35.3	19.8	mg/Kg	111	80-120
Total Organic Carbon	1650	563	1000	mg/Kg	110	80-120
Total Phosphorus	199	161	46.7	mg/Kg	81.4	80-120

a Acceptability limits established by laboratory practice.

b Indicates a value outside acceptability limits.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0031
Date Reported: 04-16-96

Table 5

LABORATORY DUPLICATE SAMPLE RESULTS
AND RELATIVE PERCENT DIFFERENCE (RPD) SUMMARY

Inorganics

Analyte	Matrix Spike Result	Matrix Spike Duplicate Result	Units	RPD, %	Maximum RPD, %[a]
Sulfate	144000	136000	mg/Kg	5.71	20
Total Kjeldahl Nitrogen	57.4	59.9	mg/Kg	4.19	20
Total Organic Carbon	1650	1710	mg/Kg	3.57	20
Total Phosphorus	199	183	mg/Kg	8.38	20
Total Alkalinity	66400[b]	74300[b]	mg/Kg	11.2	20
pH	7.49[b]	7.33[b]	pH units	0.16	0.2 pH units

a Acceptability limits established by laboratory practice.

b Represents sample and sample duplicate data.

Table 6

LABORATORY CONTROL SAMPLE RESULTS

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	1000	958	mg/Kg	95.8	80-120
Total Organic Carbon	1000	960	mg/Kg	96.0	80-120
Total Alkalinity	133	139	mg/L	105	80-120

GTEL ENVIRONMENTAL LABORATORIES INC

4211 MAY AVE.
WICHITA, KS 67209
(316) 945-2624
(800) 633-7936

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

12289

Company Name: Groundwater Technology
Phone #: 505-242-3113
FAX #: 505-242-1103
Company Address: 2501 Yale Blvd, #204, ABQ NM 87106
Site Location: HAFB, NM
Project Manager: Chuck Schick
Client Project ID: (#) 830012208, 35050
(NAME) DOE WAD 35 Ordnance
Sampler Name (Print): Lee Scott Stevenson

I attest that the proper field sampling procedures were used during the collection of these samples.

Field Sample ID	GTEL Lab # (Lab Use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME	BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	~~Hydrocarbon Profile (SIMDIS)~~ ☐ TPC CFA 18.0	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	~~TPH/IR 418.1~~ ☐ ~~SM 503~~ ☐ TPH as Diesel Mod 8015	EDB by 504 ☐ DBCP by 504 ☐	~~EPA 503.1~~ ☐ ~~EPA 504.0~~ ☐ TKN - 351.2	~~EPA 601~~ ☐ ~~EPA 8010~~ ☐ pH - 9045A	~~EPA 602~~ ☐ ~~EPA 8020~~ ☐ Moisture - ASTM D2216	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	~~EPA 610~~ ☐ ~~8310~~ ☐ Sulfate - Mod 375.4	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Total Phosphorus - 365.4	Total Iron - 6010A	Alkalinity - 310.1
SS57SMP02A-19.5	— 01	1		X								X			3/29/96	1405				X		X		X	X	X				X						X	X	X
SS57SMP0219.5-20	02	1		X								X				1405				X		X		X	X	X LSS				X						X	X	X
SS57SMP0238.5-39	03	1		X								X			↓	1500						X								X								
SS57MW049-9.5	04	1		X								X			3/30/96	1050				X		X		X	X	X				X						X	X	X
SS57MW0213.5-14	05	1		X								X			↓	1245				X		X		X	X	X				X						X	X	X

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
P.O. # ____

QA/QC Level
Blue ☐ CLP ☐ Other ☐ ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS: Analysis per DOE WAD 35
Sample #SS57SMP0219.5-20 Duplicate per Table 2-2 in FOP

Lab Use Only Lot #: Seals Intact
Storage Location: 5°C
Work Order #:

CUSTODY RECORD

Relinquished by Sampler: Lee Scott Stevenson	Date: 1/4/96	Time: 0848	Received by: A. Barnes 5561468463
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory: Waybill #

NEI/GTEL
ENVIRONMENTAL LABORATORIES, INC.

Midwest Region
4211 May Avenue
Wichita, KS 67209
(316) 945-2624
(800) 633-7936
(316) 945-0506 (FAX)

Project Number: 830012208
Project Name: Holloman AFB Officers Club Holloman, NM
Work Order Number: W6-03-0566

April 19, 1996

Charles Schick
Groundwater Technology, Inc.
2501 Yale Blvd., SE, #204
Albuquerque, NM 87106

Dear Charles Schick:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on 03-29-96 under chain of custody record 42279.

A formal quality control/quality assurance 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.

NEI/GTEL is certified by the United States Army Corps of Engineers Laboratory Validation Program. Validation is from September 18, 1995 to March 18, 1997.

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

Sincerely,
John O. Sartler
QA/QC Manager for
Terry R. Loucks
Laboratory Director

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
Login Number: W6030566
Project ID (number): 830012208 Method: GC
Project ID (name): HOLLOMAN AFB/OFFICERS CLUB/HOLLOMAN/NM Matrix: Solids

GTEL Sample Number	W6030566-01	W6030566-02	W6030566-03	W6030566-04
Client ID	SS57MW01 14.5-15	SS57SP01 34-34.5	SS57SP01 38.5-39	SS57SMP01 19-19.5
Date Sampled	03/27/96	03/27/96	03/27/96	03/28/96
Date Prepared	04/02/96	04/02/96	04/01/96	04/02/96
Date Analyzed	04/03/96	04/03/96	04/03/96	04/04/96
Dilution Factor	1.00	1.00	1.00	10.0

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
TPH as Diesel	10.	mg/kg	16.	95.	110	1100
Percent Solids	--	%	66.7	84.7	83.7	80.5

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3550 (sonication). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
Login Number: W6030566
Project ID (number): 830012208 Method: GC
Project ID (name): HOLLOMAN AFB/OFFICERS CLUB/HOLLOMAN/NM Matrix: Solids

GTEL Sample Number	W6030566-05	W6030566-06	--	--
Client ID	SS57SMP01 19.5-20	SS57SMP01 39-39.5	--	--
Date Sampled	03/28/96	03/28/96	--	--
Date Prepared	04/01/96	04/01/96		
Date Analyzed	04/04/96	04/03/96	--	--
Dilution Factor	4.00	1.00	--	--

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
TPH as Diesel	10.	mg/kg	630	< 10.	--	--
Percent Solids	--	%	80.4	77.1	--	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3550 (sonication). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	01	02	03	04
		Client Identification	SS57MW01 14.5-15	SS57SP01 34-34.5	SS57SP01 38.5-39	SS57SMP01 19-19.5
		Date Sampled	03-27-96	03-27-96	03-27-96	03-28-96
		Date Analyzed	03-30 to 04-10-96	03-30 to 04-10-96	03-30 to 04-10-96	03-30 to 04-10-96
Analyte	Method	QL* & Units	Concentration Dry Weight			
Total Alkalinity	Modified EPA 310.1	250 mg/Kg	18000	6500	---	69000
pH	EPA 9045A	NA	7.4[b]	7.5[b]	---	7.4[b]
Soluble Sulfate	Modified EPA 375.4	250 mg/Kg	64000	12000	22000	23000
Total Kjeldahl Nitrogen	Modified EPA 351.2	1.2 mg/Kg	54	25	---	66
Total Organic Carbon	CFA 18.0[a]	100 mg/Kg	1600	660	---	4300
Total Phosphorus	Modified EPA 365.4	4.0 mg/Kg	78	140	---	98
Moisture Content	ASTM D2216-80	% by Weight	33.3	15.3	---	19.5
Percent Solids			66.7	84.7	83.7	80.5

a California Fertilizer Association, Soil Testing Procedures for California, CFA-SIC Publication, 1980.

b pH measured in 0.01 $MCaCl_2$

* Quantitation Limit

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	06			
		Client Identification	SS57SMP01 39-39.5			
		Date Sampled	03-28-96			
		Date Analyzed	03-30 to 04-10-96			
Analyte	Method	QL* & Units	Concentration Dry Weight			
Total Alkalinity	Modified EPA 310.1	250 mg/Kg	---			
pH	EPA 9045A	NA	---			
Soluble Sulfate	Modified EPA 375.4	250 mg/Kg	13000			
Total Kjeldahl Nitrogen	Modified EPA 351.2	1.2 mg/Kg	---			
Total Organic Carbon	CFA 18.0[a]	100 mg/Kg	---			
Total Phosphorus	Modified EPA 365.4	4.0 mg/Kg	---			
Moisture Content	ASTM D2216-80	% by Weight	---			
Percent Solids			77.1			

a California Fertilizer Association, Soil Testing Procedures for California, CFA-SIC Publication, 1980.

b pH measured in 0.01 $MCaCl_2$

* Quantitation Limit

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

QA NONCONFORMANCE SUMMARY

Inorganics

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Initial Calibration Verification

2.1 The criteria for the calibration verification QC Check Sample was exceeded for **0** samples as shown in Table 2.

3.0 Method Blanks

3.1 Zero target analytes were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike for **1** analyte as shown in Table 4.

4.2 The acceptability limits were exceeded in the matrix spike and matrix spike duplicate total Kjeldahl nitrogen due to matrix interferences.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for **0** analytes in the duplicate samples as shown in Table 5.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for 0 analytes in the Laboratory Control Sample as shown in Table 6.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Soluble Sulfate	20.0	19.5	mg/L	97.5	90-110
Total Kjeldahl Nitrogen	1.00	0.951	mg/L	95.1	90-110
Total Phosphorus	2.50	2.48	mg/L	99.2	90-110

a Acceptability limits established by laboratory practice.

Table 3

BLANK REPORT

Inorganics

Analyte	Initial Calibration Blank	Units	Preparation Blank	Units
Sulfate	<5	mg/L	<250	mg/Kg
Total Kjeldahl Nitrogen	<0.06	mg/L	NA	mg/Kg
Total Organic Carbon	<100	mg/Kg	<100	mg/Kg
Total Phosphorus	<0.2	mg/L	NA	mg/Kg

NA - Not Applicable

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

Table 4

MATRIX SPIKE (MS) RECOVERY SUMMARY

Inorganics

Sample Spiked: Sulfate W6030516-01
Sample Spiked: Total Kjeldahl Nitrogen W6030516-02
Sample Spiked: Total Organic Carbon W6030566-02
Sample Spiked: Total Phosphorus W6030501-01

Analyte	MS Sample Result	Sample Result	Amount Added	Units	MS, % Recovery	Acceptability Limits, %[a]
Sulfate	144000	59400	100000	mg/Kg	84.6	80-120
Total Kjeldahl Nitrogen	60.6	45.7	19.2	mg/Kg	77.6[b]	80-120
Total Organic Carbon	1650	563	1000	mg/Kg	110	80-120
Total Phosphorus	199	161	46.7	mg/Kg	81.4	80-120

a Acceptability limits established by laboratory practice.

b Indicates a value outside acceptability limits.

Table 5

LABORATORY DUPLICATE SAMPLE RESULTS
AND RELATIVE PERCENT DIFFERENCE (RPD) SUMMARY

Inorganics

Analyte	Matrix Spike Result	Matrix Spike Duplicate Result	Units	RPD, %	Maximum RPD, %[a]
Sulfate	144000	136000	mg/Kg	5.71	20
Total Kjeldahl Nitrogen	60.6	58.8	mg/Kg	3.02	20
Total Organic Carbon	1650	1710	mg/Kg	3.57	20
Total Phosphorus	199	183	mg/Kg	8.38	20
Total Alkalinity	66400[b]	74300[b]	mg/Kg	11.2	20
pH	7.40[b]	7.40[b]	pH units	0.0	0.2 pH units

a Acceptability limits established by laboratory practice.

b Represents sample and sample duplicate data.

Table 6

LABORATORY CONTROL SAMPLE RESULTS

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	1000	958	mg/Kg	95.8	80-120
Total Organic Carbon	1000	960	mg/Kg	96.0	80-120
Total Alkalinity	133	139	mg/L	105	80-120

a Acceptability limits established by laboratory practice.

ANALYTICAL RESULTS
Metals

GTEL Client ID: 830012208
Login Number: W6030566
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/OFFICERS CLUB/HOLLOMAN/NM

Method: EPA 6010A
Matrix: Solids

GTEL Sample Number	W6030566-01	W6030566-02	W6030566-04	--
Client ID	SS57MW01 14.5-15	SS57SP01 34-34.5	SS57SMP01 19-19.5	--
Date Sampled	03/27/96	03/27/96	03/28/96	--
Date Prepared	04/02/96	04/02/96	04/02/96	
Date Analyzed	04/03/96	04/03/96	04/03/96	--
Dilution Factor	1.00	1.00	1.00	--

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
Iron	10.	mg/kg	2800	1500	6200	--
Percent Solids	--	%	66.7	84.7	80.5	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

EPA 6010A:

Digestion by EPA Method 3050A. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including Update 1.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

QA NONCONFORMANCE SUMMARY

Lead in Soil

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for zero samples.

2.0 Initial Calibration Verification

2.1 The validity for the calibration verification was exceeded for zero samples as shown in Table 2.

3.0 Method Blanks

3.1 Zero target elements were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike and matrix spike duplicate for zero elements as shown in Table 4.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for zero elements in the matrix spike and matrix spike duplicate samples as shown in Table 4.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for zero elements for the laboratory control samples as shown in Table 5.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

Table 2

INITIAL CALIBRATION VERIFICATION,
QC CHECK SAMPLE REPORT

Iron in Soil

Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	QC Limits, %[a]
Iron	0.997	1.03	103	90-110

a Acceptability limits as per EPA Contract Laboratory Program

Table 3

BLANK REPORT

Iron in Soil

Analyte	Initital Calibration Blank, mg/L	Preparation Blank, mg/Kg
Iron	<0.10	<10

<# Not detected at the indicated detection limit (#)

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-15-96

Table 4

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Iron in Soil
EPA Method 6010

Sample Spiked: W6030566-01

Analyte	Spike Added, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, %[a]
Iron	254	2820	2890	NA	80-120

Analyte	Spike Added, mg/kg	MSD Concentration, mg/kg	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Iron	258	3140	NA	8.52	20.0	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

b Value outside acceptability limits.

NA Not applicable; initital sample concentration greater than four times spike amount.

Table 5

LABORATORY CONTROL SAMPLE RESULTS

Iron in Soil

Analyte	Expected Result, mg/Kg	Observed Result, mg/Kg	Recovery, %	Acceptability Limits, %[a]
Iron	200	205	103	80-120

a Acceptability limits established by laboratory practice

Project Number: 830012208
Project Name: Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-05-96

QA NONCONFORMANCE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Surrogate Compound Recoveries

2.1 The recovery limits were exceeded for **0** surrogate compounds as shown in Table 2.

3.0 Matrix Spike (MS) Accuracy

3.1 The recovery limits were exceeded in the matrix spike for **0** compounds as shown in Table 3A and 3B. Due to a high background to spike ratio the matrix spike data for the batch extracted on 04-02-96 was not applicable (NA) as shown in table 3B. System control was demonstrated by the laboratory control sample.

4.0 Sample Duplicate Precision

4.1 The maximum percent difference (RPD) was exceeded for **0** compounds in the duplicate samples as shown in Table 3A and 3B.

5.0 Method Blanks

5.1 **Zero** target compounds were found in the method blank as shown in Table 4A and 4B.

6.0 Laboratory Control Samples Accuracy

6.1 The recovery limits were exceeded in the Laboratory Control Sample for **Zero** compounds as shown in Table 5A and 5B.

Project Number: 830012208
Project Name: Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-05-96

Table 2

SURROGATE COMPOUND RECOVERY
ortho-Terphenyl

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Acceptability Limits[a]: 34.5-132

GTEL No.	Surrogate Recovery %
Method Blank 04-01-96	68.8
LCSS 04-01-96	82.3
W6030536-07MS	80.5
W6030536-07MD	85.4
W6030566-03	64.3
W6030566-05	62.5
W6030566-06	76.6
Method Blank 04-02-96	77.8
LCSS 04-02-96	83.3
W6030566-01	89.6
W6030566-02	69.2
W6030566-04	69.1
W6030566-04MS	73.6
W6030566-04MD	73.0

a Acceptability limits are derived from statistical analysis of laboratory samples.

* Indicates surrogate recovery outside of acceptability limits.

MS: Matrix Spike
MSD: Matrix Spike Duplicate
LCSS: Laboratory Control Sample Spike
LCSSD: Laboratory Control Sample Spike Duplicate

Project Number: 830012208
Project Name: Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-05-96

Table 3A

MATRIX SPIKE AND MATRIX SPIKE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked: W6030536-07

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	65.0	10.2	66.5	86.6	32.1-97.5

Analyte	Spike Added, mg/Kg	MSD Concentration, mg/Kg	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Diesel Fuel	65.0	69.6	91.4	5.40	56.8	32.1-97.5

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

RPD: 0 out of 1 outside limits.
Spike Recovery: 0 out of 2 outside limits.

Table 4A

METHOD BLANK RESULTS

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Date Extracted 04-01-96

Analyte	Concentration, mg/kg
Diesel Fuel	<10

Project Number: 830012208
Project Name: Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-05-96

Table 3B

MATRIX SPIKE AND MATRIX SPIKE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked: W6030566-04

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	66.4	870	1060	NA	32.1-97.5

Analyte	Spike Added, mg/Kg	MSD Concentration, mg/Kg	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Diesel Fuel	66.2	1140	NA	NA	56.8	32.1-97.5

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

RPD: NA
Spike Recovery: NA
NA: Not applicable; the background concentration is greater than 10x the spike level. Therefore, the percent recovey and RPD cannot be accurately determined.

Table 4B

METHOD BLANK RESULTS

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Date Extracted 04-02-96

Analyte	Concentration, mg/kg
Diesel Fuel	<10

Project Number: 830012208
Project Name: Holloman AFB
Officers Club
Holloman, NM
Work Order Number: W6-03-0566
Date Reported: 04-05-96

Table 5A

LABORATORY CONTROL SAMPLE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked: Clean Sand 04-01-96

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	66.7	<10	47.8	72.3	32.1-97.5

* Indicates values outside of acceptability limits.

a Acceptability limits are derived from statistical analysis of laboratory samples.

Spike Recovery: 0 out of 1 outside limits.

Table 5B

LABORATORY CONTROL SAMPLE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked: Clean Sand 04-02-96

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	66.4	<10	52.4	78.9	32.1-97.5

* Indicates values outside of acceptability limits.

a Acceptability limits are derived from statistical analysis of laboratory samples.

Spike Recovery: 0 out of 1 outside limits.

airborne: **No** fax: **No** BBS: **No**

QA ACTION REPORT
GTEL WICHITA

Log #: **1679** Initation Date: **4/15/96**

login #: project name: **HAFB OFFICERS CLUB** Initiator Name: **JOHN SATTLER**

Result of:

reality check: **No** Internal QA/QC: **No**

client request: **No** Other: **No**

Holding time: **No**

Description: All soil results are to be reported on a dry weight basis.

Reference the Soil Moisture Method ASTM D2216
Referenced on the COC

Name: **JOHN SATTLER**

INVESTIGATION/RESOLUTION

Manager Assigned to: **Jeff Douglas**

Reissue: **No**

Expected Resolution Date:

Non-Conformance Summary
Has to be completed in 24HRS by 1600
4/17/96.

Section Manager: _____ **Date:** _____

Person Responsible: _____ (to be assigned by section manager)

Completed by: [signature] 4-15-96 **Date:** _____

Reissued Report Reviewed by: _____ **Date:** _____

Customer Contacted by: _____ **Date:** _____

QA review by: John O Sattler **Date:** _____

Completion Date: 4-16-1996

Data change: ___Yes___No

GTEL error: ___Yes___No

Bill: ___Yes___No $ _____

Time spent (hours): _____

Dist.:
- **QAAR File (Org)** _____
- **Project File** _____
- **Laboratory** _____
- **Invoicing** _____
- **Project Mgr.** _____
- **Lab Director** _____

GTEL ENVIRONMENTAL LABORATORIES INC

4211 MAY AVE.
WICHITA, KS 67209
(316) 945-2624
(800) 633-7936

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

42279

Company Name: Groundwater Technology
Phone #: 505-242-3113
FAX #: 505-242-1103
Company Address: 2501 Yale SE #204, ABQ NM 87106
Site Location: HAFB O'club
Project Manager: Charles Schick
Client Project ID: (#) 830012208.
(NAME) HAFB O'club 35050
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): Lee Smith Stevenson

Field Sample ID	GTEL Lab # (Lab Use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME	BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	~~Hydrocarbon Profile (SM/DRO)~~ ☐ TOC Method 18.0	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	~~TPH/IR 418.1 ☐ SM 503~~ ☐ TPH as Diesel MOD 8015	~~EDB by 504 ☐ DBCP by 504~~ ☐ SULFATE MOD 375.4	EPA 503.1 ☐ EPA 502.2 ☐	~~EPA 601 ☐ EPA 8010~~ ☐ pH - 9045A	~~EPA 602 ☐ EPA 8020~~ ☐ Moisture - D2216	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TKN - MOD 351.2	Total Phosphorus MOD - 365.4	Total Iron - 6010A	Alkalinity - 310.1
SS57MW0114.5-15		1		X								X			3/27/96	0950				X		X	X		X	X										X	X	X	X
SS57SP0134-34.5		1		X								X			↓	1325				X		X	X		X	X										X	X	X	X
SS57SP0138.5-39		1		X								X			↓	1340						X	X																
SS57SMP0119-19.5		1		X								X			3/28/96	0815				X		X	X		X	X										X	X	X	X
SS57SMP0119.5-20		1		X								X			↓	0915						X	X LSS																
SS57SMP0139-39.5		1		X								X			↓	0935						X	X																

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other STD
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
P.O. # _____

QA/QC Level
Blue ☐ CLP ☐ Other ☐ _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS

FAX ☐

REMARKS:
Analysis per DOE, WAD35
Sample # SS57SMP0119.5-20 Duplicate per Table 2-2 in FOP.

Lab Use Only Lot #:
Storage Location
Work Order #:

CUSTODY RECORD

Relinquished by Sampler:	Date	Time	Received by:
Lee Smith Stevenson	28 MAR 1996	12:00	Airborne 556146 8360
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:
	/96		Waybill #

NEI/GTEL
ENVIRONMENTAL LABORATORIES, INC.

