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REPORTS

DATE:
1989

El Paso
Natural Gas Company

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August 28, 1989

Mr. David G. Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
310 Old Santa Fe Trail
Suite 206
Santa Fe, New Mexico 87504

Subject: Investigation Report of the Manana - Mary Wheeler Site

Dear David:

Enclosed are two copies of the report by K.W. Brown and Associates on the site near Flora Vista. After you have had a chance to review it, we will be happy to get together with you and discuss the remediation. Henry Van or I will be happy to answer any questions you might have on the report in the interim.

Sincerely yours,

Kenneth E. Beasley
Manager of Compliance
Engineering, North Region

SITE INVESTIGATION OF THE MANANA - MARY WHEELER #1-E WELL SITE NEAR FLORA VISTA, NEW MEXICO

prepared for

El Paso Natural Gas Company
El Paso, Texas

by

K. W. Brown & Associates, Inc.
6 Graham Road
College Station, Texas 77840

September, 1989

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EXECUTIVE SUMMARY

Manana Gas, Inc., (Albuquerque, New Mexico), operates a producing natural gas well in the town of Flora Vista, New Mexico, in an area directly adjacent to the Animas River. The well, Mary Wheeler #1-E, was first pressed into service in July of 1980, with the gas being purchased by El Paso Natural Gas Company (EPNG, El Paso, Texas). Located hydrologically-downgradient of the gas production units lies a domestic water well field operated by the Flora Vista Water Users Association. describe > Through (routine well site management practices) the alluvial aquifer in which the water production wells are screened became contaminated with hydrocarbon liquids.

Hydrocarbons were detected in at least one water well, S-1, in February of 1983. Throughout the early and mid-1980s, several investigators, including the New Mexico Oil Conservation Division (OCD), have been involved in efforts aimed at isolating the exact source of the contamination.

The intent of this report is to: 1) consolidate hydrologic and chemical site-specific data developed during previous investigatory efforts, 2) provide documentation of the K. W. Brown & Associates, Inc. (KWB&A) site investigation conducted in response to OCD's June 15, 1988, directives (Boyer, 1988), and 3) offer a framework upon which site reclamation measures can be implemented.

The investigation of the Manana - Mary Wheeler #1-E well site began with a desktop effort, whereby existing information from OCD and EPNG files was compiled and studied in an effort to guide the subsequent field work and analytical testing.

Following this task, trenches were excavated via backhoe to expose the unsaturated, cobbley sand beneath the site to aid in the evaluation of the extent of subsurface hydrocarbon contamination. A structured soil sampling program was conducted concurrent with the trenching exercise, in which a sample of soil was collected from the saturated/unsaturated zone interface at three locations in the trenches: one at each end, and one in the approximate center of the pit.

Once the excavation phase was complete, four new groundwater monitoring wells were installed at about the same level as the existing on-site monitoring wells. With the exception of the upgradient well, these wells were positioned inside the area where hydrocarbon staining was visible. Groundwater samples were taken from these new wells, the existing monitoring wells, and from selected inactive water production wells.

Soil and groundwater samples were submitted to an analytical laboratory for analysis of selected metals, inorganics, and organic constituents.

Visual inspection of the dehydrator pit area, exposed during trenching activities, indicated the presence of hydrocarbon contamination of the soil between the ground surface and the water table. Oily materials were noted from a level as shallow as 12 inches below the ground surface, to as deep as 5.4 feet, which coincided with the water table in this area.

The major constituents detected in soil samples taken from trenches excavated in the dehydrator pit area were oil and grease; the aromatic volatiles, benzene, toluene, xylene, and chlorobenzene; and the polynuclear aromatic hydrocarbons, fluoranthene and chrysene.

Based on the results of the soil and groundwater sampling and analysis program, and on a review of the operating records of the production units, it appears that the principal source for the hydrocarbon contamination at the Manana - Mary Wheeler #1-E well site is the unlined dehydrator pit.

A significant contrast in chromium concentration between soil samples taken near the area believed to be the reserve pit, and the balance of the soil samples, suggests that chromium is present in this area at levels above what is considered to be characteristic of background conditions. Also, owing to the fact that chromium is a component of certain drilling mud additives, it appears likely that the trenches excavated in this area were located, at least in part, inside the boundaries of the drilling mud reserve pit. Buried debris, such as concrete fragments and scrap pipe, unearthed during the trenching effort, serves to substantiate the claim that the reserve pit had been identified during the site investigation.