Midwest Region
4211 May Avenue
Wichita, KS 67209
(316) 945-2624
(800) 633-7936
(316) 945-0506 (FAX)

GTEL Client Number: 860012208
Project ID (Name): Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516

April 19, 1996

Charles Schick
Groundwater Technology, Inc.
2501 Yale Blvd., SE, #204
Albuquerque, NM 87106

Dear Charles Schick:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on 03-27-96 under chain of custody record 42278.

A formal quality control/quality assurance 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.

NEI/GTEL is certified by the United States Army Corps of Engineers Laboratory Validation Program. Validation is from September 18, 1995 to March 18, 1997.

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

Sincerely,

Terry R. Loucks
Laboratory Director

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
Login Number: W6030516
Project ID (number): 860012208
Project ID (name): HOLLOMAN AFB/NM

Method: GC
Matrix: Solids

GTEL Sample Number	W6030516-01	W6030516-02	W6030516-03	--
Client ID	MW3 14-14.5	SMP03 19.5-20	SMP03 39.5-40	--
Date Sampled	03/25/96	03/26/96	03/26/96	--
Date Prepared	03/28/96	03/28/96	03/28/96	
Date Analyzed	03/29/96	04/02/96	03/29/96	--
Dilution Factor	10.0	20.0	1.00	--

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
TPH as Diesel	10.	mg/kg	1400	4800	< 10.	--
Percent Solids	--	%	71.4	78.8	75.2	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3550 (sonication). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

NOTE: All the client sample identifications on work order W6030516 are preceded by (SS57).

Project Number: 860012208
Project Name: Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-16-96

QA NONCONFORMANCE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Surrogate Compound Recoveries

2.1 The recovery limits were exceeded for **0** surrogate compounds as shown in Table 2.

3.0 Matrix Spike (MS) Accuracy

3.1 The recovery limits were exceeded in the matrix spike for **0** compounds as shown in Table 3 and 5.

4.0 Sample Duplicate Precision

4.1 The maximum percent difference (RPD) was exceeded for **0** compounds in the duplicate samples as shown in Table 3.

5.0 Method Blanks

5.1 **Zero** target compounds were found in the method blank as shown in Table 4.

Project Number: 860012208
Project Name: Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-16-96

Table 2

SURROGATE COMPOUND RECOVERY
ortho-Terphenyl

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Acceptability Limits[a]: 34.5-132

GTEL No.	Surrogate Recovery %
Method Blank	70.8
LCSS	83.2
W6030498-09MS	76.5
W6030498-09MD	82.6
W6030516-01	80.0
W6030516-02	98.4
W6030516-03	83.3

a Acceptability limits are derived from statistical analysis of laboratory samples.

* Indicates surrogate recovery outside of acceptability limits.

MS: Matrix Spike
MSD: Matrix Spike Duplicate
LCSS: Laboratory Control Sample Spike
LCSSD: Laboratory Control Sample Spike Duplicate

Project Number: 860012208
Project Name: Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-16-96

Table 3

MATRIX SPIKE AND MATRIX SPIKE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked: W6030498-09

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	66.7	<10	62.3	93.4	32.1-97.5

Analyte	Spike Added, mg/Kg	MSD Concentration, mg/Kg	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Diesel Fuel	66.0	57.5	87.1	6.98	56.8	32.1-97.5

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

RPD: 0 out of 1 outside limits.
Spike Recovery: 0 out of 2 outside limits.

Table 4

METHOD BLANK RESULTS

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Date Extracted 03-28-96

Analyte	Concentration, mg/kg
Diesel Fuel	<10

Project Number: 860012208
Project Name: Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-16-96

Table 5

LABORATORY CONTROL SAMPLE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Soil
GC/FID

Sample Spiked: Reagent Water 03-28-96

Analyte	Spike Added, mg/Kg	Sample Concentration, mg/Kg	MS Concentration, mg/Kg	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	66.7	< 10	48.7	73.0	32.1-97.5

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

Spike Recovery: 0 out of 2 outside limits.

GTEL Client Number: 860012208
Project ID (Name): Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-11-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	01	02		
		Client Identification	SS57MW03 14-14.5	SS57MP03 19.5-20		
		Date Sampled	03-25-96	03-25-96		
		Date Analyzed	03-29 to 04-10-96	03-29 to 04-10-96		
Analyte	Method	QL* & Units	Concentration, Dry Weight			
Total Alkalinity	Modified EPA 310.1	250 mg/Kg	**8300**	**84000**		
pH	EPA 9045A	NA	6.9[b]	7.0[b]		
Soluble Sulfate	Modified EPA 375.4	250 mg/Kg	**83000**	**110000**		
Total Kjeldahl Nitrogen	Modified EPA 351.2	1.2 mg/Kg	**56**	**58**		
Total Organic Carbon	CFA 18.0[a]	100 mg/Kg	**4200**	**7300**		
Total Phosphorus	Modified EPA 365.4	4.0 mg/Kg	**66**	**85**		
Moisture Content	ASTM D2216-80	% by Weight	**28.6**	**21.2**		
Percent Solids			71.4	78.8		

a California Fertilizer Association, Soil Testing Procedures for California, CFA-SIC Publication, 1980.

b pH measured in 0.01M $CaCl_2$
* Quantitation Limit

GTEL Client Number: 860012208
Project ID (Name): Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-11-96

QA NONCONFORMANCE SUMMARY

Inorganics

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Initial Calibration Verification

2.1 The criteria for the calibration verification QC Check Sample was exceeded for **0** samples as shown in Table 2.

3.0 Method Blanks

3.1 **Zero** target analytes were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike for **1** analyte as shown in Table 4.

4.2 The acceptability limits were exceeded in the matrix spike and matrix spike duplicate for total kjeldahl nitrogen due to matrix interferences.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for **0** analytes in the duplicate samples as shown in Table 5.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for 0 analytes in the Laboratory Control Sample as shown in Table 6.

GTEL Client Number: 860012208
Project ID (Name): Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-11-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Soluble Sulfate	20.0	19.5	mg/L	97.5	90-110
Total Kjeldahl Nitrogen	1.00	0.951	mg/L	95.1	90-110
Total Phosphorus	2.50	2.48	mg/L	99.2	90-110

a Acceptability limits established by laboratory practice.

Table 3

BLANK REPORT

Inorganics

Analyte	Initial Calibration Blank	Units	Preparation Blank	Units
Sulfate	<5	mg/L	<250	mg/Kg
Total Kjeldahl Nitrogen	<0.06	mg/L	NA	mg/Kg
Total Organic Carbon	<100	mg/Kg	<100	mg/Kg
Total Phosphorus	<0.2	mg/L	NA	mg/Kg

NA - Not Applicable

GTEL Client Number: 860012208
Project ID (Name): Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-11-96

Table 4

MATRIX SPIKE (MS) RECOVERY SUMMARY

Inorganics

Sample Spiked: Sulfate W6030516-01
Sample Spiked: Total Kjeldahl Nitrogen W6030516-02
Sample Spiked: Total Organic Carbon W6030566-02
Sample Spiked: Total Phosphorus W6030501-01

Analyte	MS Sample Result	Sample Result	Amount Added	Units	MS, % Recovery	Acceptability Limits, %[a]
Sulfate	144000	59400	100000	mg/Kg	84.6	80-120
Total Kjeldahl Nitrogen	60.6	45.7	19.2	mg/Kg	77.6[b]	80-120
Total Organic Carbon	1650	563	1000	mg/Kg	110	80-120
Total Phosphorus	199	161	46.7	mg/Kg	81.4	80-120

a Acceptability limits established by laboratory practice.
b Indicates a value outside acceptability limits.

Table 5

LABORATORY DUPLICATE SAMPLE RESULTS
AND RELATIVE PERCENT DIFFERENCE (RPD) SUMMARY

Inorganics

Analyte	Matrix Spike Result	Matrix Spike Duplicate Result	Units	RPD, %	Maximum RPD, %[a]
Sulfate	144000	136000	mg/Kg	5.71	20
Total Kjeldahl Nitrogen	60.6	58.8	mg/Kg	3.02	20
Total Organic Carbon	1650	1710	mg/Kg	3.57	20
Total Phosphorus	199	183	mg/Kg	8.38	20
Total Alkalinity	66400[b]	74300[b]	mg/Kg	11.2	20
pH	7.01[b]	7.04[b]	pH units	0.03	0.2 pH units

a Acceptability limits established by laboratory practice.
b Represents sample and sample duplicate data.

GTEL Client Number: 860012208
Project ID (Name): Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-11-96

Table 6

LABORATORY CONTROL SAMPLE RESULTS

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	1000	958	mg/Kg	95.8	80-120
Total Organic Carbon	1000	960	mg/Kg	96.0	80-120
Total Alkalinity	133	139	mg/L	105	80-120

a Acceptability limits established by laboratory practice

ANALYTICAL RESULTS
Metals

GTEL Client ID: 830012208
Login Number: W6030516
Project ID (number): 860012208
Project ID (name): HOLLOMAN AFB/NM

Method: EPA 6010A
Matrix: Solids

GTEL Sample Number	W6030516-01	W6030516-02	--	--
Client ID	MW3 14-14.5	SMP03 19.5-20	--	--
Date Sampled	03/25/96	03/26/96	--	--
Date Prepared	04/02/96	04/02/96		
Date Analyzed	04/03/96	04/03/96	--	--
Dilution Factor	1.00	1.00	--	--

Analyte	Reporting Limit	Units	Concentration:Dry Weight			
Iron	10.	mg/kg	3000	4200	--	--
Percent Solids	--	%	71.4	78.8	--	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

EPA 6010A:

Digestion by EPA Method 3050A. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including Update 1.

NOTE: All the client sample identifications on work order W6030516 are preceded by (SS57).

Project Number: 830012208
Project Name: Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-12-96

RECEIVED
MAY 14 1996

QA NONCONFORMANCE SUMMARY

Iron in Soil

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for zero samples.

2.0 Initial Calibration Verification

2.1 The validity for the calibration verification was exceeded for zero samples as shown in Table 2.

3.0 Method Blanks

3.1 Zero target elements were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike and matrix spike duplicate for zero elements as shown in Table 4.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for zero elements in the matrix spike and matrix spike duplicate samples as shown in Table 4.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for zero elements for the laboratory control samples as shown in Table 5.

Project Number: 830012208
Project Name: Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-12-96

Table 2

INITIAL CALIBRATION VERIFICATION,
QC CHECK SAMPLE REPORT

Iron in Soil

Analyte	Expected Result, mg/L	Observed Result, mg/L	Recovery, %	QC Limits, %[a]
Iron	0.997	1.03	103	90-110

a Acceptability limits as per EPA Contract Laboratory Program

Table 3

BLANK REPORT

Iron in Soil

Analyte	Initital Calibration Blank, mg/L	Preparation Blank, mg/Kg
Iron	<0.10	<10

<# Not detected at the indicated detection limit(#)

Project Number: 830012208
Project Name: Holloman AFB
Holloman, NM
Work Order Number: W6-03-0516
Date Reported: 04-12-96

Table 4

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Iron in Soil
EPA Method 6010

Sample Spiked: W6030566-01

Analyte	Spike Added, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, %[a]
Iron	254	2820	2890	NA	80-120

Analyte	Spike Added, mg/kg	MSD Concentration, mg/kg	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Iron	258	3140	NA	8.52	20.0	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

b Value outside acceptability limits.

NA Not applicable; initital sample concentration greater than four times spike amount.

Table 5

LABORATORY CONTROL SAMPLE RESULTS

Iron in Soil

Analyte	Expected Result, mg/Kg	Observed Result, mg/Kg	Recovery, %	Acceptability Limits, %[a]
Iron	200	205	103	80-120

a Acceptability limits established by laboratory practice

GTEL ENVIRONMENTAL LABORATORIES INC

4211 MAY AVE.
WICHITA, KS 67209
(316) 945-2624
(800) 633-7936

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

42278

Company Name: GOVT. SVCS, GROUNDWATER TECHNOLOGY
Phone #: 505 242 3113
FAX #: 505 242 1103
Company Address: 2501 YALE, SE, ALBUQUERQUE, NM. 87108
Site Location: HAFB-O'Club.
Project Manager: Charles Schick
Client Project ID: (#) 830012208.0 35050
(NAME)
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): LEE SCOTT STEVENSON

Field Sample ID	GTEL Lab # (Lab Use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME	BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	~~Hydrocarbon Profile (GMPIS)~~ ☐ TOC 18.0 CFA	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	~~TPH/IR 418.1 ☐ SM 503~~ ☐ TPH as diesel Mod 8015	~~EDB by 504~~ ☐ ~~DBCP by 504~~ ☐ SULFATE 375.4	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	OTHER: TKN - mod 351.2	Total Phos. 365.4	Total Iron 6010A	H/K, pH, MOISTURE
SS57MW0314-14.5	01	1		1								X			3/25/96					✓		✓	✓														✓	✓	✓	✓
SS57SMP0319.5-20	02	1		1								X								✓		✓	✓														✓	✓	✓	✓
~~SS57SMP0329.5-30~~												✓								~~✓~~		~~✓~~	~~✓~~																	
SS57SMP0339.5-40	03	1		1								X										✓	✓																	
~~SS57SMP0349.5-50~~																				~~✓~~		~~✓~~																		

WO 30576

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
P.O. # _____

QA/QC Level
Blue ☐ CLP ☐ Other ☐ _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS: Analyze per DO8, WAD 35.

Lab Use Only Lot #: Seals Intact
Storage Location: 3°C
Work Order #:

CUSTODY RECORD

Relinquished by Sampler:	Date	Time	Received by:
Lee Scott Stevenson	26 March 1996	15:00	AIR BORNE 556146806 5
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:
	3/27/96	0830	Tammi Melnick

APPENDIX B-2
SOIL PHYSICAL PROPERTIES TESTING RESULTS

PTS Laboratories, Inc.

Geotechnical Services

8100 Secura Way • Santa Fe Springs • CA 90670
Phone (310) 907-3607 • Fax (310) 907-3610

April 19, 1996

RECEIVED
APR 2 2 1996

Chuck Schick
Groundwater Technology
2501 Yale Blvd. SE, Suite 204
Albuquerque, NM 87106

Re: Project No: 830012208.35050
PTS File: 26050

Dear Mr. Schick:

Enclosed are final data for analyses conducted on the samples submitted from your D08 WAD35 O'Club project. All analyses were performed by applicable ASTM, EPA or API methodology. Samples will be retained for 30 days before disposal unless prior arrangements are made.

We appreciate the opportunity to be of service and trust these data will prove beneficial in the development of this project. Please feel free to call myself or Fred Adame, Supervisor, should you have any questions or require additional information.

Sincerely,

PTS Laboratories, Inc.

Larry Kunkel
District Manager

LAK:lg

Enclosures

PTS Laboratories, Inc.

CLIENT: GROUNDWATER TECHNOLOGY

FILE NO: 26050
DATE: APRIL 1996
PROJ. NAME: D08 WAD35 O'CLUB
PROJ. NO: 830012208.35050

PHYSICAL PROPERTIES DATA

(METHODOLOGY: ASTM D2216, API RP40, EPA 9100)

SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENT. (1)	DENSITY BULK (g/cc)	DENSITY GRAIN (g/cc)	EFFECTIVE POROSITY, % Vb	CONDUCTED AT 25.0 PSI CONFINING STRESS: NATIVE STATE EFFECTIVE PERMEABILITY TO AIR (millidarcy)	NATIVE STATE EFFECTIVE AIR CONDUCTIVITY (cm/s)	NATIVE STATE EFFECTIVE PERMEABILITY TO WATER (millidarcy)	NATIVE STATE EFFECTIVE WATER CONDUCTIVITY (cm/s)
SS57SPO119-19.5	19.0-19.5	V	1.40	2.62	46.5	6.42	4.74E-04		
SS57SPO129-29.5	29.0-29.5	V	1.61	2.66	39.3	1,185	6.54E-02		
SS57SPO139-39.5	39.0-39.5	V	1.54	2.63	41.4	17.8	1.08E-03		

(1) SAMPLE ORIENTATION:
H = HORIZONTAL
V=VERTICAL

Vb = BULK VOLUME, cc
Pv = PORE VOLUME, cc

PTS Laboratories, Inc.

CLIENT: GROUNDWATER TECHNOLOGY

FILE NO: 26050
DATE: APRIL 1996
PROJ. NAME: D08 WAD35 O'CLUB
PROJ. NO: 830012208.35050

PARTICLE SIZE SUMMARY

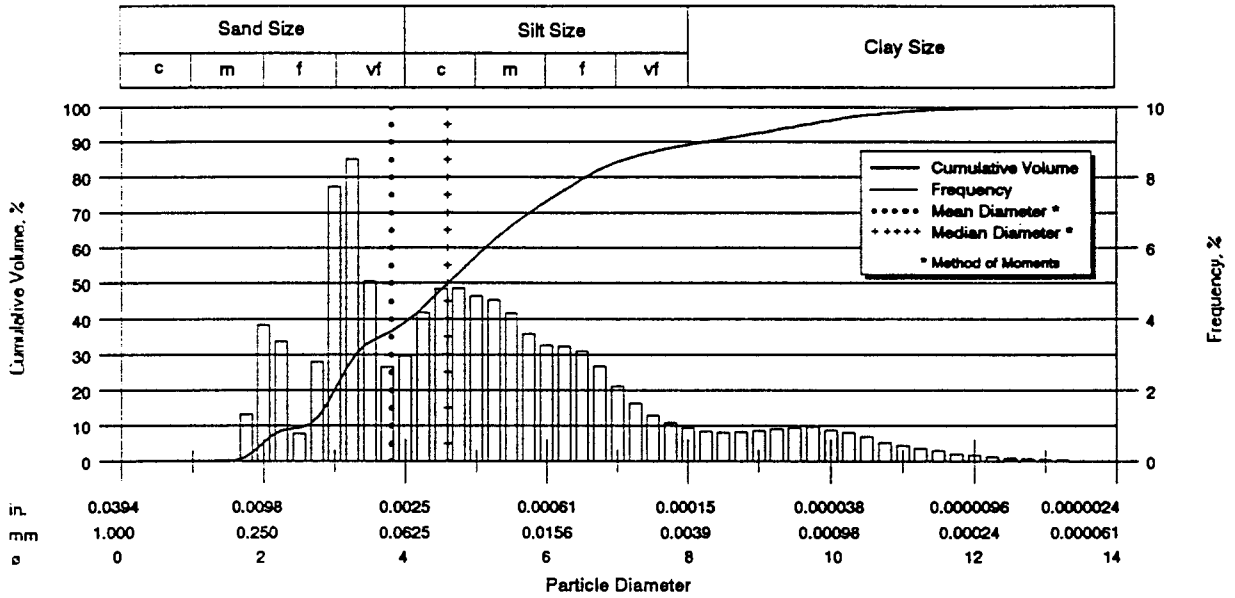
(METHODOLOGY: ASTM D4464)

Sample ID	Median Grain Size, mm	Particle Size Distribution, % grain volume									Classification				
			Sand Fraction												
		Granule	V. Coarse	Coarse	Medium	Fine	V. Fine	Silt	Clay	Silt & Clay	Liquid Limit	Plastic Limit	Plasticity Index	Moisture Content	USCS ID
SS57SPO119-19.5	0.0413	0.00	0.00	0.00	5.20	14.66	19.18	50.10	10.86	60.96	36	32	4	31.7	ML
SS57SPO129-29.5	0.2314	0.00	0.00	4.94	36.20	44.39	6.58	5.32	2.57	7.89	NP	NP	NP	18.0	SW
SS57SPO139-39.5	0.1077	0.00	0.00	1.27	10.83	28.97	23.51	27.09	8.33	35.42	31	28	3	27.7	~~ML~~ SM

PTS Laboratories, Inc.

File No: 26050
Date: April 1996
Project Name: D08 WAD35 O'Club
Client: Groundwater Technology
Sample ID: SS57SP0119-19.5

Particle Size by Laser Light Scattering
(ASTM D4464)



Particle Size Distribution

	Diameter [U.S. Sieve]	[in]	[mm]	[phi]	Volume, % [Inc.]	[Cum.]
Coarse Sand	20	0.0331	0.84	0.25	0.00	0.00
	25	0.0280	0.71	0.50	0.00	0.00
	30	0.0232	0.59	0.75	0.00	0.00
	35	0.0197	0.50	1.00	0.00	0.00
Medium Sand	40	0.0165	0.42	1.25	0.00	0.00
	45	0.0138	0.35	1.50	0.04	0.04
	50	0.0118	0.30	1.75	1.32	1.36
	60	0.0098	0.25	2.00	3.84	5.20
Fine Sand	70	0.0083	0.210	2.25	3.36	8.56
	80	0.0070	0.177	2.50	0.77	9.33
	100	0.0059	0.149	2.75	2.79	12.12
	120	0.0049	0.125	3.00	7.74	19.86
Very Fine Sand	140	0.0041	0.105	3.25	8.50	28.36
	170	0.0035	0.088	3.50	5.06	33.42
	200	0.0029	0.074	3.75	2.65	36.07
	230	0.0025	0.063	4.00	2.97	39.04
Silt	270	0.0021	0.053	4.25	4.18	43.22
	325	0.0017	0.044	4.50	4.86	48.08
	400	0.0015	0.037	4.75	4.84	52.92
	450	0.0012	0.031	5.00	4.65	57.57
	500	0.0010	0.025	5.32	5.74	63.31
	635	0.0008	0.020	5.64	5.02	68.33
		0.00061	0.0156	6.00	4.77	73.10
		0.00031	0.0078	7.00	11.10	84.20
		0.00015	0.0039	8.00	4.94	89.14
Clay		0.000079	0.0020	9.00	3.34	92.48
		0.000039	0.00098	10.0	3.69	96.17
		0.000019	0.00049	11.0	2.47	98.64
		0.0000094	0.00024	12.0	1.02	99.66
		0.0000047	0.00012	13.0	0.31	99.97
		0.0000039	0.00010	13.3	0.03	100.00

Sorting Statistics

Parameter	[Moment]	[Trask]	[Inman]	[Folk]
Mean, in	0.0028	0.0016	0.0013	0.0014
Mean, mm	0.0714	0.0400	0.0328	0.0354
Mean, phi	3.8081	4.6450	4.9323	4.8207
Median, in	0.0016	0.0016	0.0016	0.0016
Median, mm	0.0413	0.0413	0.0413	0.0413
Median, phi	4.5974	4.5975	4.5975	4.5975
Std Deviation, in	0.0029	0.0148	0.0095	0.0086
Std Deviation, mm	0.0756	0.3793	0.2430	0.2200
Std Deviation, phi	3.7249	1.3987	2.0407	2.1847
Skewness	1.4180	0.9140	0.6044	0.2425
Kurtosis	1.4350	0.2661	0.8828	1.0480
Mode, mm	0.1271			
95% Confidence	0.0566			
Limits, mm	0.0862			
Variance, mm2	0.0057			
Coef. of Variance, %	106.00			

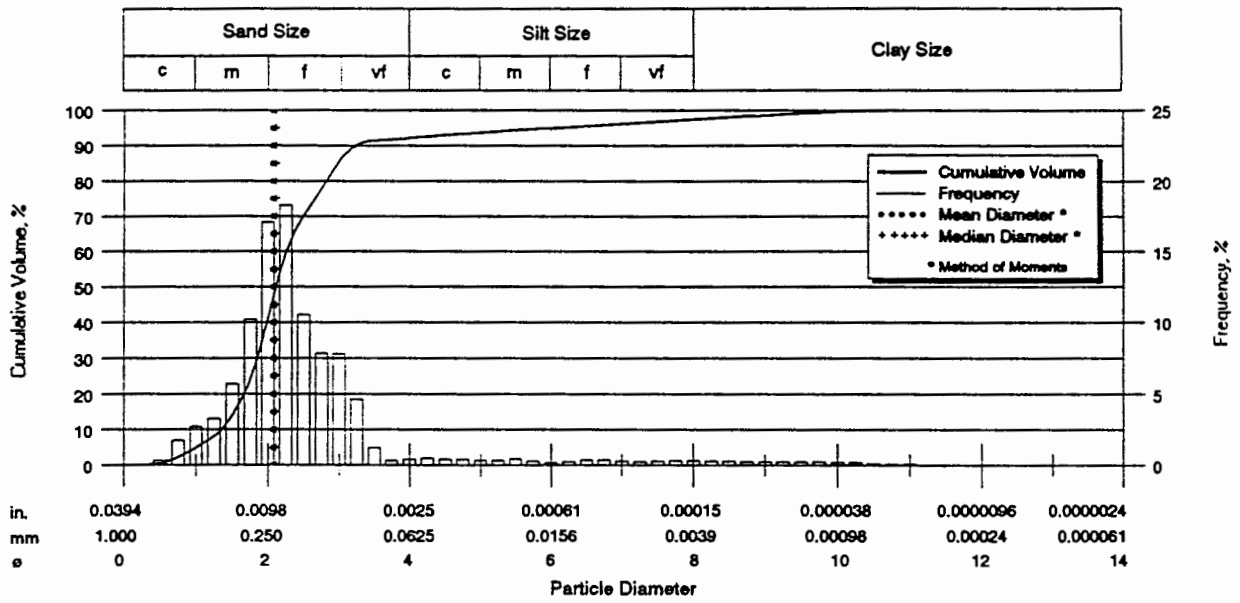
Percentiles [volume, %]	Particle Diameter [in]	[mm]	[phi]
5	0.0098	0.2520	1.9886
10	0.0064	0.1638	2.6097
16	0.0053	0.1348	2.8916
25	0.0044	0.1133	3.1424
50	0.0016	0.0413	4.5975
75	0.0006	0.0141	6.1476
84	0.0003	0.0080	6.9730
90	0.0001	0.0033	8.2569
95	0.0000	0.0012	9.6730

PTS Laboratories, Inc.

File No: 26050
Date: April 1996
Project Name: D08 WAD35 O'Club
Sample ID: SS57SP0129-29.5

Client: Groundwater Technology

Particle Size by Laser Light Scattering
(ASTM D4464)



Particle Size Distribution

	Diameter [U.S. Sieve]	[in]	[mm]	[phi]	Volume, % [Inc.]	[Cum.]
Coarse Sand	20	0.0331	0.84	0.25	0.18	0.18
	25	0.0280	0.71	0.50	0.32	0.50
	30	0.0232	0.59	0.75	1.73	2.23
	35	0.0197	0.50	1.00	2.71	4.94
Medium Sand	40	0.0165	0.42	1.25	3.23	8.17
	45	0.0138	0.35	1.50	5.69	13.86
	50	0.0118	0.30	1.75	10.20	24.06
	60	0.0098	0.25	2.00	17.08	41.14
Fine Sand	70	0.0083	0.210	2.25	18.29	59.43
	80	0.0070	0.177	2.50	10.53	69.96
	100	0.0059	0.149	2.75	7.81	77.77
	120	0.0049	0.125	3.00	7.76	85.53
Very Fine Sand	140	0.0041	0.105	3.25	4.61	90.14
	170	0.0035	0.088	3.50	1.24	91.38
	200	0.0029	0.074	3.75	0.32	91.70
	230	0.0025	0.063	4.00	0.41	92.11
Silt	270	0.0021	0.053	4.25	0.49	92.60
	325	0.0017	0.044	4.50	0.40	93.00
	400	0.0015	0.037	4.75	0.39	93.39
	450	0.0012	0.031	5.00	0.34	93.73
	500	0.0010	0.025	5.32	0.43	94.16
	635	0.0008	0.020	5.64	0.52	94.68
		0.00061	0.0156	6.00	0.28	94.96
		0.00031	0.0078	7.00	1.27	96.23
		0.00015	0.0039	8.00	1.20	97.43
Clay		0.000079	0.0020	9.00	1.10	98.53
		0.000039	0.00098	10.0	0.98	99.51
		0.000019	0.00049	11.0	0.47	99.98
		0.0000094	0.00024	12.0	0.02	100.00
		0.0000047	0.00012	13.0	0.00	100.00
		0.0000039	0.00010	13.3	0.00	100.00

Sorting Statistics

Parameter	[Moment]	[Trask]	[Inman]	[Folk]
Mean, in	0.0093	0.0084	0.0082	0.0084
Mean, mm	0.2394	0.2155	0.2095	0.2166
Mean, phi	2.0625	2.2145	2.2549	2.2071
Median, in	0.0090	0.0090	0.0090	0.0090
Median, mm	0.2314	0.2314	0.2314	0.2314
Median, phi	2.1115	2.1115	2.1115	2.1115
Std Deviation, in	0.0051	0.0166	0.0242	0.0181
Std Deviation, mm	0.1298	0.4268	0.8193	0.4633
Std Deviation, phi	2.9456	1.2282	0.6914	1.1101
Skewness	0.8990	1.0548	2.0485	0.3844
Kurtosis	1.8620	0.2387	2.6486	2.3028
Mode, mm	0.2404			
95% Confidence	0.2140			
Limits, mm	0.2649			
Variance, mm2	0.0168			
Coef. of Variance, %	54.22			

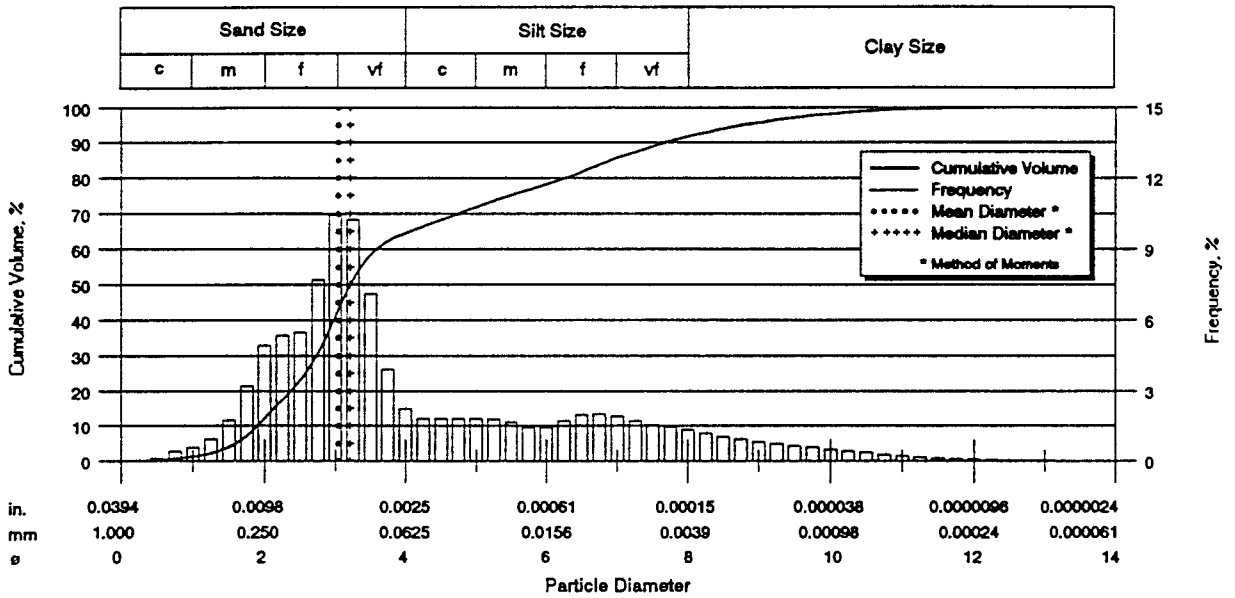
Percentiles [volume, %]	Particle Diameter [in]	[mm]	[phi]
5	0.0194	0.4982	1.0052
10	0.0152	0.3906	1.3562
16	0.0132	0.3383	1.5635
25	0.0115	0.2941	1.7656
50	0.0090	0.2314	2.1115
75	0.0062	0.1578	2.6635
84	0.0051	0.1297	2.9463
90	0.0041	0.1061	3.2369
95	0.0006	0.0151	6.0504

PTS Laboratories, Inc.

File No:	26050
Date:	April 1996
Project Name:	D08 WAD35 O'Club
Sample ID:	SS57SP0139-39.5

Client: Groundwater Technology

Particle Size by Laser Light Scattering
(ASTM D4464)



Particle Size Distribution

	[U.S. Sieve]	Diameter [in]	[mm]	[phi]	Volume, % [Inc.]	[Cum.]
Coarse Sand	20	0.0331	0.84	0.25	0.14	0.14
	25	0.0280	0.71	0.50	0.13	0.27
	30	0.0232	0.59	0.75	0.43	0.70
	35	0.0197	0.50	1.00	0.57	1.27
Medium Sand	40	0.0165	0.42	1.25	0.95	2.22
	45	0.0138	0.35	1.50	1.73	3.95
	50	0.0118	0.30	1.75	3.22	7.17
	60	0.0098	0.25	2.00	4.93	12.10
Fine Sand	70	0.0083	0.210	2.25	5.35	17.45
	80	0.0070	0.177	2.50	5.48	22.93
	100	0.0059	0.149	2.75	7.69	30.62
	120	0.0049	0.125	3.00	10.45	41.07
Very Fine Sand	140	0.0041	0.105	3.25	10.24	51.31
	170	0.0035	0.088	3.50	7.12	58.43
	200	0.0029	0.074	3.75	3.91	62.34
	230	0.0025	0.063	4.00	2.24	64.58
Silt	270	0.0021	0.053	4.25	1.80	66.38
	325	0.0017	0.044	4.50	1.81	68.19
	400	0.0015	0.037	4.75	1.79	69.98
	450	0.0012	0.031	5.00	1.80	71.78
	500	0.0010	0.025	5.32	2.27	74.05
	635	0.0008	0.020	5.64	1.97	76.02
		0.00061	0.0156	6.00	2.05	78.07
		0.00031	0.0078	7.00	7.58	85.65
		0.00015	0.0039	8.00	6.02	91.67
Clay		0.000079	0.0020	9.00	3.98	95.65
		0.000039	0.00098	10.0	2.46	98.11
		0.000019	0.00049	11.0	1.26	99.37
		0.0000094	0.00024	12.0	0.48	99.85
		0.0000047	0.00012	13.0	0.14	99.99
		0.0000039	0.00010	13.3	0.01	100.00

Sorting Statistics

Parameter	[Moment]	[Trask]	[Inman]	[Folk]
Mean, in	0.0047	0.0024	0.0017	0.0023
Mean, mm	0.1215	0.0616	0.0448	0.0600
Mean, phi	3.0410	4.0210	4.4803	4.0584
Median, in	0.0042	0.0042	0.0042	0.0042
Median, mm	0.1077	0.1077	0.1077	0.1077
Median, phi	3.2149	3.2144	3.2144	3.2144
Std Deviation, in	0.0045	0.0142	0.0079	0.0083
Std Deviation, mm	0.1147	0.3643	0.2030	0.2116
Std Deviation, phi	3.1241	1.4568	2.3004	2.2403
Skewness	1.6740	1.3627	0.8633	0.5512
Kurtosis	4.6160	0.2497	0.5638	1.0201
Mode, mm	0.1271			
95% Confidence	0.0990			
Limits, mm	0.1440			
Variance, mm2	0.0132			
Coef. of Variance, %	94.40			

Percentiles [volume, %]	Particle Diameter [in]	[mm]	[phi]
5	0.0128	0.3292	1.6031
10	0.0105	0.2681	1.8990
16	0.0086	0.2207	2.1800
25	0.0065	0.1677	2.5757
50	0.0042	0.1077	3.2144
75	0.0009	0.0226	5.4664
84	0.0004	0.0091	6.7807
90	0.0002	0.0048	7.6884
95	0.0001	0.0022	8.7978

DATE PTS FILE # 26050 CHAIN OF CUSTODY RECORD PAGE OF

PTS Laboratories, Inc.

8100 Secura Way
Santa Fe Springs, CA 90670
Ph: (310) 907-3607 • Fax: (310) 907-3610

COMPANY: Groundwater Technology
PROJECT MANAGER: Chuck Schick
PROJECT NAME: DO8 WA035 O'club
FAX NUMBER: 505-242-1103
PROJECT NUMBER: 830012208.35050
PHONE NUMBER: 505-242-1103
SITE LOCATION: HAFB, NM
ADDRESS: Corner of W. 8th St & W. New Mexico HAFB, NM
SAMPLER SIGNATURE: [signature]

PO#

SPECIAL HANDLING
24 HOURS 5 DAYS
72 HOURS NORMAL
OTHER STD

SAMPLE CONDITIONS
RECEIVED ON ICE YES/NO
SEALED YES/NO
OTHER YES/NO

ANALYSIS REQUEST

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	PHYSICAL PROPERTIES PACKAGE, API RP40	MOISTURE CONTENT, ASTM D2216	POROSITY, API RP40	GRAIN DENSITY, API RP40	BULK DENSITY, API RP40	AIR PERMEABILITY, API RP40	SPECIFIC RETENTION/YEILD ASTM D425	CATION EXCHANGE CAPACITY, EPA 9080	SOIL pH, EPA 9045	GRAIN SIZE: DRY; 400 MESH	GRAIN SIZE: WET/DRY, 20 MICRON	GRAIN SIZE: LASER; 1 MICRON	HYDRAULIC CONDUCTIVITY, EPA 9100, API RP40	TOC: EPA 9060	Atterberg Limit ASTM D4318	Sieve Analysis ASTM D421 & D422						NUMBER OF SAMPLES	COMMENTS
									X																	
SS57SP0119-19.5	3-27-96	1220	19-19.5						X									X	X						2	
SS57SP0129-29.5	↓	1300	29-29.5						X									X	X						2	
SS57SP0139-39.5	↓	1340	39-39.5						X									X	X						2	
																										Airborne #
																										5561468161
																										Received at
																										Ambient Temp

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
[signature]	Airborne 5561468161		Lisa Grades
COMPANY: GTI/GSI	COMPANY:	COMPANY:	COMPANY: PTS Laboratories
DATE: 28 MAR 1996 TIME: 12:00	DATE: TIME:	DATE: TIME:	DATE: 3/29/96 TIME: 11:30 AM

APPENDIX C
GROUNDWATER ANALYTICAL RESULTS

NEI/GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Midwest Region
4211 May Avenue
Wichita, KS 67209
(316) 945-2624
(800) 633-7936
(316) 945-0506 (FAX)

RECEIVED
APR 30 1996

April 26, 1996

Chuck Schick
GROUNDWATER TECHNOLOGY,INC
2501 Yale Blvd Se #204
Albuquerque, NM 87106

RE: GTEL Client ID:	830012208
Login Number:	W6040290
Project ID (number):	830012208
Project ID (name):	HOLLOMAN AFB/DO8 WAD 35/HOLLOMAN/NM

Dear Chuck Schick:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 04/12/96 under Chain-of-Custody Number(s) 42287.

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. This report is to be reproduced only in full.

NEI/GTEL is certified by the U.S. Army Corp of Engineers Laboratory Validation, expiration date March 18, 1997.

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

Sincerely,
GTEL Environmental Laboratories, Inc.

John O Sattler
QA/QC Manager for

Terry R. Loucks
Laboratory Director

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
Login Number: W6040290
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Method: GC
Matrix: Aqueous

GTEL Sample Number	W6040290-01	W6040290-02	W6040290-03	W6040290-04
Client ID	SS57MW03	SS57SP01 18-20	SS57SP01 28-30	SS57SP01 18-20DUP
Date Sampled	04/10/96	04/10/96	04/10/96	04/10/96
Date Prepared	04/17/96	04/17/96	04/17/96	04/17/96
Date Analyzed	04/23/96	04/23/96	04/23/96	04/23/96
Dilution Factor	1.00	1.00	1.00	1.00

Analyte	Reporting Limit	Units	Concentration:			
TPH as Diesel	100	ug/L	9700	3300	790	3400

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3510 (liquid/liquid). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0290
Date Reported: 04-25-96

QA NONCONFORMANCE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Surrogate Compound Recoveries

2.1 The recovery limits were exceeded for **0** surrogate compounds as shown in Table 2.

3.0 Matrix Spike (MS) Accuracy

3.1 The recovery limits were exceeded in the matrix spike for **0** compounds as shown in Table 3.

4.0 Sample Duplicate Precision

4.1 The maximum percent difference (RPD) was exceeded for **0** compounds in the duplicate samples as shown in Table 3.

5.0 Method Blanks

5.1 **Zero** target compounds were found in the method blank as shown in Table 4.

6.0 Laboratory Control Sample Accuracy

6.1 The recovery limits were exceeded in the laboratory control sample for **zero** compounds as shown in Table 5.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0290
Date Reported: 04-25-96

Table 2

SURROGATE COMPOUND RECOVERY
ortho-Terphenyl

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Acceptability Limits[a]: 22.6-147

GTEL No.	Surrogate Recovery %
Method Blank 04-17-96	79.7
LCSS 04-17-96	94.5
W6040311-01MS	66.0
W6040311-01MD	73.2
W6040290-01	66.7
W6040290-02	58.5
W6040290-03	75.8
W6040311-04	58.8

a Acceptability limits are derived from statistical analysis of laboratory samples.

* Indicates surrogate recovery outside of acceptability limits.

MS: Matrix Spike
MSD: Matrix Spike Duplicate
LCSS: Laboratory Control Sample Spike
LCSSD: Laboratory Control Sample Spike Duplicate

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0290
Date Reported: 04-25-96

Table 3

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Sample Spiked: W6040311-01

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	3770	1220	4110	76.7	23.2-105

Analyte	Spike Added, ug/L	MSD Concentration, ug/L	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Diesel Fuel	3770	4750	93.6	19.8	36.7	23.2-105

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

RPD: 0 out of 1 outside limits.
Spike Recovery: 0 out of 2 outside limits.

Table 4

METHOD BLANK RESULTS

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Date Extracted 04-17-96

Analyte	Concentration, ug/L
Diesel Fuel	<100

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0290
Date Reported: 04-25-96

Table 5

LABORATORY CONTROL SAMPLE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID Modified 8015

Sample Spiked: Reagent H_2O 04-17-96

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	2000	<100	1200	60.0	23.2-105

* Indicates values outside of acceptability limits.

a Acceptability limits are derived from statistical analysis of laboratory samples.

Spike Recovery: 0 out of 1 outside limits.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	01	02	04	
		Client Identification	SS57MW03	SS57SP01 18-20	SS57SP01 18-20 Dup	
		Date Sampled	04-10-96	04-10-96	04-10-96	
		Date Analyzed	04-24-96	04-24-96	04-24-96	
Analyte	Method	QL* & Units	Concentration			
Sulfate	EPA 375.4	5 mg/L	**2100**	**1800**	**2000**	

a Distillation by 350.2.

* Quantitation Limit

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

QA NONCONFORMANCE SUMMARY

Inorganics

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Initial Calibration Verification

2.1 The criteria for the calibration verification QC Check Sample was exceeded for **0** samples as shown in Table 2.

3.0 Method Blanks

3.1 **Zero** target analytes were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike for **0** analyte as shown in Table 4.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for **0** analytes in the duplicate samples as shown in Table 5.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for 0 analytes in the Laboratory Control Sample as shown in Table 6.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	20.0	20.8	mg/L	104	90-110

a Acceptability limits established by laboratory practice.

Table 3

BLANK REPORT

Inorganics

Analyte	Initial Calibration Blank	Preparation Blank	Units
Sulfate	<5	NA	mg/L

NA - Not Applicable

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

Table 4

MATRIX SPIKE (MS) RECOVERY SUMMARY

Inorganics

Sample Spiked: W6040311-04

Analyte	MS Sample Result	Sample Result	Amount Added	Units	MS, % Recovery	Acceptability Limits, %[a]
Sulfate	3460	1660	1820	mg/L	107	80-120

a Acceptability limits established by laboratory practice.

Table 5

LABORATORY DUPLICATE SAMPLE RESULTS
AND RELATIVE PERCENT DIFFERENCE (RPD) SUMMARY

Inorganics

Analyte	Sample Result	Duplicate Result	Units	RPD, %	Maximum RPD, %[a]
Sulfate	3460	3470	mg/L	0.289	20

a Acceptability limits established by laboratory practice.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

Table 6

LABORATORY CONTROL SAMPLE RESULTS

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	123	116	mg/L	94.3	80-120

a Acceptability limits established by laboratory practice

ANALYTICAL RESULTS
Metals

GTEL Client ID: 830012208
Login Number: W6040290
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Method: EPA 6010A
Matrix: Aqueous

GTEL Sample Number	W6040290-01	W6040290-02	W6040290-03	W6040290-04
Client ID	SS57MW03	SS57SP01 18-20	SS57SP01 28-30	SS57SP01 18-20DUP
Date Sampled	04/10/96	04/10/96	04/10/96	04/10/96
Date Prepared	04/16/96	04/16/96	04/16/96	04/16/96
Date Analyzed	04/16/96	04/16/96	04/16/96	04/16/96
Dilution Factor	1.00	1.00	1.00	1.00

Analyte	Reporting Limit	Units	Concentration:			
Iron	100	ug/L	< 100	190	< 100	230

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

EPA 6010A:

Digestion for Total Metals by EPA Method 3010A. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including Update 1.

W6040290-01:

The results indicate dissolved metals.

W6040290-02:

The results indicate dissolved metals.

W6040290-03:

The results indicate dissolved metals.

W6040290-04:

The results indicate dissolved metals.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

QA NONCONFORMANCE SUMMARY

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for zero samples.

2.0 Initial Calibration Verification

2.1 The validity for the calibration verification was exceeded for zero samples as shown in Table 2.

3.0 Method Blanks

3.1 Zero target elements were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike and matrix spike duplicate for zero elements as shown in Table 4A and Table 4B.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for zero elements in the matrix spike and matrix spike duplicate samples as shown in Table 4A and Table 4B.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for zero elements for the laboratory control samples as shown in Table 5.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Metals in Water[a]

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %[a]
Iron	997	1010	101	90-110

a Acceptability limits as per EPA Contract Laboratory Program

Table 3

BLANK REPORT

Metals in Water

Analyte	Initial Calibration Blank, ug/L	Preparation Blank, ug/L
Iron	<100	<100

<# Not detected at the indicated detection limit(#)

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

Table 4A

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Metals in Water

Sample Spiked: W6040290-01

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Iron	2000	<100	1840	92.5	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

NA Not applicable; initital sample concentration greater than four times spike amount.

Table 4B

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Metals in Water

Analyte	Spike Added, ug/L	MSD Concentration, ug/L	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Iron	2000	1850	92.7	0.273	20.0	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

NA Not applicable; initital sample concentration greater than four times spike amount.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-040290
Date Reported: 04-25-96

Table 5

LABORATORY CONTROL SAMPLE RESULTS

Metals in Water

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %[a]
Iron	2000	1920	96.1	80-120

a Acceptability limits established by laboratory practice

GTEL ENVIRONMENTAL LABORATORIES INC

4211 MAY AVE.
WICHITA, KS 67209
(316) 945-2624
(800) 633-7936

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

12287

Company Name: GROUNDWATER TECHNOLOGY GOVT SVC.
Phone #: 505 242 3115
FAX #: 505 242 1073

Company Address: 2501 YALE, SE. #204 ALBUQUERQUE, NM 87106
Site Location: HAFB OFF-SITE CLUY - NM.

Project Manager: CHUCK SCHECK.
Client Project ID: (#) 8300122083.5

I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): (NAME) LEE SCOTT STEVENSON

Field Sample ID	GTEL Lab # (Lab Use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME	BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Petroleum Diesel	[illegible]	Iron
SS57MW03	01	4	✓						X	X		X			10 Apr 1996	14:30																					✓	✓
SS57SP0118-20	02	4	✓						X	X		X				15:35																					✓	✓
SS57SP0128-30	03	4	✓						X	X		X				17:20																					✓	✓
SS57SP0118-20DUP	04	4	✓						X	X		X				15:35																					✓	✓
	TB-18 05																																					

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
P.O. # _____

QA/QC Level
Blue ☐ CLP ☐ Other ☐ _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS:
Iron Sample Field Filtered
Analyze for DOB WAC 25

Lab Use Only Lot #: Seals Intact
Storage Location
Work Order #:

CUSTODY RECORD

Relinquished by Sampler:	Date	Time	Received by:
[signature]	11 Apr 1996	08:31	A. Boone SS 61416 [illegible]
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory: Waybill # [illegible]

NEI/GTEL
ENVIRONMENTAL LABORATORIES, INC.

Midwest Region
4211 May Avenue
Wichita, KS 67209
(316) 945-2624
(800) 633-7936
(316) 945-0506 (FAX)

RECEIVED
APR 30 1996

April 26, 1996

Chuck Schick
GROUNDWATER TECHNOLOGY,INC
2501 Yale Blvd Se #204
Albuquerque, NM 87106

RE: GTEL Client ID:	830012208
Login Number:	W6040311
Project ID (number):	830012208
Project ID (name):	HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Dear Chuck Schick:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 04/13/96 under Chain-of-Custody Number(s) 42285.

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. This report is to be reproduced only in full.

NEI/GTEL is certified by the U.S. Army Corp of Engineers Laboratory Validation, expiration date March 18, 1997.

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

Sincerely,
GTEL Environmental Laboratories, Inc.

John O. Sattler
QA/QC Manager for,

Terry R. Loucks
Laboratory Director

ANALYTICAL RESULTS
Metals

GTEL Client ID: 830012208
Login Number: W6040311
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/DO8 WAD 35/HOLLOMAN/NM

Method: EPA 6010A
Matrix: Aqueous

GTEL Sample Number	W6040311-01	--	--	--
Client ID	SS57SP01 38-40	--	--	--
Date Sampled	04/11/96	--	--	--
Date Prepared	04/16/96			
Date Analyzed	04/16/96	--	--	--
Dilution Factor	1.00	--	--	--

Analyte	Reporting Limit	Units	Concentration:			
Iron	100	ug/L	140	--	--	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

EPA 6010A:

Digestion for Total Metals by EPA Method 3010A. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including Update 1.

W6040311-01:

The results indicate dissolved metals.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

QA NONCONFORMANCE SUMMARY

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for zero samples.

2.0 Initial Calibration Verification

2.1 The validity for the calibration verification was exceeded for zero samples as shown in Table 2.

3.0 Method Blanks

3.1 Zero target elements were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike and matrix spike duplicate for zero elements as shown in Table 4A and Table 4B.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for zero elements in the matrix spike and matrix spike duplicate samples as shown in Table 4A and Table 4B.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for zero elements for the laboratory control samples as shown in Table 5.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Metals in Water[a]

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %[a]
Iron	997	1010	101	90-110

a Acceptability limits as per EPA Contract Laboratory Program

Table 3

BLANK REPORT

Metals in Water

Analyte	Initial Calibration Blank, ug/L	Preparation Blank, ug/L
Iron	<100	<100

<# Not detected at the indicated detection limit(#)

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 4A

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Metals in Water

Sample Spiked: W6040290-01

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Iron	2000	<100	1840	92.5	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

NA Not applicable; initital sample concentration greater than four times spike amount.

Table 4B

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Metals in Water

Analyte	Spike Added, ug/L	MSD Concentration, ug/L	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Iron	2000	1850	92.7	0.273	20.0	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

NA Not applicable; initital sample concentration greater than four times spike amount.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 5

LABORATORY CONTROL SAMPLE RESULTS

Metals in Water

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %[a]
Iron	2000	1920	96.1	80-120

a Acceptability limits established by laboratory practice

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	02	03	04	
		Client Identification	SS57MW05	SS57MW09	SS57MW07	
		Date Sampled	04-12-96	04-12-96	04-12-96	
		Date Analyzed	04-24-96	04-24-96	04-24-96	
Analyte	Method	QL* & Units	Concentration			
Sulfate	EPA 375.4	5 mg/L	**1700**	**1800**	**1500**	

* Quantitation Limit

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

QA NONCONFORMANCE SUMMARY

Inorganics

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Initial Calibration Verification

2.1 The criteria for the calibration verification QC Check Sample was exceeded for **0** samples as shown in Table 2.

3.0 Method Blanks

3.1 **Zero** target analytes were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike for **0** analyte as shown in Table 4.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for **0** analytes in the duplicate samples as shown in Table 5.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for 0 analytes in the Laboratory Control Sample as shown in Table 6.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	20.0	20.8	mg/L	104	90-110

a Acceptability limits established by laboratory practice.

Table 3

BLANK REPORT

Inorganics

Analyte	Initial Calibration Blank	Preparation Blank	Units
Sulfate	<5	NA	mg/L

NA - Not Applicable

Table 4

MATRIX SPIKE (MS) RECOVERY SUMMARY

Inorganics

Sample Spiked: W6040311-04

Analyte	MS Sample Result	Sample Result	Amount Added	Units	MS, % Recovery	Acceptability Limits, %[a]
Sulfate	3460	1660	1820	mg/L	107	80-120

a Acceptability limits established by laboratory practice.

Project ID (Number): 830012208
Project ID (Name): Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 5

LABORATORY DUPLICATE SAMPLE RESULTS
AND RELATIVE PERCENT DIFFERENCE (RPD) SUMMARY

Inorganics

Analyte	Sample Result	Duplicate Result	Units	RPD, %	Maximum RPD, %[a]
Sulfate	3460	3470	mg/L	0.289	20

a Acceptability limits established by laboratory practice.

Table 6

LABORATORY CONTROL SAMPLE RESULTS

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	123	116	mg/L	94.3	80-120

a Acceptability limits established by laboratory practice

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
Login Number: W6040311
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Method: GC
Matrix: Aqueous

GTEL Sample Number	W6040311-01	W6040311-02	W6040311-03	W6040311-04
Client ID	SS57SP01 38-40	SS57MW05	SS57MW09	SS57MW07
Date Sampled	04/11/96	04/12/96	04/12/96	04/12/96
Date Prepared	04/17/96	04/17/96	04/17/96	04/17/96
Date Analyzed	04/23/96	04/23/96	04/23/96	04/23/96
Dilution Factor	1.00	1.00	1.00	1.00

Analyte	Reporting Limit	Units	Concentration:			
TPH as Diesel	100	ug/L	1200	< 100	< 100	< 100

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3510 (liquid/liquid). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

QA NONCONFORMANCE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Surrogate Compound Recoveries

2.1 The recovery limits were exceeded for **0** surrogate compounds as shown in Table 2.

3.0 Matrix Spike (MS) Accuracy

3.1 The recovery limits were exceeded in the matrix spike for **0** compounds as shown in Table 3.

4.0 Sample Duplicate Precision

4.1 The maximum percent difference (RPD) was exceeded for **0** compounds in the duplicate samples as shown in Table 3.

5.0 Method Blanks

5.1 **Zero** target compounds were found in the method blank as shown in Table 4.

6.0 Laboratory Control Sample Accuracy

6.1 The recovery limits were exceeded in the laboratory control sample for **0** compounds as shown in Table 5.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 2

SURROGATE COMPOUND RECOVERY
ortho-Terphenyl

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Acceptability Limits[a]: 22.6-147

GTEL No.	Surrogate Recovery %
Method Blank 04-17-96	79.7
LCSS 04-17-96	94.5
W6040311-01	82.0
W6040311-01MS	66.0
W6040311-01MD	73.2
W6040311-02	77.9
W6040311-03	75.4
W6040311-04	78.4

a Acceptability limits are derived from statistical analysis of laboratory samples.

* Indicates surrogate recovery outside of acceptability limits.

MS: Matrix Spike
MSD: Matrix Spike Duplicate
LCSS: Laboratory Control Sample Spike
LCSSD: Laboratory Control Sample Spike Duplicate

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 3

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Sample Spiked: W6040311-01

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	3770	1220	4110	76.7	23.2-105

Analyte	Spike Added, ug/L	MSD Concentration, ug/L	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Diesel Fuel	3770	4750	93.6	19.8	36.7	23.2-105

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

RPD: 0 out of 1 outside limits.
Spike Recovery: 0 out of 2 outside limits.

Table 4

METHOD BLANK RESULTS

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Date Extracted 04-17-96

Analyte	Concentration, ug/L
Diesel Fuel	< 100

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0311
Date Reported: 04-26-96

Table 5

LABORATORY CONTROL SAMPLE

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID Modified 8015

Sample Spiked: Reagent H_2O 04-17-96

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	2000	<100	1200	60.0	23.2-105

* Indicates values outside of acceptability limits.

a Acceptability limits are derived from statistical analysis of laboratory samples.

Spike Recovery: 0 out of 1 outside limits.

GTEL ENVIRONMENTAL LABORATORIES INC

4211 MAY AVE.
WICHITA, KS 67209
(316) 945-2624
(800) 633-7936

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

42285

Company Name: GROUNDWATER TECHNOLOGY GOVT SERVICES.
Phone #: 505 242 3113
FAX #: 505 242 1103

Company Address: 2501 YALE, SE, #204 ALBUQUERQUE N.M. 87106
Site Location: Holloman AFB, NM

Project Manager: Chuck Schick
Client Project ID: (#) 83001 27 08.35050
(NAME) HAFB O'Club

I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): LEE SCOTT STEVENSON

Field Sample ID	GTEL Lab # (Lab Use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME	BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TPH Diesel	Sulfates	Dissolved Iron
SS57SP0138-40	01	3	✓						2	1		✓			11 Apr 1996	15:55																				✓		✓
SS57MW05	02	3	✓						2						12 Apr 1996	08:50																				✓	✓	
SS57MW09	03	3	✓						2						"	09:40																				✓	✓	
~~SS57MW07~~	04	3	✓						2			✓			"	11:40																				✓	✓	

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
P.O. # _____

QA/QC Level
Blue ☐ CLP ☐ Other ☐ _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS: Analyse per DO8, WAD 35
HAFB Officers Club.

Lab Use Only Lot #: 2
Storage Location
Work Order #: Seals Intact

CUSTODY RECORD

Relinquished by Sampler:	Date	Time	Received by:
[signature]	12 Apr 1996	13:10	[signature] SS6 [illegible] 8 8C
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date 4/ [illegible] 96	Time 8:50	Received by Laboratory: [signature] 55 [illegible]
			Waybill #

NEI/GTEL
ENVIRONMENTAL LABORATORIES, INC.

Midwest Region
4211 May Avenue
Wichita, KS 67209
(316) 945-2624
(800) 633-7936
(316) 945-0506 (FAX)

RECEIVED
MAY 0 6 1996

April 25, 1996

Chuck Schick
GROUNDWATER TECHNOLOGY, INC
2501 Yale Blvd Se #204
Albuquerque, NM 87106

RE: GTEL Client ID:	830012208
Login Number:	W6040254
Project ID (number):	830012208
Project ID (name):	HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Dear Chuck Schick:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 04/11/96 under Chain-of-Custody Number(s) 45102.

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. This report is to be reproduced only in full.

NEI/GTEL is certified by the U.S. Army Corp of Engineers Laboratory Validation, expiration date March 18, 1997.

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

Sincerely,
GTEL Environmental Laboratories, Inc.

John C. Statler
QA Manager for
Terry R. Loucks
Laboratory Director

ANALYTICAL RESULTS
Metals

GTEL Client ID: 830012208
ogin Number: W6040254
Project ID (number): 830012208
Project ID (name): HOLLOMAN AFB/D08 WAD 35/HOLLOMAN/NM

Method: EPA 6010A
Matrix: Aqueous

GTEL Sample Number	W6040254-01	W6040254-02	W6040254-03	--
Client ID	SS57MW04	SS57MW02	SS57MW01	--
Date Sampled	04/09/96	04/09/96	04/09/96	--
Date Prepared	04/16/96	04/16/96	04/16/96	
Date Analyzed	04/16/96	04/16/96	04/16/96	--
Dilution Factor	1.00	1.00	1.00	--

Analyte	Reporting Limit	Units	Concentration:			
Iron	100	ug/L	3100	< 100	110	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

EPA 6010A:

Digestion for Total Metals by EPA Method 3010A. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including Update 1.

W6040254-01:

The results indicate dissolved metals.

W6040254-02:

The results indicate dissolved metals.

W6040254-03:

The results indicate dissolved metals.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

QA NONCONFORMANCE SUMMARY

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for zero samples.

2.0 Initial Calibration Verification

2.1 The validity for the calibration verification was exceeded for zero samples as shown in Table 2.

3.0 Method Blanks

3.1 Zero target elements were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike and matrix spike duplicate for zero elements as shown in Table 4A and Table 4B.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for zero elements in the matrix spike and matrix spike duplicate samples as shown in Table 4A and Table 4B.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for zero elements for the laboratory control samples as shown in Table 5.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Metals in Water[a]

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %[a]
Iron	0.997	1010	101	90-110

a Acceptability limits established by laboratory practice

Table 3

BLANK REPORT

Metals in Water

Analyte	Initial Calibration Blank, ug/L	Preparation Blank, ug/L
Iron	<100	<100

<# Not detected at the indicated detection limit (#)

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

Table 4A

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Metals in Water

Sample Spiked: W6040290-01

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Iron	2000	< 100	1840	92.5	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

NA Not applicable; initital sample concentration greater than four times spike amount.

Table 4B

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Metals in Water

Analyte	Spike Added, ug/L	MSD Concentration, ug/L	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Iron	2000	1850	92.7	0.273	20.0	80-120

a Acceptability limits as per EPA Contract Laboratory Program.

NA Not applicable; initital sample concentration greater than four times spike amount.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

Table 5

LABORATORY CONTROL SAMPLE RESULTS

Metals in Water

Analyte	Expected Result, ug/L	Observed Result, ug/L	Recovery, %	Acceptability Limits, %[a]
Iron	2000	1920	96.1	80-120

a Acceptability limits established by laboratory practice

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-25-96

ANALYTICAL RESULTS

Inorganics

		GTEL Sample Number	01	02	03	
		Client Identification	SS57MW04	SS57MW02	SS57MW01	
		Date Sampled	04-09-96	04-09-96	04-09-96	
		Date Analyzed	04-24-96	04-24-96	04-24-96	
Analyte	Method	QL* & Units	Concentration			
Sulfate	EPA 375.4	5 mg/L	**1700**	**1700**	**1700**	

a Distillation by 350.2.

* Quantitation Limit

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-25-96

QA NONCONFORMANCE SUMMARY

Inorganics

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Initial Calibration Verification

2.1 The criteria for the calibration verification QC Check Sample was exceeded for **0** samples as shown in Table 2.

3.0 Method Blanks

3.1 **Zero** target analytes were found in the method blank as shown in Table 3.

4.0 Matrix Spike (MS) Accuracy

4.1 The recovery limits were exceeded in the matrix spike for **0** analyte as shown in Table 4.

5.0 Sample Duplicate Precision

5.1 The maximum percent difference (RPD) was exceeded for **0** analytes in the duplicate samples as shown in Table 5.

6.0 Laboratory Control Sample

6.1 The recovery limits were not met for 0 analytes in the Laboratory Control Sample as shown in Table 6.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-25-96

Table 2

INITIAL CALIBRATION VERIFICATION QC CHECK SAMPLE REPORT

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	20.0	20.8	mg/L	104	90-110

a Acceptability limits established by laboratory practice.

Table 3

BLANK REPORT

Inorganics

Analyte	Initial Calibration Blank	Preparation Blank	Units
Sulfate	<5	NA	mg/L

NA - Not Applicable

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-25-96

Table 4

MATRIX SPIKE (MS) RECOVERY SUMMARY

Inorganics

Sample Spiked: W6040311-04

Analyte	MS Sample Result	Sample Result	Amount Added	Units	MS, % Recovery	Acceptability Limits, %[a]
Sulfate	3460	1660	1820	mg/L	107	80-120

a Acceptability limits established by laboratory practice.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-25-96

Table 5

LABORATORY DUPLICATE SAMPLE RESULTS
AND RELATIVE PERCENT DIFFERENCE (RPD) SUMMARY

Inorganics

Analyte	Sample Result	Duplicate Result	Units	RPD, %	Maximum RPD, %[a]
Sulfate	3460	3470	mg/L	0.289	20

a Acceptability limits established by laboratory practice.

Project ID Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-25-96

Table 6

LABORATORY CONTROL SAMPLE RESULTS

Inorganics

Analyte	Expected Result	Observed Result	Units	Recovery, %	Acceptability Limits, %[a]
Sulfate	123	116	mg/L	94.3	80-120

a Acceptability limits established by laboratory practice

ANALYTICAL RESULTS
Total Petroleum Hydrocarbons By GC

GTEL Client ID: 830012208
Login Number: W6040254
Project ID (number): 830012208 Method: GC
Project ID (name): HOLLOMAN AFB/DO8 WAD 35/HOLLOMAN/NM Matrix: Aqueous

GTEL Sample Number	W6040254-01	W6040254-02	W6040254-03	--
Client ID	SS57MW04	SS57MW02	SS57MW01	--
Date Sampled	04/09/96	04/09/96	04/09/96	--
Date Prepared	04/12/96	04/12/96	04/12/96	
Date Analyzed	04/16/96	04/16/96	04/16/96	--
Dilution Factor	1.00	1.00	1.00	--

Analyte	Reporting Limit	Units	Concentration:			
TPH as Diesel	100	ug/L	250	4100	2500	--

Notes:

Dilution Factor:

Dilution factor indicates the adjustments made for sample dilution.

GC:

Extraction by EPA Method 3510 (liquid/liquid). ASTM Method D3328(modified) is used for qualitative identification of fuel patterns. The method has been modified to include quantitation by applying calibration and quality assurance guidelines outlined in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition including promulgated Update 1.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

QA NONCONFORMANCE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

1.0 Sample Handling

1.1 Sample handling and holding time criteria were not met for **0** samples.

2.0 Surrogate Compound Recoveries

2.1 The recovery limits were exceeded for **0** surrogate compounds as shown in Table 2.

3.0 Matrix Spike (MS) Accuracy

3.1 The recovery limits were exceeded in the matrix spike for **0** compounds as shown in Table 3.

4.0 Sample Duplicate Precision

4.1 The maximum percent difference (RPD) was exceeded for **0** compounds in the duplicate samples as shown in Table 3.

5.0 Method Blanks

5.1 **Zero** target compounds were found in the method blank as shown in Table 4.

6.0 Laboratory Control Sample Accuracy

6.1 The recovery limits were exceeded in the laboratory control sample for **Zero** compounds as shown in Table 5.

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

Table 2

SURROGATE COMPOUND RECOVERY
ortho-Terphenyl

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Acceptability Limits[a]: 22.6-147%

GTEL No.	Surrogate Recovery %
Method Blank 04-12-96	52.1
LCSS 04-12-96	73.5
W6040254-01	77.4
W6040254-01MS	73.8
W6040254-01MSD	76.3
W6040254-02	64.0
W6040254-03	55.8

a Acceptability limits are derived from statistical analysis of laboratory samples.

* Indicates surrogate recovery outside of acceptability limits.

MS: Matrix Spike
MSD: Matrix Spike Duplicate
LCSS: Laboratory Control Sample Spike
LCSSD: Laboratory Control Sample Spike Duplicate

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

Table 3

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Sample Spiked: W6-04-0254-01

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	4170	252	2600	56.3	23.2-105

Analyte	Spike Added, ug/L	MSD Concentration, ug/L	MSD Percent Recovery	RPD %	Acceptability Limits, %[a]	
					RPD	% Recovery
Diesel Fuel	4170	2680	58.2	3.3	36.7	23.2-105

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

RPD: 0 out of 1 outside limits.
Spike Recovery: 0 out of 2 outside limits.

Table 4

METHOD BLANK RESULTS

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Date Extracted 04-12-96

Analyte	Concentration, ug/L
Diesel Fuel	<100

Project Number: 830012208
Project Name: Holloman AFB
DO8 WAD 35
Holloman, NM
Work Order Number: W6-04-0254
Date Reported: 04-17-96

Table 5

LABORATORY CONTROL SAMPLE SPIKE SUMMARY

Total Petroleum Hydrocarbons as Diesel Fuel in Water
GC/FID

Sample Spiked: Reagent Water 04-12-96

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
Diesel Fuel	2000	<100	1100	55.0	23.2-105

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from statistical analysis of laboratory samples.

Spike Recovery: 0 out of 1 outside limits.

GTEL ENVIRONMENTAL LABORATORIES INC

4211 MAY AVE.
WICHITA, KS 67209
(316) 945-2624
(800) 633-7936

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

45102

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 505 242 3113
FAX #: 505 242 1103

Company Address: 2501 YALE, SE #204 ALBUQUERQUE NM 87106
Site Location: Holloman AFB O'Club

Project Manager: CHUCK SCHECK
Client Project ID: (#) 830012208, 35050

I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): (NAME) LEE SCOTT STEVENSON

Field Sample ID	GTEL Lab # (Lab Use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO3	H2SO4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME	BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TPH Diesel Mod 8015	Sulfate 375.4	Dissolved Iron SW6010A
SS57MW04	01	4	✓						✓	✓		✓			9/4/96	15:45																				✓	✓	✓
SS57MW02	02	4	✓						✓	✓		✓				16:45																				✓	✓	✓
SS57MW01	03	4	✓						✓	✓		✓				17:15																				✓	✓	✓

U09-041-0254

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
P.O. # _____

QA/QC Level
Blue ☐ CLP ☐ Other ☐ _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS: IRON SAMPLES Field Filtered @ 0.45u.
Analyze per DO8 WAD35

Lab Use Only Lot #:
Storage Location
Work Order #:

CUSTODY RECORD

Relinquished by Sampler:	Date	Time	Received by:
Lee Scott Stevenson	10/4/1996	08:40	Airborne 556 1/16 8:56
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:
		0530	Waybill #

APPENDIX D
PILOT TEST FIELD DATA

SOIL VENT PILOT TEST DATA RECORD

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 1

Extraction Well No. VET-01

Description of Flow Regime: 25% flow from VET-01

Time at Start of Test: 16:02

COMMENTS:

Date: 4-15-96

Tester(s): Scott Stevenson, Curtis Wright

Site Name: Officers Club HAFB

Barometric Press.: 13:00 30.51 in Hg

Ambient Temp.: 65 °F

Weather Conditions: Sunny, clear

Monitor point	MW 01	MW 02	MW 03	MW 04	Vacuum at Extraction Well	Vacuum at Blower	Air Temperatue: at Blower Inlet	Air Temperatue: at Blower Outlet	Air Flow Rate: Velocity blower well	Air Flow Rate: Volume blower well	Vapor Concentration: VOC Gastech	Vapor Concentration: CO2	Vapor Concentration: O2	Vapor Concentration: ~~CO~~ H2S	H2S
Distance from VET-01 (ft)															
Time in Minutes	Measured Pressure (inches of water) (2)				in W.C.	in W.C.	(°F)(°C)	(°F)	(fpm)	(scfm)	ppmv	% vol	% vol	ppm	
2	0		0		6	–		115		<25	200	0.2	19.5	0	
12					6					<25	1100	0.2	20.2	0	
26	0		0		6					<25	2000	0.2	20.3	0	

Test Equipment:

	Make and Model
Vacuum	ENIM liquid filled gauge / Magnehelic
CO2 Meter	Landtec GA-90
O2 Meter - 4 Gas	Landtech GA-90
Air Flow	See-flo Model 3211-10T5
~~PID/FID~~ CGO	Gastech GT-302
Blower:	Roots 36 U RAI

Vapor Concentrations:

VOC: PID Mini Rae

Manuf.:

Model:

Calibration Method

Notes: (1) Measured parameters at equivalent time periods (e.g. every 15 minutes.....)

(2) Stabilization of measured vacuum when change in vacuum is less than 20% between equivalent timeframes.

SOIL VENT PILOT TEST DATA RECORD

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 2

Extraction Well No. VET-01

Description of Flow Regime: 50% vacuum

Time at Start of Test: 16:30

COMMENTS:

Date: 4-15-96

Tester(s): Scott Stevenson, Curtis Wright

Site Name: HAFB Officers Club

Barometric Press.: 30.39 ↓ in Hg

Ambient Temp.: 70 °F

Weather Conditions: Clear, Sunny windy

Monitor point	MW 01	MW 02	MW 03	MW 04	Vacuum at Extraction Well	Vacuum at Blower	Air Temperatue: at Blower Inlet	Air Temperatue: at Blower Outlet	Air Flow Rate: Velocity blower well	Air Flow Rate: Volume blower well	Vapor Concentration: VOC	Vapor Concentration: CO2	Vapor Concentration: O2	Vapor Concentration: ~~CO2~~ 1,1,2,5
Distance from VET-01 (ft)														
Time in Minutes	Measured Pressure (inches of water) (2)				in W.C.	in W.C.	(°F)(°C)	(°F)(°C)	(fpm)	(scfm)	ppmv	% vol	% vol	ppm
2	0		0		15					105	3580	0.4	19.9	0
15	0		0		15					105	2060	0.3	19.9	0
30	-0.1		0		15					105	1960	0.2	20.3	0

Test Equipment:

	Make and Model
Vacuum	
CO2 Meter	
O2 Meter - 4 Gas	
Air Flow	
PID/FID	
Blower:	

Vapor Concentrations:

VOC: PID

Manuf.:

Model:

Calibration Method

Notes: (1) Measured parameters at equivalent time periods (e.g. every 15 minutes.....)

(2) Stabilization of measured vacuum when change in vacuum is less than 20% between equivalent timeframes.

SOIL VENT PILOT TEST DATA RECORD

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 3

Extraction Well No. VET-01

Description of Flow Regime: Extraction from trench full vacuum.

Time at Start of Test: 09:00

COMMENTS: Samples VET-01-1 collected at 09:40 one Summa Canister and one Tedlar bag

Date: 4-16-96

Tester(s): Scott Stevenson, Curtis Wright

Site Name: Officers Club

Barometric Press.: 30.4 in Hg

Ambient Temp.: 60 °F

Weather Conditions: P.C.

Monitor point	MW 01	MW 02	MW 03	MW 04	Vacuum at Extraction Well in W.C.	Vacuum at Blower in Hg	Air Temperatue: at Blower Inlet (°F)(°C)	Air Temperatue: at Blower Outlet (°F)	Air Flow Rate: Velocity blower well (fpm)	Air Flow Rate: Volume blower well (scfm)	Vapor Concentration: VOC ppmv	CO2 % vol	O2 % vol	Mini Rae PID ppm	H_2S	effluent after carbon VOC ppm	Mini Rae ppm	H_2S ppm
Distance from VET-01 (ft)	6		30															
Time in Minutes	Measured Pressure (inches of water) (2)																	
5	-0.15		-0.02		22	2		125		140	1630	0.4	19.8	0.6	0	1600	0	0
30	-0.15		-0.02		23	2.2		131		155	1660	0.4	19.7	0.4	0	1580	0	0
System down 15 min for repair to belt tensioner 9:45 → 10:00																		
60	-0.10		-0.02		10													
Losing vacuum / belts slipping																		
	10:15 System off - restart				10:40													
65	-0.17		-0.03		26	2.8		145		170	1740	0.2	19.6	0.6	0	1740	0	0
90	-0.15		-0.01		22	2.1		126		150	1920	0.2	19.6	0.7	0	1900	0	0
120	-0.15		-0.03		22	2.1		124		145	1620	0.1	19.5	0.8	0	1480	0	0
140	-0.15		-0.02		22	2.1		125		150	1500	0.1	19.6	0.7	0	1460	0	0

Test Equipment:

	Make and Model
Vacuum	ENFM Liquid filled gauge / Magnehelic
CO2 Meter	handtec GA-90
O2 Meter - 4 Gas	handtech GA-90
Air Flow	See-flow Model 3211-10T5
~~PID/FID~~ Gas Detector	Gastech GT-302
Blower:	Roots RAI 95C 36U RAI

Vapor Concentrations:

VOC: PID - Mini Rae

Manuf.:

Model:

Calibration Method

Notes: (1) Measured parameters at equivalent time periods (e.g. every 15 minutes.....)

(2) Stabilization of measured vacuum when change in vacuum is less than 20% between equivalent timeframes.

AIR SPARGE PILOT TEST DATA RECORD

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 4

Injection Well No. SP-01 18-20

Mode of Injection (Pulsed, Continuous, Combined): Continuous

Time at Start of Test: 14:30

COMMENTS: Vapor extraction from VET-01 @ 130 cfm, 20" WC. at well.

Breakthrough at 8 psi after 5 min.

Date: 4-16-96

Tester(s): Scott Stevenson, Curtis Wright

Barometric Press.: 30.3 ↓ in Hg

Ambient Temp.: 78 °F

Weather Conditions: Partly Cloudy, windy

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	~~SMP01 18-20~~	MW 01	MW 02	MW 03	MW 04	Pressure at Air Sparge Well ~~in WC~~ PSI	Pressure at Blowe ~~in WC~~ PSI	Air ~~Temp~~: from Blower (°F)(°C)	Air Flow Rate: ~~Velocity~~ ppm H_2S w/ PID (fpm)	Air Flow Rate: Volume at well (scfm)
Distance from SP-01 (ft.)	10.0	10.0	10.0	18.8	18.8	18.8	29.5	29.5	29.5		9.9	50.8	35.3	69.4					
Time in Minutes	Measured Pressure (inches of water) (2) / HC Conc. w/ PID																		
30	0/1.4	0/0.9	0/0.4	0/1.5	0/1.3	0/1.9	0/92.3	0/2.8	0/4.6		-0.04/1.9		-0.02/13.3			9.2	0.8	0	10
90																9.0	1.9	0	10
90	0/1.0	0/0.8	0/0.5	0/1.4	0/0.7	0/0.9	0/77.8	0/1.1	0/2.4		-1.0/13		+0.01/2.2						
110		Basement		H_2S = 0			PID = 0				SVE = 130 scfm				20" WC. at VET-01				
140		Barometer		30.22 ↓												9.0	3.5	0	11
150	0/0.6	0/1.3	0/1.2	0/1.1	0/1.0	0/0.7	0/100	0/0.9	0/2.7		-0.03/1.4		0/10						
205																8.7	4.2	0	13
207		Start He injection					20 psi												
246	0/0.5	0/0.6	0/1.1	0/0.8	0/0.8	0/1.1	0/83	0/1.8	0/4.8		0/1.2		-0.01/32.6			9.8	5.0	0	15
276		Collect air sample				SP-01-18-20-A5													

Test Equipment:

	Make and Model
Vacuum	Roots 36 U RAI
CO2 Meter	Landtec GA-90
O2 Meter - 4 Gas	
Air Flow	
PID/~~FID~~	Mini Rae
H2S Meter - 4 Gas	
Blower:	Roots 32 U RAI

ORP

SP-01 ~~Red~~ +535 mV

MW-01 +396 mV

SP-03 +740 → -385 mV gray precipitate

Notes: (1) Measured parameters at equivalent time periods (e.g. every 15 minutes.....)

(2) Stabilization of measured vacuum when change in vacuum is less than 20% between equivalent timeframes.

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 4

Injection Well No. SP-01 18-20

Mode of Injection (Pulsed, Continuous, Combined): Continuous

Time at Start of Test: 14:30

Date: 4-16-96

COMMENTS:

Tester(s): SS, CW.

OXYGEN

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Oxygen Concentration (%)													
30	20.6	20.2	20.6	20.6	20.6	20.6	20.3	20.7	20.1		20.9		16.1	
90	20.5	20.4	20.5	20.4	20.4	20.4	20.4	20.6	20.2		20.7		18.5	
150	20.7	20.5	20.6	20.6	20.6	20.5	20.6	20.6	20.5		20.7		12.3	
240													15.6	
246	20.4	20.2	20.3	20.3	20.3	20.2	20.3	20.3	20.1		20.3		12.3	

25.7 abs. P
Barometer 30.24 ↓

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 4

Injection Well No. SP-01 18-20

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 14:30

Date: 4-16 96

COMMENTS:

Tester(s): S.S., CW

CARBON DIOXIDE

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Carbon Dioxide Concentration (%)													
30	0	0	0	0	0	0	0	0	0		0		1.8	
90	0	0	0	0	0	0	0	0	0		0		0.7	
150	0	0	0	0	0	0	0	0	0		0		~~3.4~~ CW 4.0	
240													2.2	
246	0	0	0	0	0	0	0	0	0		0		3.7	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 4

Injection Well No. SP-01 18-20

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: 14:30

Date: 4-16-96

COMMENTS: Beware the Well numbers!

Tester(s): S.S., C.W.

DISSOLVED OXYGEN

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04	SMP01 28-30	SMP01 38-40
Time in Minutes	SPARGE	Dissolved Oxygen (ppm)														
60		0.6	0.5	0.35	0.35	0.30	0.5	0.55	0.55	0.30	1.5		1.75		0.40	0.3
120		1.0	0.65	0.50	0.35	0.35	1.0	0.75	0.95	0.50	1.25		1.25		0.50	0.45
180		0.55	0.45	0.40	0.35	0.30	0.55	0.6	0.85	0.35	1.75		1.8		0.40	0.40
280										1.80						

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 4

Injection Well No. SP01-18-20

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: ~~1720~~ 17:57

Date: 4-16-96

COMMENTS: Start He injection into SP01-18-20 at 20 psi through 1/4" copper tubing.

Vapor extraction flow rate 140 scfm

Helium out @ 18:36

Tester(s):

HELIUM

Background = 0.10

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04	VET-01 %
Time in Minutes	Measured Helium Concentration (%)														
5											0.09				0.19
10															0.60
15	0.10			0.10			0.09						0.09		1.5
20	0.10			0.10			0.09				0.09		0.09		
25															2.3
30	~~0.0~~										0.0				2.6
43	0.0	0.90	0.0	0.0	0.09	0.09	0.0	0.08	0.08		0.0		0.0		
62															0.90

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 4

Injection Well No.

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 14:30

Date: 4-16-96

COMMENTS:

Tester(s):

HYDROGEN SULFIDE

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Hydrogen Sulfide Concentration (%)													
30	0	0	0	0	0	0	>200	0	0		0		0	
90	0	0	0	0	0	0	>200	0	0		0		22	
150	0	0	0	0	0	0	>200	0	0		0		54	
246	0	0	0	0	0	0	>200	0	0		0		95	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 4

Injection Well No. SP-01 18-20

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: 14:30

Date: 4-16-96

COMMENTS: Top of Riser SMP + MWs
Top of steel on SP01
The Well numbers on this page - BEWARE!
*AT 60 MIN Round = SMP02 H_2O level rising as we measure (28-30')

Tester(s):

DEPTH TO WATER

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04	SMP01 28-30	SMP01 38-40
Time in Minutes	Depth to Water (Feet) 11.83															
60		11.21	11.52	10.09	10.59	10.82	~~0.58~~	11.73	12.01	9.12	10.46		11.85		10.43	10.61
120		11.12	11.40	10.01	10.55	10.82	11.76	11.70	11.98	9.00	10.71		11.83		10.34	10.50
180		11.15	11.48	10.05	10.58	10.82	11.75	11.72	11.98	9.17	10.81		11.83		10.38	10.58
280										8.30						

19:08

AIR SPARGE PILOT TEST DATA RECORD

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 5

Injection Well No. SP01-28-30

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: 10:00

COMMENTS: VET-01 vapor extraction started @ 09:40. Flow = 150 cfm 22" W.C. at VET-01. Changed carbon drum TX 25088VP used. Switched to TX25091VP. System down 11:07 → 11:17

Date: 4-17-96

Tester(s): Scott Stevenson, Curt. Wright

	8:30	9:50	
Barometric Press.:	30.35↓	30.26↓	in Hg
Ambient Temp.:	68°		°F
Weather Conditions:	High clouds, windy		

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04	~~Pressure~~ at VET-01 Exhaust ~~Air Sparge Well~~ H_2S ~~in W.C.~~ ppm	Pressure at Blower psi ~~in W.C.~~	~~Air Temp.~~ from ~~Blower~~ Mini RAE PID ~~(°F)~~ IN	OUT	Air Flow Rate: ~~Velocity~~ at VET-01 ~~well~~ flow ~~(fpm)~~ (scfm)	Volume at well (scfm)
Distance from SP-01 (ft.)		10.0																		
Time in Minutes	Measured Pressure (inches of water) (2)																			
09:55															0		2.2	0	150	
10:00																10		0	130	2
10:10 10											204				0	11	2.7	0	120	5
~~[illegible]~~ 40	0	0.2									F-04 SW		0		0	10.3	2.3	0.4	125	6
67		Belt off - shut down to repair																		
78		restart VES													0	1.0	2.5	0.2	150	0
130		0.4									-.12		0		0	10.3	2.3	0.4	120	6
~~OW~~ 150															0	9.4	1.8	0.2	120	6
185															0	9.7	2.1	0.2	125	7
210		Start He injection 20 psi													0	1.0	1.9	0.3	140	0 air
325		Spitting									-0.1		0		0	8	1.3	0	125	5
345		Sparge system off @ 16:45													0	1.0	1.4	0	155	0

Test Equipment:

	Make and Model
Vacuum	Roots 36U RAI
CO2 Meter	Landtech GA-90
O2 Meter - 4 Gas	"
Air Flow (sparge)	Sea-flow 3411-04TO
PID/~~[illegible]~~	Mini RAE
H2S Meter - 4 Gas	Gastech
Blower:	Roots 5ZU RAI

Notes:

(1) Measured parameters at equivalent time periods (e.g. every 15 minutes.....)

(2) Stabilization of measured vacuum when change in vacuum is less than 20% between equivalent timeframes.

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 5

Injection Well No. SP-01-28-30

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 10:00

Date: 4-17-96

COMMENTS:

Tester(s): S. Stevenson, C. WRIGHT

OXYGEN

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Oxygen Concentration (%)													
08:50	20.0						20.1				20.0		12.3	
30	20.4	17.3	20.4	20.2	20.1	20.1	20.4	20.3	20.2		20.9		16.7	
135	20.4	17.5	20.3	20.7	20.4	20.3	20.6	20.4	20.2		21.1		16.2	CHW
260		NA					20.8	20.9	20.9				~~14.1~~	11.3
325	20.4	~~19.7~~ NA	19.7	20.6	20.6	20.6	20.5	20.8	20.5		21.2		14.0	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 5

Injection Well No. SP01-28-30

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 10:00

Date: 4-17-96

COMMENTS:

Tester(s): S. Stevenson, C. Wright

CARBON DIOXIDE

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Carbon Dioxide Concentration (%)													
08:50	0						0				0.1		4.4	
30	0	0.2	0	0	0	0	0	0	0		0		1.6	
135	0	0.4	0	0	0	0	0	0	0		0		2.0	CW
260		NA		0	0	0	0	0	0		0		~~3.7~~	4.6
325	0	NA	0	0	0	0	0	0	0		0		3.4	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 5

Injection Well No. SP-01 - 28-30

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 13:30 He injection

Date: 4-17-96

COMMENTS: VET-01 Vapor extraction started at 09:40. Down 10 min for repair at ~~10~~:07 → ~~10~~:17.

Tester(s): S. Stevenson, C. Wright

HELIUM

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	~~SMP01 18-20~~	MW 01	MW 02	MW 03	MW 04	VET-01
Time in Minutes	Measured Helium Concentration (%)														
08:50	0.0						0.0				0.51		0.0		
09:50															0.20
12:10															0.13
13:30	START He injection														0.11
13:37	1.5	>1.0*	1.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0		0.14
13:50															0.16
13:53	2.5	NA	12.0	0.0	0.08	0.0									
14:02					0.0										0.16
14:10	5.0	3.3*	14.0												0.16
14:12	STOP He injection														
14:15				0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0		
14:25															0.15
16:30	0.18	NA	3.4	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0		~~0.14~~ CSW
16:45															0.19

* in vault around cap

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 5

Injection Well No. SP01-28-30

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 10:00

Date: 4-17-96

COMMENTS:

Tester(s): S. Stevenson, C. WRIGHT

HYDROGEN SULFIDE

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Hydrogen Sulfide Concentration (%)													
08:50							>200				0		0	
30	0	0	0	0	0	0	158	0	0		0		10	
135	0	0	0	0	0	0	>200	0	4		0		38	
260	0	NA	>200	0	0	0	>200	0	10		0		34	
325	0	NA	26	0	0	0	77	0	6		0		>200	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 5

Injection Well No. SP01-28-30

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 10:00

Date: 4-17-96

COMMENTS: At 55 min. when trying to get D.O. at SMP01-28-30, water flowed out of well.

Tester(s):

DISSOLVED OXYGEN

SP-01 S 3.5

SP-01 S	Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04	SP-01 M	SP01 D
	Time in Minutes	Dissolved Oxygen (ppm)															
3.5	09:08	0.70	0.50	0.50	0.45	0.45	0.40	1.25	0.75	0.95		1.35	0.50	1.75	0.50	0.70	0.65
	50	1.40	NA	0.30	0.25	0.30	0.20	0.35	0.40	0.50		0.90		0.95			
1.0	~~145~~ 155	0.40	NA	0.50	0.25	0.25	0.25	0.75	0.55	0.50		1.30		0.75			0.4
0.45	14:55 300	0.65	N/A ~~0.35~~	0.35	0.35	0.30	0.30	0.40	0.35	0.25		0.40		0.50			0.50

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 5

Injection Well No.

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 10:00

Date: 4-17-96

COMMENTS:

* water level dropping quickly 11:07 belt on blower failed

Tester(s):

DEPTH TO WATER

SP-01 S		Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	SMP01 18-20	MW 01	MW 02	MW 03	MW 04	SP-01 M	D
		Time in Minutes	Depth to Water (Feet)															
11.77	908		11.84	10.90	10.95	10.71	11.72	10.98	12.27	12.23	12.32		11.73	10.43	11.87	10.44	11.76	11.97
		50	8.65	N/A	8.49	9.53	9.78	9.92	10.13	10.1 *								
9.28		190	7.97	N/A	8.74	9.29	9.81	9.85	9.90	9.48	10.63		11.49		11.81			9.29
9.82		14:56	9.22	N/A	10.48	9.93	10.58	10.58	11.13	11.40	11.77		11.41		11.80			11.38

AIR SPARGE PILOT TEST DATA RECORD

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 6

Injection Well No. SP01-38-40

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: 10:00

COMMENTS: START VES @ 09:18, flow 125 scfm, vac. 20 in WC.
10:44 shut down - belt off restart 10:50
11:18 shut down - belt off - replaced belt
restart 11:30
off at 17:00

Date: 4-18-96

Tester(s): Curtis Wright, Scott Stevenson

Barometric Press.: 30.40 in Hg

Ambient Temp.: 68° °F

Weather Conditions: Clear, windy

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	SMP01 18-20	MW 01	MW 02	MW 03	~~MW~~ H_2S ppm	Pressure at Air Sparge Well ~~in WC~~ psi	Pressure at Blowe Vac. at VET-01 in ~~WC~~ in WC	~~Air Temp:~~ ~~from Blower~~ PID in	OUT	Air Flow Rate: ~~Velocity at well~~ VES flow rate (~~fpm~~ scfm)	Volume at well (scfm)
Distance from SP-01 (ft.)																				
Time in Minutes	Measured Pressure (inches of water) (2)																			
09:19																20	3.3	0.4	125	0
01														0	10	20	1.4	0.4	120	<2
07											-0.1			0	12	18	1.6	0.3	120	<2
15	0		0											0	12.6	17			115	3
30	0	0	0								-0.1		0	0	11.4	18	1.5	0.3	115	5
55														0	11.3	20	1.4	0.3	130	5
95											-0.15				11.2	20			130	2
120															11.4	19	1.8	0.3	120	2
165														0	10.8	19	1.6	0.3	115	5
180		spitting		Helium injection										0	0	21	1.7	0.3	130	0 air
230														0	11.6	20	1.6	0.3	125	3
270														0	10.3	19	1.3	0.3	120	3

Test Equipment:

	Make and Model
Vacuum	Roots 36 U RAI
CO2 Meter	Landtec GA-90
O2 Meter - 4 Gas	
Air Flow	See flow 3211-04TO
PID/~~FID~~	Mini RAE
H2S Meter - 4 Gas	Gastec GT-302
Blower:	Roots 32U RAI

Notes:

-0.05 @ 15:30 → 10.4

(1) Measured parameters at equivalent time periods (e.g. every 15 minutes.....)

(2) Stabilization of measured vacuum when change in vacuum is less than 20% between equivalent timeframes.

min							
1510				1.4	0.1		
365	0	10.5	20	1.2	0.2	120	5
415	0	10.8	19	1.4	0.1	120	5

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 6

Injection Well No. SP01-38-40

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: 10:00

Date: 4-18-96

COMMENTS:

Tester(s): S. Stevenson, C. WRIGHT

OXYGEN

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	~~SMP01 18-20~~	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Oxygen Concentration (%)													
08:52	20.4	20.4	20.5	20.6	20.7	20.7	20.7	20.7	20.6		20.7		14.5	
40	20.3	20.2	19.9											
55				20.2	20.2	20.3	20.4	20.6	20.6		21.0		16.7	
185	20.7	14.1	20.3	20.4	20.4	20.6	20.4	20.4	20.1		20.9		15.9	
1510 - 310	20.5	8.8	20.8	20.8	20.8	20.8	20.3	20.5	20.3		20.7		16.8	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 6

Injection Well No. SP01-38-40

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: 10:00

Date: 4-18-96

COMMENTS:

Tester(s): C. WRIGHT, S. Stevenson

CARBON DIOXIDE

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	~~SMP01 18-20~~	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Carbon Dioxide Concentration (%)													
08:52	0	0	0	0	0	0	0.1	0	0		0		3.3	
40	0	0	0											
55				0	0	0	0	0	0		0		1.5	
185	0	0.3	0	0	0	0	0	0	0		0		2.2	
1510 – 310	0	0.2	0	0	0	0	0	0	0		0		1.6	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 6

Injection Well No. SP01-38-40

Mode of Injection (Pulsed, Continuous, Combined): Cont.

Time at Start of Test: 10:00

Date: 4-18-96

COMMENTS: VET-01 Started @ 09:18
Air Sparge start at 10:00

Tester(s): S. Stevenson, C. WRIGHT

HELIUM

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	SP01 ~~SMP01 18-20~~ S	SP01 M	MW 01	MW 02	MW 03	MW 04	VET-01
Time in Minutes	Measured Helium Concentration (%)															
08:52	0.09	0.33	0.68	0.0	0.0	0.0	0.0	0.0	0.0			0.20		0		
09:19																0.30
09:59																0.15
10:35	0.09	0.12	0.49													0.17
10:55				0.0	0.0	0.0	0.0	0.0	0.0			0		0.0		0.12
12:00																0.12
12:48																0.09
13:00		START	He injection @ 20 psi													
13:05	0.0	1.7	0.39	0.0	0.0	0.0	0.0	0.0	0.0	1.0		0.08		0.0		
13:23	0.45	83	1.5	0.0	0.0	0.0					Blw	0.08				0.14
13:33			No He in Basement or sump													0.16
13:39	1.7	spouting H2O	1.6	0.0	0.0	0.0	0.0	0.0	0.0			0.08				
13:47		STOP	He injection													0.16
13:54	0.24	89	0.97													
14:28	0.26	85	0.51													0.16
15:10	0.22	46	0.30	0.0	0.0	0.0	0.0	0.0	0.0			0.0		0.0		0.11
16:10																0.14

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 6

Injection Well No. SP01-38-40

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test:

Date: 4-18-96

COMMENTS:

Tester(s): S. Stevenson, C. Wright

HYDROGEN SULFIDE

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 38-40	~~SMP01 18-20~~	MW 01	MW 02	MW 03	MW 04
Time in Minutes	Measured Hydrogen Sulfide Concentration (%)													
08:52	0	0	0	0	0	0	175	0	0		0		0	
40	0	0	0											
55				0	0	0	124	0	0		0		8	
185	0	0	0	0	0	0	>200	0	18		0		19	
1510 - 310	0	0	0	0	0	0	187	2	14		0		18	

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 6

Injection Well No. SP01-38-40

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 10:00

Date: 4-18-96

COMMENTS:

Tester(s): S. Stevenson, G. WRIGHT

DISSOLVED OXYGEN

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	[redacted]	MW 01	MW 02	MW 03	MW 04	SP01 S	M
Time in Minutes	Dissolved Oxygen (ppm)															
09:25	0.65	3.90	0.35	0.35	0.35	0.40	0.50	0.35	0.50		0.65	0.35	0.75	0.45	0.40	7.5
70	0.95	6.60	0.40	0.40	0.30	0.35	0.25	0.25	0.25		0.50		0.55		0.30	7.5
240	1.05	1.60	0.45	0.40	0.40	0.30	0.60	0.50	0.50		0.65		0.75		0.75	
340	1.00	5.50	0.45	0.30	0.30	0.25	0.40	0.45	0.50		0.75		1.25		0.50	
395	1.00										0.60		1.15			

AIR SPARGE PILOT TEST DATA RECORD (continued)

Site SS-57 Officers Club - Holloman AFB, NM

Test No. 6

Injection Well No. SP01-38-40

Mode of Injection (Pulsed, Continuous, Combined):

Time at Start of Test: 10:00

Date: 4-18-96

COMMENTS:

Tester(s): S. Stevenson, C. WRIGHT

DEPTH TO WATER

Monitor point	SMP01 18-20	SMP01 28-30	SMP01 38-40	SMP02 18-20	SMP02 28-30	SMP02 38-40	SMP03 18-20	SMP03 28-30	SMP03 28-40	~~SMP04~~	MW 01	MW 02	MW 03	MW 04	SP01 S	SP01 M
Time in Minutes	Depth to Water (Feet)															
09:25	10.87	10.95	11.00	10.74	10.90	10.99	12.29	12.22	12.32		11.70	10.38	11.84	8.44	11.80	11.79
05																11.60
10																11.45
15	10.80	9.80	10.20													
24				10.61	10.39	10.39	11.89	11.32	11.78							
70	10.44	9.29	10.16													
240	9.68	9.10	11.73	10.30	10.98	11.09	11.90	11.26	12.28		11.62		11.82		10.90	
340	10.22	7.50	10.66	10.39	10.70	10.83	11.86	11.82	12.02		11.65		11.83		11.02	

APPENDIX E
AIR SAMPLE ANALYTICAL RESULTS

RECEIVED
MAY 0 2 1996

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604160A

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/17/96
DATE COMPLETED: 4/24/96

INVOICE # 10207
P.O. #
PROJECT # 830012208.35060 HAFB-O' Club
AMOUNT$: $487.37

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	VET-01-1	TO-3	3.0 "Hg	$100.00
03A	VET-01-2	TO-3	2.5 "Hg	$100.00
04A	Lab Blank	TO-3	NA	NC

Misc. Charges	6 Liter Summa Canister Preparation (2) @ $35.00 each.	$70.00
	1 Liter Tedlar Bags (6) @ $15.00 each.	$90.00
	Shipping (4/12/96)	$127.37

CERTIFIED BY: Linda L. Freeman
Laboratory Director

DATE: 4/24/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

Total Petroleum Hydrocarbons by Modified EPA Method TO-3
GC/FID

Field Sample I.D.	Lab Sample I.D.	File Name	Sample Date	Analyzed For	Dilution Factor	Det. Limit (ppmv)	Det. Limit (µG/L)	Amount (ppmv)	Amount (µG/L)
VET-01-1	9604160A-01A	6041906	4/16/96	TPH*	12.4	**0.12**	**0.52**	**33**	**140**
VET-01-2	9604160A-03A	6041907	4/16/96	TPH*	9.12	**0.091**	**0.38**	**32**	**130**
Lab Blank	9604160A-04A	6041904	NA	TPH*	1.00	**0.010**	**0.042**	**Not Detected**	**Not Detected**

Analysis Date: 4/19/96
Container Type: 6 Liter Summa Canister

COMMENTS: *Total Petroleum Hydrocarbons referenced to Gasoline (MW = 100).
NA = Not Applicable

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 008958

Contact Person: Chuck Schuck
Company: Groundwater Technology GSI
Address: 2501 Yale S.E. City: ABQ. State: NM Zip: 87106
Phone: 505 242 3113 FAX: 505 242 1103
Collected By: Signature

Project info:
P.O. #
Project #: 830017708350060
Project Name: HAFB-O'Club

Turn Around Time:
☒ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
01A	VET-01-1	4/11/96 09:40	TO-3, TO-14	28.5	3	3.0"Hg
	VET-01-1 Tedlar	4/11/96 09:43	reduced sulfur			
03A	VET-01-2	4/11/96 12:07	TO-3, TO-14	28.5	2.5	2.5"Hg
						4/17/96

Relinquished By: (Signature) Date/Time: [illegible] 4/16 Print Name: Carol Lockhart
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time: [illegible] ATL 4/17/96 1015

Notes: Reduced sulfur

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	Dirksen	5412038551 5	TS	4/17/96 1015	Amb	Good	Yes No None N/A	9604160A

Form 1293 rev. 06

RECEIVED

MAY 0 2 1996

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604160B

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/17/96
DATE COMPLETED: 4/24/96

INVOICE # 10207
P.O. #
PROJECT # 830012208.35060 HAFB-O' Club
AMOUNT$: $500.00

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	VET-01-1	TO-14	3.0 "Hg	$250.00
03A	VET-01-2	TO-14	2.5 "Hg	$250.00
04A	Lab Blank	TO-14	NA	NC

CERTIFIED BY: Linda L. Freeman
Laboratory Director

DATE: 4/24/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: VET-01-1

ID#: 9604160B-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041926**	**Date of Collection:**	**4/16/96**
Dil. Factor:	**5.73**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	2.9	Not Detected
Freon 114	2.9	Not Detected
Chloromethane	2.9	Not Detected
Vinyl Chloride	2.9	Not Detected
Bromomethane	2.9	Not Detected
Chloroethane	2.9	Not Detected
Freon 11	2.9	Not Detected
1,1-Dichloroethene	2.9	Not Detected
Freon 113	2.9	Not Detected
Methylene Chloride	2.9	Not Detected
1,1-Dichloroethane	2.9	Not Detected
cis-1,2-Dichloroethene	2.9	Not Detected
Chloroform	2.9	Not Detected
1,1,1-Trichloroethane	2.9	Not Detected
Carbon Tetrachloride	2.9	Not Detected
Benzene	2.9	9.7
1,2-Dichloroethane	2.9	Not Detected
Trichloroethene	2.9	35
1,2-Dichloropropane	2.9	Not Detected
cis-1,3-Dichloropropene	2.9	Not Detected
Toluene	2.9	4.8
trans-1,3-Dichloropropene	2.9	Not Detected
1,1,2-Trichloroethane	2.9	Not Detected
Tetrachloroethene	2.9	Not Detected
Ethylene Dibromide	2.9	Not Detected
Chlorobenzene	2.9	Not Detected
Ethyl Benzene	2.9	Not Detected
m,p-Xylene	2.9	3.1
o-Xylene	2.9	Not Detected
Styrene	2.9	Not Detected
1,1,2,2-Tetrachloroethane	2.9	Not Detected
1,3,5-Trimethylbenzene	2.9	Not Detected
1,2,4-Trimethylbenzene	2.9	6.3
1,3-Dichlorobenzene	2.9	Not Detected
1,4-Dichlorobenzene	2.9	Not Detected
Chlorotoluene	2.9	Not Detected
1,2-Dichlorobenzene	2.9	Not Detected
1,2,4-Trichlorobenzene	2.9	Not Detected
Hexachlorobutadiene	2.9	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: VET-01-1

ID#: 9604160B-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041926**	**Date of Collection:**	**4/16/96**
Dil. Factor:	**5.73**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	11	Not Detected
1,3-Butadiene	11	Not Detected
Acetone	11	14
Carbon Disulfide	11	Not Detected
2-Propanol	11	Not Detected
trans-1,2-Dichloroethene	11	Not Detected
Vinyl Acetate	11	Not Detected
Chloroprene	11	Not Detected
2-Butanone (Methyl Ethyl Ketone)	11	Not Detected
Hexane	11	120
Tetrahydrofuran	11	140
Cyclohexane	11	79
1,4-Dioxane	11	Not Detected
Bromodichloromethane	11	Not Detected
4-Methyl-2-pentanone	11	Not Detected
2-Hexanone	11	Not Detected
Dibromochloromethane	11	Not Detected
Bromoform	11	Not Detected
4-Ethyltoluene	11	Not Detected
Ethanol	11	Not Detected
Methyl tert-Butyl Ether	11	Not Detected
Heptane	11	33
TNMOC*	29	2200

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**94**	**70-130**
Toluene-d8	**94**	**70-130**
4-Bromofluorobenzene	**104**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: VET-01-2

ID#: 9604160B-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041925**	**Date of Collection:**	**4/16/96**
Dil. Factor:	**3.24**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	1.6	Not Detected
Freon 114	1.6	Not Detected
Chloromethane	1.6	Not Detected
Vinyl Chloride	1.6	Not Detected
Bromomethane	1.6	Not Detected
Chloroethane	1.6	Not Detected
Freon 11	1.6	Not Detected
1,1-Dichloroethene	1.6	Not Detected
Freon 113	1.6	Not Detected
Methylene Chloride	1.6	Not Detected
1,1-Dichloroethane	1.6	Not Detected
cis-1,2-Dichloroethene	1.6	Not Detected
Chloroform	1.6	Not Detected
1,1,1-Trichloroethane	1.6	Not Detected
Carbon Tetrachloride	1.6	Not Detected
Benzene	1.6	11
1,2-Dichloroethane	1.6	Not Detected
Trichloroethene	1.6	29
1,2-Dichloropropane	1.6	Not Detected
cis-1,3-Dichloropropene	1.6	Not Detected
Toluene	1.6	5.7
trans-1,3-Dichloropropene	1.6	Not Detected
1,1,2-Trichloroethane	1.6	Not Detected
Tetrachloroethene	1.6	Not Detected
Ethylene Dibromide	1.6	Not Detected
Chlorobenzene	1.6	Not Detected
Ethyl Benzene	1.6	Not Detected
m,p-Xylene	1.6	3.2
o-Xylene	1.6	Not Detected
Styrene	1.6	Not Detected
1,1,2,2-Tetrachloroethane	1.6	Not Detected
1,3,5-Trimethylbenzene	1.6	Not Detected
1,2,4-Trimethylbenzene	1.6	4.3
1,3-Dichlorobenzene	1.6	Not Detected
1,4-Dichlorobenzene	1.6	Not Detected
Chlorotoluene	1.6	Not Detected
1,2-Dichlorobenzene	1.6	Not Detected
1,2,4-Trichlorobenzene	1.6	Not Detected
Hexachlorobutadiene	1.6	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: VET-01-2

ID#: 9604160B-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041925**	**Date of Collection:**	**4/16/96**
Dil. Factor:	**3.24**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	6.5	Not Detected
1,3-Butadiene	6.5	Not Detected
Acetone	6.5	22
Carbon Disulfide	6.5	Not Detected
2-Propanol	6.5	Not Detected
trans-1,2-Dichloroethene	6.5	Not Detected
Vinyl Acetate	6.5	Not Detected
Chloroprene	6.5	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.5	Not Detected
Hexane	6.5	160
Tetrahydrofuran	6.5	89
Cyclohexane	6.5	110
1,4-Dioxane	6.5	Not Detected
Bromodichloromethane	6.5	Not Detected
4-Methyl-2-pentanone	6.5	Not Detected
2-Hexanone	6.5	Not Detected
Dibromochloromethane	6.5	Not Detected
Bromoform	6.5	Not Detected
4-Ethyltoluene	6.5	Not Detected
Ethanol	6.5	Not Detected
Methyl tert-Butyl Ether	6.5	Not Detected
Heptane	6.5	40
TNMOC*	16	3000

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**85**	**70-130**
Toluene-d8	**89**	**70-130**
4-Bromofluorobenzene	**102**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604160B-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041921**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/19/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	0.50	Not Detected
Freon 114	0.50	Not Detected
Chloromethane	0.50	Not Detected
Vinyl Chloride	0.50	Not Detected
Bromomethane	0.50	Not Detected
Chloroethane	0.50	Not Detected
Freon 11	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
Methylene Chloride	0.50	Not Detected
1,1-Dichloroethane	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Carbon Tetrachloride	0.50	Not Detected
Benzene	0.50	Not Detected
1,2-Dichloroethane	0.50	Not Detected
Trichloroethene	0.50	Not Detected
1,2-Dichloropropane	0.50	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected
Toluene	0.50	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
Ethylene Dibromide	0.50	Not Detected
Chlorobenzene	0.50	Not Detected
Ethyl Benzene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Styrene	0.50	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected
Chlorotoluene	0.50	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected
Hexachlorobutadiene	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604160B-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041921**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/19/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	2.0	Not Detected
1,3-Butadiene	2.0	Not Detected
Acetone	2.0	Not Detected
Carbon Disulfide	2.0	Not Detected
2-Propanol	2.0	Not Detected
trans-1,2-Dichloroethene	2.0	Not Detected
Vinyl Acetate	2.0	Not Detected
Chloroprene	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected
Hexane	2.0	Not Detected
Tetrahydrofuran	2.0	Not Detected
Cyclohexane	2.0	Not Detected
1,4-Dioxane	2.0	Not Detected
Bromodichloromethane	2.0	Not Detected
4-Methyl-2-pentanone	2.0	Not Detected
2-Hexanone	2.0	Not Detected
Dibromochloromethane	2.0	Not Detected
Bromoform	2.0	Not Detected
4-Ethyltoluene	2.0	Not Detected
Ethanol	2.0	Not Detected
Methyl tert-Butyl Ether	2.0	Not Detected
Heptane	2.0	Not Detected
TNMHC*	5.0	Not Detected

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: NA

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**88**	**70-130**
Toluene-d8	**101**	**70-130**
4-Bromofluorobenzene	**100**	**70-130**

AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 006953

Page 1 of 1

Contact Person: Chuck Schick
Company: Groundwater Technology GSI
Address: 2501 Yale, S.E. City: ABQ. State: NM Zip: 87106
Phone: 505 242 3113 FAX: 505 242 1103
Collected By: Signature

Project info:
P.O. #
Project # 830012208.35060
Project Name: HAFB-O'Club.

Turn Around Time:
☒ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
01A	VET-01-1	4/16/96 09:40	TO-3, TO-14	28.5	3	3.0"Hg
	VET-01-1 Tedlar	4/16/96 09:43	reduced sulfur			
03A	VET-01-2	4/16/96 12:07	TO-3, TO-14	29.5	2.5	2.5"Hg
						4/17/96

Relinquished By: (Signature) Date/Time: 12:15 4/16/96 Print Name: CURTIS WRIGHT
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time: ATL 4/17/96 1015

Notes: Reduced sulfur

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	Airborne	5412038505	TS	4/17/96 1015	Ambient	Good	(Yes) No None N/A	9604160 B

RECEIVED
MAY 0 2 1996

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604160C

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/17/96
DATE COMPLETED: 4/24/96

INVOICE # 10207
P.O. #
PROJECT # 830012208.35060 HAFB-O' Club
AMOUNT$: $150.00

FRACTION #	NAME	TEST	PRICE
02A	VET-01-1 Tedlar	ASTM D-5504	$150.00
03A	Lab Blank	ASTM D-5504	NC

CERTIFIED BY: Linda L. Freeman
Laboratory Director

DATE: 4/24/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: VET-01-1 Tedlar
ID#: 9604160C-02A

Sulfur Gases by ASTM D-5504
GC/SCD

File Name:	**B0417018**	**Date of Collection:**	**4/16/96**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/17/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	Not Detected
Carbonyl Sulfide	4.0	5.0
Methyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	15
Carbon Disulfide	4.0	Not Detected
Dimethyl Disulfide	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Isopropylmercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propylmercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butylmercaptan	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank
ID#: 9604160C-03A

Sulfur Gases by ASTM D-5504
GC/SCD

File Name:	**B0417010**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/17/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	Not Detected
Carbonyl Sulfide	4.0	Not Detected
Methyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	Not Detected
Carbon Disulfide	4.0	Not Detected
Dimethyl Disulfide	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Isopropylmercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propylmercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butylmercaptan	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 006953

Contact Person: Chuck Schick
Company: Groundwater Technology GSI
Address: 2501 Yale, S.E. City: ABQ. State: NM Zip: 87106
Phone: 505 242 3113 FAX: 505 242 1103
Collected By: Signature

Project info:
P.O. #
Project #: 83001 2208.35060
Project Name: HAFB-O'Club

Turn Around Time:
☒ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
	VET-01-1	4/16/96 09:40	TO-3, TO-14	28.5	3	
02A	VET-01-1 Tedlar	4/16/96 09:43	reduced sulfur			
	VET-01-2	4/16/96 12:07	TO-3, TO-14	29.5	2.5	

Relinquished By: (Signature) Date/Time 12:15 4/16/96 Print Name: CURTIS WRIGHT
Relinquished By: (Signature) Date/Time Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time Received By: (Signature) Date/Time ATL 4/17/96 1015

Notes: Reduced sulfur

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	Airborne	5412038555	TS	4/17/96 1145	Ambient	Good	(Yes) No None N/A	9604160C

RECEIVED
APR 29 1996

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604175A

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/18/96
DATE COMPLETED: 4/26/96

INVOICE # 10248
P.O. #
PROJECT # 830012208 HAFB-O' Club
AMOUNT$: $540.00

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	SP01-18-20-AS	TO-3	2.5 "Hg	$100.00
02A	SP01-28-30-AS	TO-3	3.0 "Hg	$100.00
03A	SP01-28-30-DS	TO-3	3.0 "Hg	$100.00
04A	SP01-28-30-EFF	TO-3	5.0 "Hg	$100.00
05A	Lab Blank	TO-3	NA	NC

Misc. Charges	6 Liter Summa Canister Preparation (4) @ $35.00 each.	$140.00

CERTIFIED BY: Linda L. Freeman
Laboratory Director

DATE: 4/26/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

Total Petroleum Hydrocarbons by Modified EPA Method TO-3
GC/FID

Field Sample I.D.	Lab Sample I.D.	File Name	Sample Date	Analyzed For	Dilution Factor	Det. Limit (ppmv)	Det. Limit (µG/L)	Amount (ppmv)	Amount (µG/L)
SP01-18-20-AS	9604175A-01A	6042007	4/16/96	TPH*	24.3	0.24	1.0	48	200
SP01-28-30-AS	9604175A-02A	6042008	4/17/96	TPH*	24.8	0.25	1.0	42	170
SP01-28-30-DS	9604175A-03A	6042009	4/17/96	TPH*	24.8	0.25	1.0	67	280
SP01-28-30-EFF	9604175A-04A	6042010	4/17/96	TPH*	26.8	0.27	1.1	31	130
Lab Blank	9604175A-05A	6042003	NA	TPH*	1.00	0.010	0.042	Not Detected	Not Detected

Analysis Date: 4/20/96
Container Type: 6 Liter Summa Canister

COMMENTS: *Total Petroleum Hydrocarbons referenced to Gasoline (MW = 100).
NA = Not Applicable

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Contact Person [illegible]
Company [illegible]
Address [illegible] #2-4 City Albuquerque State NM Zip 87106
Phone [illegible] FAX 505-[illegible]-1103
Collected By: Signature [illegible]

Project info:
P.O. # [illegible]
Project # [illegible]
Project Name [illegible]

Turn Around Time:
☑ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
01A	[illegible]	4/17/96 11:[illegible]7	TAMS [illegible], TO-3, VOC [illegible] 14, TAMS [illegible] TO [illegible]	2[illegible]	2.[illegible]	2.5 "Hg
02A	[illegible]	4/17/96 14:44	TAMS [illegible] + TAMS [illegible], TO-3, VOC [illegible] TO-14	31	3	3.0 "Hg
03A	[illegible] DS	4/17/96 14:48	TAMS [illegible] + TAMS [illegible], TO-3, VOC [illegible] TO-14	30	3	3.0 "Hg
04A	[illegible] Eff	4/17/96 14:53	TAMS [illegible] + TAMS [illegible], TO-3, VOC [illegible] TO-14	20	5	5.0 "Hg
	[illegible] Fall	4/17/96 15[illegible]	[illegible]	[illegible]	[illegible]	

Relinquished By: (Signature) Date/Time [illegible] 4/17/96 1545 Print Name Curtis Knight
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time Jeff Gimenez 4/18/96 1035

Notes: [illegible]

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	[illegible]	[illegible]	[illegible]	4/18/96 1057	AMBIENT	GOOD	Yes No None N/A	9604175A

Form 1293 rev. 06

RECEIVED
APR 29 1996

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604175B

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/18/96
DATE COMPLETED: 4/26/96

INVOICE # 10248
P.O. #
PROJECT # 830012208 HAFB-O' Club
AMOUNT$: $1,000.00

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	SP01-18-20-AS	TO-14	2.5 "Hg	$250.00
02A	SP01-28-30-AS	TO-14	3.0 "Hg	$250.00
03A	SP01-28-30-DS	TO-14	3.0 "Hg	$250.00
04A	SP01-28-30-EFF	TO-14	5.0 "Hg	$250.00
05A	Lab Blank	TO-14	NA	NC
05B	Lab Blank	TO-14	NA	NC

CERTIFIED BY: Linda J. Freeman
Laboratory Director

DATE: 4/26/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: SP01-18-20-AS

ID#: 9604175B-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041929**	**Date of Collection:**	**4/16/96**
Dil. Factor:	**1.46**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	0.73	1.2
Freon 114	0.73	Not Detected
Chloromethane	0.73	Not Detected
Vinyl Chloride	0.73	Not Detected
Bromomethane	0.73	Not Detected
Chloroethane	0.73	Not Detected
Freon 11	0.73	0.83
1,1-Dichloroethene	0.73	Not Detected
Freon 113	0.73	Not Detected
Methylene Chloride	0.73	Not Detected
1,1-Dichloroethane	0.73	Not Detected
cis-1,2-Dichloroethene	0.73	Not Detected
Chloroform	0.73	Not Detected
1,1,1-Trichloroethane	0.73	Not Detected
Carbon Tetrachloride	0.73	Not Detected
Benzene	0.73	14
1,2-Dichloroethane	0.73	Not Detected
Trichloroethene	0.73	18
1,2-Dichloropropane	0.73	Not Detected
cis-1,3-Dichloropropene	0.73	Not Detected
Toluene	0.73	9.5
trans-1,3-Dichloropropene	0.73	Not Detected
1,1,2-Trichloroethane	0.73	Not Detected
Tetrachloroethene	0.73	Not Detected
Ethylene Dibromide	0.73	Not Detected
Chlorobenzene	0.73	Not Detected
Ethyl Benzene	0.73	1.2
m,p-Xylene	0.73	2.7
o-Xylene	0.73	1.2
Styrene	0.73	Not Detected
1,1,2,2-Tetrachloroethane	0.73	Not Detected
1,3,5-Trimethylbenzene	0.73	0.83
1,2,4-Trimethylbenzene	0.73	3.1
1,3-Dichlorobenzene	0.73	Not Detected
1,4-Dichlorobenzene	0.73	Not Detected
Chlorotoluene	0.73	Not Detected
1,2-Dichlorobenzene	0.73	Not Detected
1,2,4-Trichlorobenzene	0.73	Not Detected
Hexachlorobutadiene	0.73	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: SP01-18-20-AS

ID#: 9604175B-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041929**	**Date of Collection:**	**4/16/96**
Dil. Factor:	**1.46**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	2.9	Not Detected
1,3-Butadiene	2.9	Not Detected
Acetone	2.9	26
Carbon Disulfide	2.9	7.0
2-Propanol	2.9	Not Detected
trans-1,2-Dichloroethene	2.9	Not Detected
Vinyl Acetate	2.9	Not Detected
Chloroprene	2.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.9	4.5
Hexane	2.9	180
Tetrahydrofuran	2.9	39
Cyclohexane	2.9	300
1,4-Dioxane	2.9	Not Detected
Bromodichloromethane	2.9	Not Detected
4-Methyl-2-pentanone	2.9	Not Detected
2-Hexanone	2.9	Not Detected
Dibromochloromethane	2.9	Not Detected
Bromoform	2.9	Not Detected
4-Ethyltoluene	2.9	Not Detected
Ethanol	2.9	4.4
Methyl tert-Butyl Ether	2.9	Not Detected
Heptane	2.9	58
TNMOC*	7.3	9400

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**86**	**70-130**
Toluene-d8	**98**	**70-130**
4-Bromofluorobenzene	**115**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: SP01-28-30-AS

ID#: 9604175B-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041931**	**Date of Collection:**	**4/17/96**
Dil. Factor:	**2.48**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	1.2	17
Freon 114	1.2	Not Detected
Chloromethane	1.2	Not Detected
Vinyl Chloride	1.2	Not Detected
Bromomethane	1.2	Not Detected
Chloroethane	1.2	Not Detected
Freon 11	1.2	3.3
1,1-Dichloroethene	1.2	Not Detected
Freon 113	1.2	Not Detected
Methylene Chloride	1.2	Not Detected
1,1-Dichloroethane	1.2	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected
Chloroform	1.2	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected
Carbon Tetrachloride	1.2	Not Detected
Benzene	1.2	15
1,2-Dichloroethane	1.2	Not Detected
Trichloroethene	1.2	20
1,2-Dichloropropane	1.2	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected
Toluene	1.2	9.9
trans-1,3-Dichloropropene	1.2	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected
Tetrachloroethene	1.2	Not Detected
Ethylene Dibromide	1.2	Not Detected
Chlorobenzene	1.2	Not Detected
Ethyl Benzene	1.2	Not Detected
m,p-Xylene	1.2	2.9
o-Xylene	1.2	Not Detected
Styrene	1.2	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected
1,2,4-Trimethylbenzene	1.2	3.2
1,3-Dichlorobenzene	1.2	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected
Chlorotoluene	1.2	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected
1,2,4-Trichlorobenzene	1.2	Not Detected
Hexachlorobutadiene	1.2	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: SP01-28-30-AS

ID#: 9604175B-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041931**	**Date of Collection:**	**4/17/96**
Dil. Factor:	**2.48**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	5.0	Not Detected
1,3-Butadiene	5.0	Not Detected
Acetone	5.0	40
Carbon Disulfide	5.0	Not Detected
2-Propanol	5.0	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected
Vinyl Acetate	5.0	Not Detected
Chloroprene	5.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	5.3
Hexane	5.0	150
Tetrahydrofuran	5.0	22
Cyclohexane	5.0	120
1,4-Dioxane	5.0	Not Detected
Bromodichloromethane	5.0	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected
2-Hexanone	5.0	Not Detected
Dibromochloromethane	5.0	Not Detected
Bromoform	5.0	Not Detected
4-Ethyltoluene	5.0	Not Detected
Ethanol	5.0	6.1
Methyl tert-Butyl Ether	5.0	Not Detected
Heptane	5.0	60
TNMOC*	12	3900

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**87**	**70-130**
Toluene-d8	**94**	**70-130**
4-Bromofluorobenzene	**101**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: SP01-28-30-DS

ID#: 9604175B-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5042005**	**Date of Collection: 4/17/96**
Dil. Factor:	**2.98**	**Date of Analysis: 4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	1.5	18
Freon 114	1.5	Not Detected
Chloromethane	1.5	Not Detected
Vinyl Chloride	1.5	Not Detected
Bromomethane	1.5	Not Detected
Chloroethane	1.5	Not Detected
Freon 11	1.5	3.6
1,1-Dichloroethene	1.5	Not Detected
Freon 113	1.5	Not Detected
Methylene Chloride	1.5	Not Detected
1,1-Dichloroethane	1.5	Not Detected
cis-1,2-Dichloroethene	1.5	Not Detected
Chloroform	1.5	Not Detected
1,1,1-Trichloroethane	1.5	Not Detected
Carbon Tetrachloride	1.5	Not Detected
Benzene	1.5	22
1,2-Dichloroethane	1.5	Not Detected
Trichloroethene	1.5	18
1,2-Dichloropropane	1.5	Not Detected
cis-1,3-Dichloropropene	1.5	Not Detected
Toluene	1.5	16
trans-1,3-Dichloropropene	1.5	Not Detected
1,1,2-Trichloroethane	1.5	Not Detected
Tetrachloroethene	1.5	Not Detected
Ethylene Dibromide	1.5	Not Detected
Chlorobenzene	1.5	Not Detected
Ethyl Benzene	1.5	Not Detected
m,p-Xylene	1.5	3.3
o-Xylene	1.5	Not Detected
Styrene	1.5	Not Detected
1,1,2,2-Tetrachloroethane	1.5	Not Detected
1,3,5-Trimethylbenzene	1.5	Not Detected
1,2,4-Trimethylbenzene	1.5	3.4
1,3-Dichlorobenzene	1.5	Not Detected
1,4-Dichlorobenzene	1.5	Not Detected
Chlorotoluene	1.5	Not Detected
1,2-Dichlorobenzene	1.5	Not Detected
1,2,4-Trichlorobenzene	1.5	Not Detected
Hexachlorobutadiene	1.5	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: SP01-28-30-DS

ID#: 9604175B-03A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5042005**	**Date of Collection:**	**4/17/96**
Dil. Factor:	**2.98**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	6.0	Not Detected
1,3-Butadiene	6.0	Not Detected
Acetone	6.0	18
Carbon Disulfide	6.0	Not Detected
2-Propanol	6.0	Not Detected
trans-1,2-Dichloroethene	6.0	Not Detected
Vinyl Acetate	6.0	Not Detected
Chloroprene	6.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	6.0	Not Detected
Hexane	6.0	230
Tetrahydrofuran	6.0	23
Cyclohexane	6.0	160
1,4-Dioxane	6.0	Not Detected
Bromodichloromethane	6.0	Not Detected
4-Methyl-2-pentanone	6.0	Not Detected
2-Hexanone	6.0	Not Detected
Dibromochloromethane	6.0	Not Detected
Bromoform	6.0	Not Detected
4-Ethyltoluene	6.0	Not Detected
Ethanol	6.0	Not Detected
Methyl tert-Butyl Ether	6.0	Not Detected
Heptane	6.0	92
TNMOC*	15	5300

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**90**	**70-130**
Toluene-d8	**96**	**70-130**
4-Bromofluorobenzene	**102**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: SPO1-28-30-Eff

ID#: 9604175B-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041932**	**Date of Collection:**	**4/17/96**
Dil. Factor:	**1.89**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	0.95	Not Detected
Freon 114	0.95	Not Detected
Chloromethane	0.95	Not Detected
Vinyl Chloride	0.95	Not Detected
Bromomethane	0.95	Not Detected
Chloroethane	0.95	Not Detected
Freon 11	0.95	Not Detected
1,1-Dichloroethene	0.95	Not Detected
Freon 113	0.95	Not Detected
Methylene Chloride	0.95	2.5
1,1-Dichloroethane	0.95	Not Detected
cis-1,2-Dichloroethene	0.95	Not Detected
Chloroform	0.95	Not Detected
1,1,1-Trichloroethane	0.95	0.98
Carbon Tetrachloride	0.95	Not Detected
Benzene	0.95	Not Detected
1,2-Dichloroethane	0.95	Not Detected
Trichloroethene	0.95	2.8
1,2-Dichloropropane	0.95	Not Detected
cis-1,3-Dichloropropene	0.95	Not Detected
Toluene	0.95	6.2
trans-1,3-Dichloropropene	0.95	Not Detected
1,1,2-Trichloroethane	0.95	Not Detected
Tetrachloroethene	0.95	Not Detected
Ethylene Dibromide	0.95	Not Detected
Chlorobenzene	0.95	Not Detected
Ethyl Benzene	0.95	Not Detected
m,p-Xylene	0.95	3.1
o-Xylene	0.95	1.1
Styrene	0.95	Not Detected
1,1,2,2-Tetrachloroethane	0.95	Not Detected
1,3,5-Trimethylbenzene	0.95	Not Detected
1,2,4-Trimethylbenzene	0.95	1.7
1,3-Dichlorobenzene	0.95	Not Detected
1,4-Dichlorobenzene	0.95	Not Detected
Chlorotoluene	0.95	Not Detected
1,2-Dichlorobenzene	0.95	Not Detected
1,2,4-Trichlorobenzene	0.95	Not Detected
Hexachlorobutadiene	0.95	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: SPO1-28-30-Eff

ID#: 9604175B-04A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041932**	**Date of Collection:**	**4/17/96**
Dil. Factor:	**1.89**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	3.8	Not Detected
1,3-Butadiene	3.8	Not Detected
Acetone	3.8	4.4
Carbon Disulfide	3.8	Not Detected
2-Propanol	3.8	5.4
trans-1,2-Dichloroethene	3.8	Not Detected
Vinyl Acetate	3.8	Not Detected
Chloroprene	3.8	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	Not Detected
Hexane	3.8	Not Detected
Tetrahydrofuran	3.8	5.1
Cyclohexane	3.8	Not Detected
1,4-Dioxane	3.8	Not Detected
Bromodichloromethane	3.8	Not Detected
4-Methyl-2-pentanone	3.8	Not Detected
2-Hexanone	3.8	Not Detected
Dibromochloromethane	3.8	Not Detected
Bromoform	3.8	Not Detected
4-Ethyltoluene	3.8	Not Detected
Ethanol	3.8	8.5
Methyl tert-Butyl Ether	3.8	Not Detected
Heptane	3.8	Not Detected
TNMOC*	9.5	230

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**87**	**70-130**
Toluene-d8	**94**	**70-130**
4-Bromofluorobenzene	**108**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604175B-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041921**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/19/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	0.50	Not Detected
Freon 114	0.50	Not Detected
Chloromethane	0.50	Not Detected
Vinyl Chloride	0.50	Not Detected
Bromomethane	0.50	Not Detected
Chloroethane	0.50	Not Detected
Freon 11	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
Methylene Chloride	0.50	Not Detected
1,1-Dichloroethane	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Carbon Tetrachloride	0.50	Not Detected
Benzene	0.50	Not Detected
1,2-Dichloroethane	0.50	Not Detected
Trichloroethene	0.50	Not Detected
1,2-Dichloropropane	0.50	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected
Toluene	0.50	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
Ethylene Dibromide	0.50	Not Detected
Chlorobenzene	0.50	Not Detected
Ethyl Benzene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Styrene	0.50	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected
Chlorotoluene	0.50	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected
Hexachlorobutadiene	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604175B-05A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5041921**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/19/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	2.0	Not Detected
1,3-Butadiene	2.0	Not Detected
Acetone	2.0	Not Detected
Carbon Disulfide	2.0	Not Detected
2-Propanol	2.0	Not Detected
trans-1,2-Dichloroethene	2.0	Not Detected
Vinyl Acetate	2.0	Not Detected
Chloroprene	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected
Hexane	2.0	Not Detected
Tetrahydrofuran	2.0	Not Detected
Cyclohexane	2.0	Not Detected
1,4-Dioxane	2.0	Not Detected
Bromodichloromethane	2.0	Not Detected
4-Methyl-2-pentanone	2.0	Not Detected
2-Hexanone	2.0	Not Detected
Dibromochloromethane	2.0	Not Detected
Bromoform	2.0	Not Detected
4-Ethyltoluene	2.0	Not Detected
Ethanol	2.0	Not Detected
Methyl tert-Butyl Ether	2.0	Not Detected
Heptane	2.0	Not Detected
TNMOC*	5.0	Not Detected

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: NA

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**88**	**70-130**
Toluene-d8	**101**	**70-130**
4-Bromofluorobenzene	**100**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604175B-05B

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5042004**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	0.50	Not Detected
Freon 114	0.50	Not Detected
Chloromethane	0.50	Not Detected
Vinyl Chloride	0.50	Not Detected
Bromomethane	0.50	Not Detected
Chloroethane	0.50	Not Detected
Freon 11	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
Methylene Chloride	0.50	Not Detected
1,1-Dichloroethane	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Carbon Tetrachloride	0.50	Not Detected
Benzene	0.50	Not Detected
1,2-Dichloroethane	0.50	Not Detected
Trichloroethene	0.50	Not Detected
1,2-Dichloropropane	0.50	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected
Toluene	0.50	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
Ethylene Dibromide	0.50	Not Detected
Chlorobenzene	0.50	Not Detected
Ethyl Benzene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Styrene	0.50	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected
Chlorotoluene	0.50	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected
Hexachlorobutadiene	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604175B-05B

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**5042004**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	2.0	Not Detected
1,3-Butadiene	2.0	Not Detected
Acetone	2.0	Not Detected
Carbon Disulfide	2.0	Not Detected
2-Propanol	2.0	Not Detected
trans-1,2-Dichloroethene	2.0	Not Detected
Vinyl Acetate	2.0	Not Detected
Chloroprene	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected
Hexane	2.0	Not Detected
Tetrahydrofuran	2.0	Not Detected
Cyclohexane	2.0	Not Detected
1,4-Dioxane	2.0	Not Detected
Bromodichloromethane	2.0	Not Detected
4-Methyl-2-pentanone	2.0	Not Detected
2-Hexanone	2.0	Not Detected
Dibromochloromethane	2.0	Not Detected
Bromoform	2.0	Not Detected
4-Ethyltoluene	2.0	Not Detected
Ethanol	2.0	Not Detected
Methyl tert-Butyl Ether	2.0	Not Detected
Heptane	2.0	Not Detected
TNMOC*	5.0	Not Detected

*Total Non-Methane Organic Compounds Referenced to Heptane (MW = 100).

Container Type: NA

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**89**	**70-130**
Toluene-d8	**98**	**70-130**
4-Bromofluorobenzene	**103**	**70-130**

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 006954

Page 1 of 1

Contact Person: Chuck Schick
Company: Groundwater Technology
Address: 2501 Yale Blvd. SE #204 City: Albuquerque State: NM Zip: 87106
Phone: 505-242-3113 FAX: 505-242-1103
Collected By: Signature: [signature]

Project info:
P.O. #:
Project #: 830012208
Project Name: HAFB Officers Club

Turn Around Time:
☑ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
01A	SP01-18-20-AS	4/16/96 19:07	TNMOC by TO-3, VOC's by TO-14, TPH diesel TO3	21	2.5	2.5"Hg
02A	SP01-28-30-AS	4/17/96 14:44	TPH diesel + TNMOC by TO-3, VOC's TO-14	31	3	3.0"Hg
03A	SP01-28-30-DS	4/17/96 14:48	TPH diesel + TNMOC by TO-3, VOC's by TO-14	30	3	3.0"Hg
04A	SP01-28-30-Eff	4/17/96 14:53	TPH diesel + TNMOC by TO-3, VOC's by TO-14	26.5	5	5.0"Hg
	SP01-28-30-AS Tedlar	4/17/96 15:00	Reduced sulfur	Tedlar bag		

Relinquished By: (Signature) Date/Time: [signature] 4/17/96 15:05 Print Name: CURTIS WRIGHT
Relinquished By: (Signature) Date/Time: Received By: (Signature) Date/Time:
Relinquished By: (Signature) Date/Time: Received By: (Signature) Date/Time: Scott Amerson 4/18/96 1055

Notes: Tedlar bag packed with canister SP 01-28-30-DS

4/18/96

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	FED EX	8681024601	AL	4/18/96 1055	AMBIENT	GOOD	(Yes) No None N/A	9604175B

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604175C

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/18/96
DATE COMPLETED: 4/26/96

INVOICE # 10248
P.O. #
PROJECT # 830012208 HAFB-O' Club
AMOUNT$: $150.00

FRACTION #	NAME	TEST	PRICE
05A	SP01-28-30-AS	ASTM D-5504	$150.00
06A	Lab Blank	ASTM D-5504	NC

CERTIFIED BY: Linda L. Freeman
Laboratory Director

DATE: 4/26/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: SP01-28-30-AS
ID#: 9604175C-05A

Sulfur Gases by ASTM D-5504
GC/SCD

File Name:	**B0418007**	**Date of Collection:**	**4/17/96**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/18/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	250
Carbonyl Sulfide	4.0	Not Detected
Methyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	Not Detected
Carbon Disulfide	4.0	Not Detected
Dimethyl Disulfide	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Isopropylmercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propylmercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butylmercaptan	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank
ID#: 9604175C-06A

Sulfur Gases by ASTM D-5504
GC/SCD

File Name:	**B0418005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/18/96**	

Compound	Det. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	Not Detected
Carbonyl Sulfide	4.0	Not Detected
Methyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	Not Detected
Carbon Disulfide	4.0	Not Detected
Dimethyl Disulfide	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Isopropylmercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propylmercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butylmercaptan	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 006954

Contact Person: Chuck Schick
Company: Groundwater Technology
Address: 2501 Yale Blvd. SE #204 City: Albuquerque State: NM Zip: 87106
Phone: 505-242-3113 FAX: 505-242-1103
Collected By: Signature: [signature]

Project info:
P.O. #:
Project #: 830012208
Project Name: HAFB Officers Club

Turn Around Time:
☑ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
	SP01-18-20-AS	4/16/96 19:07	TNMOC by TO-3, VOC's by TO-14, TPH diesel TO3	21	2.5	
	SP01-28-30-AS	4/17/96 14:44	TPH diesel + TNMOC by TO-3, VOC's TO-14	31	3	
	SP01-28-30-DS	4/17/96 14:48	TPH diesel + TNMOC by TO-3, VOC's by TO-14	30	3	
	SP01-28-30-Eff	4/17/96 14:53	TPH diesel + TNMOC by TO-3, VOC's by TO-14	26.5	5	
05A	SP01-28-30-AS Tedlar	4/17/96 15:00	Reduced sulfur	Tedlar bag		

Relinquished By: (Signature) Date/Time: [signature] 4/17/96 15:05 Print Name: CURTIS WRIGHT
Relinquished By: (Signature) Date/Time: Received By: (Signature) Date/Time:
Relinquished By: (Signature) Date/Time: Received By: (Signature) Date/Time: Scott Anderson 4/18/96 1055

Notes: Tedlar bag packed with canister SP 01-28-30-DS

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	FED EX	8681024601	SA	4/18/96 1055	AMBIENT	GOOD	(Yes) No None N/A	9604175C

RECEIVED
MAY 2 0 1996

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604186A

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/19/96
DATE COMPLETED: 4/26/96
DATE RE-ISSUED: 5/14/96 To amend client ID; per client's request.

INVOICE # 10250
P.O. #
PROJECT # 830012208.35 Officer's Club HAFB
AMOUNT$: $150.00

FRACTION #	NAME	TEST	PRICE
02A	SP01-38-40-AS Tedlar	ASTM D-5504	$150.00
03A	Lab Blank	ASTM D-5504	NC

CERTIFIED BY: Linda L. Freeman
Laboratory Director

DATE: 5/16/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: SP01-38-40-AS Tedlar
ID#: 9604186A-02A

Sulfur Gases by ASTM D-5504
GC/SCD

File Name:	**B0419006**	**Date of Collection:**	**4/18/96**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/19/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	4.1
Carbonyl Sulfide	4.0	7.3
Methyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	Not Detected
Carbon Disulfide	4.0	4.4
Dimethyl Disulfide	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Isopropylmercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propylmercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butylmercaptan	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank
ID#: 9604186A-03A

Sulfur Gases by ASTM D-5504
GC/SCD

File Name:	**B0419005**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/19/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	Not Detected
Carbonyl Sulfide	4.0	Not Detected
Methyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	Not Detected
Carbon Disulfide	4.0	Not Detected
Dimethyl Disulfide	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Isopropylmercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propylmercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butylmercaptan	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 006968

Contact Person: Chuck Schick
Company: Groundwater Technology
Address: 2501 Yale Blvd SE #204 City: Albuquerque State: NM Zip: 87106
Phone: 505-242-3113 FAX: 505-242-1103
Collected By: Signature: [signature]

Project info:
P.O. #:
Project #: 830017208.35
Project Name: Officers Club HAFB

Turn Around Time:
☒ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
	SP01-38-40-AS	4/18/96 14:45	TPH diesel + TNMOC by TO-3, VOCs TO-14	30	4	
01A	SP01-38-40-AS Tedlar	4/18/96 14:50	Reduced Sulfur	NA		

Relinquished By: (Signature) [signature] Date/Time 4/18/96 15:00 Print Name: CURTIS WRIGHT
Relinquished By: (Signature) Date/Time Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time Received By: (Signature) [signature] Date/Time AR 4/19/96 900

Notes: Tedlar bag needs to be analyzed within 24 hours.

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed-X	7598296230	TS	4/19/96 900	Ambient	Good	Yes No (None) N/A	96041864

RECEIVED
APR 29 1996

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604186B

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/19/96
DATE COMPLETED: 4/26/96

INVOICE # 10250
P.O. #
PROJECT # 830012208.35 Officer's Club HAFB
AMOUNT$: $361.72

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	SP01-38-40-AS	TO-14	4.0 "Hg	$250.00
02A	Lab Blank	TO-14	NA	NC

Misc. Charges	6 Liter Summa Canister Preparation (1) @ $35.00 each.	$70.00
	Shipping (4/15/96)	$41.72

CERTIFIED BY: Linda Freeman
Laboratory Director

DATE: 4/26/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: SP01-38-40-AS

ID#: 9604186B-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**9042006**	**Date of Collection:**	**4/18/96**
Dil. Factor:	**1.55**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	0.78	30
Freon 114	0.78	Not Detected
Chloromethane	0.78	Not Detected
Vinyl Chloride	0.78	Not Detected
Bromomethane	0.78	Not Detected
Chloroethane	0.78	Not Detected
Freon 11	0.78	43
1,1-Dichloroethene	0.78	Not Detected
Freon 113	0.78	2.0
Methylene Chloride	0.78	Not Detected
1,1-Dichloroethane	0.78	Not Detected
cis-1,2-Dichloroethene	0.78	Not Detected
Chloroform	0.78	Not Detected
1,1,1-Trichloroethane	0.78	Not Detected
Carbon Tetrachloride	0.78	Not Detected
Benzene	0.78	14
1,2-Dichloroethane	0.78	Not Detected
Trichloroethene	0.78	17
1,2-Dichloropropane	0.78	Not Detected
cis-1,3-Dichloropropene	0.78	Not Detected
Toluene	0.78	13
trans-1,3-Dichloropropene	0.78	Not Detected
1,1,2-Trichloroethane	0.78	Not Detected
Tetrachloroethene	0.78	Not Detected
Ethylene Dibromide	0.78	Not Detected
Chlorobenzene	0.78	Not Detected
Ethyl Benzene	0.78	Not Detected
m,p-Xylene	0.78	2.7
o-Xylene	0.78	1.5
Styrene	0.78	Not Detected
1,1,2,2-Tetrachloroethane	0.78	Not Detected
1,3,5-Trimethylbenzene	0.78	1.2
1,2,4-Trimethylbenzene	0.78	4.3
1,3-Dichlorobenzene	0.78	Not Detected
1,4-Dichlorobenzene	0.78	Not Detected
Chlorotoluene	0.78	Not Detected
1,2-Dichlorobenzene	0.78	Not Detected
1,2,4-Trichlorobenzene	0.78	Not Detected
Hexachlorobutadiene	0.78	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: SP01-38-40-AS

ID#: 9604186B-01A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**9042006**	**Date of Collection:**	**4/18/96**
Dil. Factor:	**1.55**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	3.1	Not Detected
1,3-Butadiene	3.1	Not Detected
Acetone	3.1	73
Carbon Disulfide	3.1	Not Detected
2-Propanol	3.1	Not Detected
trans-1,2-Dichloroethene	3.1	Not Detected
Vinyl Acetate	3.1	Not Detected
Chloroprene	3.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.1	14
Hexane	3.1	210
Tetrahydrofuran	3.1	Not Detected
Cyclohexane	3.1	140
1,4-Dioxane	3.1	Not Detected
Bromodichloromethane	3.1	Not Detected
4-Methyl-2-pentanone	3.1	Not Detected
2-Hexanone	3.1	Not Detected
Dibromochloromethane	3.1	Not Detected
Bromoform	3.1	Not Detected
4-Ethyltoluene	3.1	Not Detected
Ethanol	3.1	Not Detected
Methyl tert-Butyl Ether	3.1	Not Detected
Heptane	3.1	78
TPH*	7.8	6300

*Total Petroleum Hydrocarbons (C2 + Hydrocarbons) Referenced to Gasoline (MW = 100).

Container Type: 6 Liter Summa Canister

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**96**	**70-130**
Toluene-d8	**108**	**70-130**
4-Bromofluorobenzene	**120**	**70-130**

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604186B-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**9042004**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Freon 12	0.50	Not Detected
Freon 114	0.50	Not Detected
Chloromethane	0.50	Not Detected
Vinyl Chloride	0.50	Not Detected
Bromomethane	0.50	Not Detected
Chloroethane	0.50	Not Detected
Freon 11	0.50	Not Detected
1,1-Dichloroethene	0.50	Not Detected
Freon 113	0.50	Not Detected
Methylene Chloride	0.50	Not Detected
1,1-Dichloroethane	0.50	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected
Chloroform	0.50	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected
Carbon Tetrachloride	0.50	Not Detected
Benzene	0.50	Not Detected
1,2-Dichloroethane	0.50	Not Detected
Trichloroethene	0.50	Not Detected
1,2-Dichloropropane	0.50	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected
Toluene	0.50	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected
Tetrachloroethene	0.50	Not Detected
Ethylene Dibromide	0.50	Not Detected
Chlorobenzene	0.50	Not Detected
Ethyl Benzene	0.50	Not Detected
m,p-Xylene	0.50	Not Detected
o-Xylene	0.50	Not Detected
Styrene	0.50	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected
Chlorotoluene	0.50	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected
Hexachlorobutadiene	0.50	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9604186B-02A

EPA METHOD TO-14 GC/MS Full Scan

File Name:	**9042004**	**Date of Collection:**	**NA**
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/20/96**

Compound	Det. Limit (ppbv)	Amount (ppbv)
Propylene	2.0	Not Detected
1,3-Butadiene	2.0	Not Detected
Acetone	2.0	Not Detected
Carbon Disulfide	2.0	Not Detected
2-Propanol	2.0	Not Detected
trans-1,2-Dichloroethene	2.0	Not Detected
Vinyl Acetate	2.0	Not Detected
Chloroprene	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected
Hexane	2.0	Not Detected
Tetrahydrofuran	2.0	Not Detected
Cyclohexane	2.0	Not Detected
1,4-Dioxane	2.0	Not Detected
Bromodichloromethane	2.0	Not Detected
4-Methyl-2-pentanone	2.0	Not Detected
2-Hexanone	2.0	Not Detected
Dibromochloromethane	2.0	Not Detected
Bromoform	2.0	Not Detected
4-Ethyltoluene	2.0	Not Detected
Ethanol	2.0	Not Detected
Methyl tert-Butyl Ether	2.0	Not Detected
Heptane	2.0	Not Detected
TPH*	5.0	Not Detected

*Total Petroleum Hydrocarbons (C2 + Hydrocarbons) Referenced to Gasoline (MW = 100).

Container Type: NA

Surrogates	% Recovery	Method Limits
Octafluorotoluene	**96**	**70-130**
Toluene-d8	**108**	**70-130**
4-Bromofluorobenzene	**117**	**70-130**

AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 006968

Contact Person: Chuck Schick
Company: Groundwater Technology
Address: 2501 Yale Blvd SE #204 City: Albuquerque State: NM Zip: 87106
Phone: 505-242-3113 FAX: 505-242-1103
Collected By: Signature: [signature]

Project info:
P.O. #:
Project #: 830012208.35
Project Name: Officers Club HAFB

Turn Around Time:
☒ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
01A	SP01-38-40-AS	4/18/96 14:45	TPH diesel + TNMOC by TO-3, VOCs TO-14	30	4	4.0"Hg
	SP01-38-40-AS Tedlar	4/18/96 14:50	Reduced Sulfur	NA		

Relinquished By: (Signature) [signature] Date/Time 4/18/96 15:00 Print Name: CURTIS WRIGHT
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time
Received By: (Signature) [signature] Date/Time AR 4/19/96 900

Notes: Tedlar bag needs to be analyzed within 24 hours.

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed-Ex	7598296230	TS	4/19/96 900	Ambient	Good	Yes No (None) N/A	9604186B

RECEIVED
APR 29 1996

@ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9604186C

Work Order Summary

CLIENT: Mr. Chuck Schick
Groundwater Technology, Inc.
2501 Yale Boulevard SE, Suite 204
Albuquerque, NM 87106

BILL TO: Same

PHONE: 505-242-3113
FAX: 505-242-1103
DATE RECEIVED: 4/19/96
DATE COMPLETED: 4/26/96

INVOICE # 10250
P.O. #
PROJECT # 830012208.35 Officer's Club HAFB
AMOUNT$: $100.00

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	SP01-38-40-AS	TO-3	4.0 "Hg	$100.00
02A	Lab Blank	TO-3	NA	NC

CERTIFIED BY: Linda B. Freeman
Laboratory Director

DATE: 4/26/96

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

Total Petroleum Hydrocarbons by Modified EPA Method TO-3
GC/FID

Field Sample I.D.	Lab Sample I.D.	File Name	Sample Date	Analyzed For	Dilution Factor	Det. Limit (ppmv)	Det. Limit (µG/L)	Amount (ppmv)	Amount (µG/L)
SP01-38-40-AS	9604186C-01A	6042012	4/18/96	TPH*	25.8	**0.26**	**1.1**	**53**	**220**
Lab Blank	9604186C-02A	6042003	NA	TPH*	1.00	**0.010**	**0.042**	**Not Detected**	**Not Detected**

Analysis Date: 4/20/96
Container Type: 6 Liter Summa Canister

COMMENTS: *Total Petroleum Hydrocarbons referenced to Gasoline (MW = 100).
NA = Not Applicable

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

CHAIN-OF-CUSTODY RECORD

№ 006968

Page 1 of 1

Contact Person: Chuck Schick
Company: Groundwater Technology
Address: 2501 Yale Blvd SE #204 City: Albuquerque State: NM Zip: 87106
Phone: 505-242-3113 FAX: 505-242-1103
Collected By: Signature: [signature]

Project info:
P.O. #:
Project #: 830012208.35
Project Name: Officers Club HAFB

Turn Around Time:
☒ Normal
☐ Rush _____ Specify

Lab I.D.	Field Sample I.D.	Date & Time	Analyses Requested	Canister Pressure / Vacuum Initial	Final	Receipt
01A	SP01-38-40-AS	4/18/96 14:45	TPH diesel + TNMOC by TO-3, VOCs TO-14	30	4	4.0 psi
	SP01-38-40-AS Tedlar	4/18/96 14:50	Reduced Sulfur	NA		4/19/96

Relinquished By: (Signature) Date/Time: [signature] 4/18/96 15:00 Print Name: CURTIS WRIGHT
Relinquished By: (Signature) Date/Time: Received By: (Signature) Date/Time:
Relinquished By: (Signature) Date/Time: Received By: (Signature) Date/Time: [signature] AIR 4/19/96 900

Notes: Tedlar bag needs to be analyzed within 24 hours.

Lab Use Only	Shipper Name	Air Bill #	Opened By:	Date/Time	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed-X	7598296230	TS	4/19/96 900	Ambient	Good	Yes No (None) N/A	9604186C

Form 1293 rev. 06

APPENDIX F
VENT-ROI RESULTS

ANALYSIS OF VACUUM DISSIPATION DATA FROM PILOT TEST

15 INCHES APPLIED VACUUM:

Monitoring Well	Distance from SVE Well (ft)	Measured Vacuum (inches w.c.)	log10(Vac)
MW01	6	.15	-.824
MW03	30	.02	-1.699

Additional data point based on applied vacuum:
1.5 inches of water column at 0 feet from SVE well

Slope = -.055 per foot
Intercept = .756 inches of water column
R squared = .868

25 INCHES APPLIED VACUUM:

Monitoring Well	Distance from SVE Well (ft)	Measured Vacuum (inches w.c.)	log10(Vac)
MW01	6	.2	-.699
MW03	30	.06	-1.222

Additional data point based on applied vacuum:
2.5 inches of water column at 0 feet from SVE well

Slope = -.045 per foot
Intercept = 1.071 inches of water column
R squared = .74

Average slope from tests at 2 applied vacuums = -.05 per foot.

OBSERVED AND PREDICTED FLOW RESPONSE TO APPLIED VACUUM

	Applied Vacuum (inches w.c.)	Observed Flow Response (scfm)	Predicted Flow Response (scfm)	Relative Percent Difference
1.	15	100	95.77	-4.3 %
2.	17.5	115	111.38	-3.2 %
3.	25	150	157.62	5 %
4.	27	165	169.8	2.9 %

Mean Value of Relative Percent Difference:	.1 %
Mean Absolute Value of Relative Percent Difference:	3.8 %
Standard Deviation of Prediction:	6.1 scfm
Soil Permeability in Horizontal Direction (sq cm):	7.64E-07
Standard Deviation of Soil Permeability Estimation (sq cm):	3.5E-08
Ratio of Horizontal to Vertical Permeability:	3.3

RESULTS OF VENT-ROI ANALYSIS

*EFFECTIVE RADIUS CALCULATION FOR CONVENTIONAL SOIL VAPOR EXTRACTION SYSTEM

Holloman AFB Officer's Club site in HAFB, NM

hydrogen sulfide analysis for capture estimates

hydrogen sulfide (single component, volatile and biodegradable)

Molecular Weight	= 34
Vapor Pressure	= 10580.96 mm Hg
Temperature Constant	= 1904 deg K
Liquid Density	= .001 g/cc
Zero Order Bioremediation Rate Constant	= .1 ppm/day
Initial Total Soil Contaminant Concentration	= 500 ppm
Residual (Non-degradable) Soil Concentration	= 1 ppm

Vented trenches, 2 feet wide by 4.5 feet deep by 10 feet long, not extending to groundwater with gravel backfill from 4 to 4.5 feet

Thickness of Vented Soil Interval	= 9 feet
Slope of log10(P) vs Distance from Pilot Test	= .05 per ft
Soil Gas Temperature	= 70 deg F
Applied Vacuum	= 27 in. water column
Air Flow Rate per Trench	= 169.8 scfm
Desired Time to Cleanup	= 365 days
Cleanup Goal	= 90 % removal

VOLATILIZATION:	SINGLE TRENCH EFFECTIVE RADIUS	= 159.06 FEET
159.06 FEET		
	INTERTRENCH EFFECTIVE RADIUS	= 144.99 FEET
BIODEGRADATION:	SINGLE TRENCH RADIUS OF INFLUENCE	= 75.22 FEET
	INTERTRENCH RADIUS OF INFLUENCE	= 70.84 FEET
VOL. PLUS BIO.:	SINGLE TRENCH EFFECTIVE RADIUS	= 159.06 FEET
	INTERTRENCH EFFECTIVE RADIUS	= 144.99 FEET

RESULTS OF VENT-ROI ANALYSIS

EFFECTIVE RADIUS CALCULATION FOR CONVENTIONAL SOIL VAPOR EXTRACTION SYSTEM

Holloman AFB Officer's Club site in HAFB, NM

diesel

Diesel/No. 2 Fuel Oil (contaminant mixture, volatile and biodegradable)

log10(MW P*)	= .2 - 6.03 ðm
Temperature Constant	= 1904 deg K
Liquid Density	= .8 g/cc
Zero Order Bioremediation Rate Constant	= .1 ppm/day
Initial Total Soil Contaminant Concentration	= 2000 ppm
Residual (Non-degradable) Soil Concentration	= 1 ppm

Vented trenches, 2 feet wide by 4.5 feet deep by 10 feet long, not extending to groundwater with gravel backfill from 4 to 4.5 feet

Thickness of Vented Soil Interval	= 9 feet
Slope of log10(P) vs Distance from Pilot Test	= .05 per ft
Soil Gas Temperature	= 70 deg F
Applied Vacuum	= 27 in. water column
Air Flow Rate per Trench	= 169.8 scfm
Desired Time to Cleanup	= 365 days
Cleanup Goal	= 90 % removal

VOLATILIZATION: SINGLE TRENCH EFFECTIVE RADIUS = .04 FEET
.04 FEET

INSUFFICIENT SURFACE INFILTRATION FOR MULTIPLE TRENCH SYSTEM

BIODEGRADATION: SINGLE TRENCH RADIUS OF INFLUENCE = 75.22 FEET
INTERTRENCH RADIUS OF INFLUENCE = 70.84 FEET

VOL. PLUS BIO.: SINGLE TRENCH EFFECTIVE RADIUS = .42 FEET
INTERTRENCH EFFECTIVE RADIUS = .1 FEET