An analysis of groundwater samples collected from the newly-installed monitoring wells, OCD's monitoring wells, and selected production wells, indicates that the greatest concentration of volatile organic compounds lies within the bounds of the visible hydrocarbon plume.

Methylene chloride, a commonly-used laboratory solvent, was detected in three groundwater samples, all of which are located outside the plume boundaries. It is very likely that the identification of this compound can be attributed to its usage in sample container decontamination by the analytical laboratory.

Based on the results of a risk assessment, and on the findings of the site investigation, it is recommended that EPNG proceed with excavation of visibly-contaminated soils.

1.0 INTRODUCTION

Manana Gas, Inc., (Albuquerque, New Mexico), operates a producing natural gas well in the town of Flora Vista, New Mexico, in an area directly adjacent to the Animas River. The well, Mary Wheeler #1-E, was first pressed into service in July of 1980, with the gas being purchased by El Paso Natural Gas Company (El Paso, Texas). Located hydrologically-downgradient of the gas production units lies a domestic water well field operated by the Flora Vista Water Users Association. Through routine well site management practices the alluvial aquifer in which the water production wells are screened became contaminated with hydrocarbon liquids.

Hydrocarbons were detected in at least one water well, S-1, in February of 1983. Throughout the early and mid-1980s, several investigators, including the New Mexico Oil Conservation Division (OCD), have been involved in efforts aimed at isolating the exact source of the contamination. Conventional exploratory activities carried out by OCD and others led to the realization that a production unit termed the dehydrator pit was the most likely source of contamination.

This report, entitled "Site Investigation of the Manana - Mary Wheeler #1-E Well Site Near Flora Vista, New Mexico," serves to: 1) consolidate hydrologic and chemical site-specific data developed during previous investigatory efforts, 2) provide documentation of the K. W. Brown & Associates, Inc. (KWB&A) site investigation conducted in response to OCD's June 15, 1988, directives (Boyer, 1988), and 3) offer a framework upon which site reclamation measures can be implemented.

Comprised of six sections, this document provides a detailed account of the activities that took place on-site from the time in which the gas well first became operational, until the conclusion of the latest site investigation. Section 2.0 chronicles the environmental aspects of the well site activities, while Section 3.0 includes a discussion of the site investigation conducted by KWB&A. Following the site investigation, the analytical data generated during this exercise were used to formulate a risk assessment, the results of which are reported in Section 4.0. Section 5.0 provides a listing of the conclusions borne out by the site investigation/risk assessment elements.

Finally, a remedial action plan is included as the last section of this report (Section 6.0). Since much of the information presented in Sections 2.0 through 5.0 are considered to be germane to developing a site reclamation program, the remedial action plan has been included as the closing discussion.

2.0 HISTORICAL BACKGROUND

This section provides background on the Manana - Mary Wheeler #1-E gas well site. This background includes a description and comprehensive historical perspective of the well site, which is operated by Manana Gas, Inc. of Albuquerque, New Mexico. Included in the discussion is a chronology of the events that led to the contamination of S-1, a water-supply well owned and operated by the Flora Vista (New Mexico) Water Users Association.

2.1 DESCRIPTION OF SITE

The Mary Wheeler #1-E well site, located in the town of Flora Vista, New Mexico (Figure 2-1), presently consists of a producing gas well, an oil storage tank, a produced water tank, and a gas dehydrator (Plate 1, Appendix A). Southwest of the gas well units are the Flora Vista Water Users Association (FVWUA) production wells and associated pumping equipment. The Animas River lies approximately 100 feet east of the well head, and an active alfalfa farming operation is directly adjacent to the production units on the west.

Four hundred seventy feet north of the gas well is a well owned by the FVWUA, S-4, that is believed to be dormant at the present time. Beginning at the gas well head and proceeding southwest, the first FVWUA well to be encountered is S-1, located 250 feet southwest of the gas well. Next is SX-1, an exploratory well that has never been placed into service as a producing water well. Continuing southwest from SX-1, SX-2, another unused exploration well, is the next well to be encountered, followed by S-5, the pump house, S-2 (active), S-3, and S-7 (active). Production well S-6, an active well, lies 210 feet due north of S-3. Unless noted otherwise, the

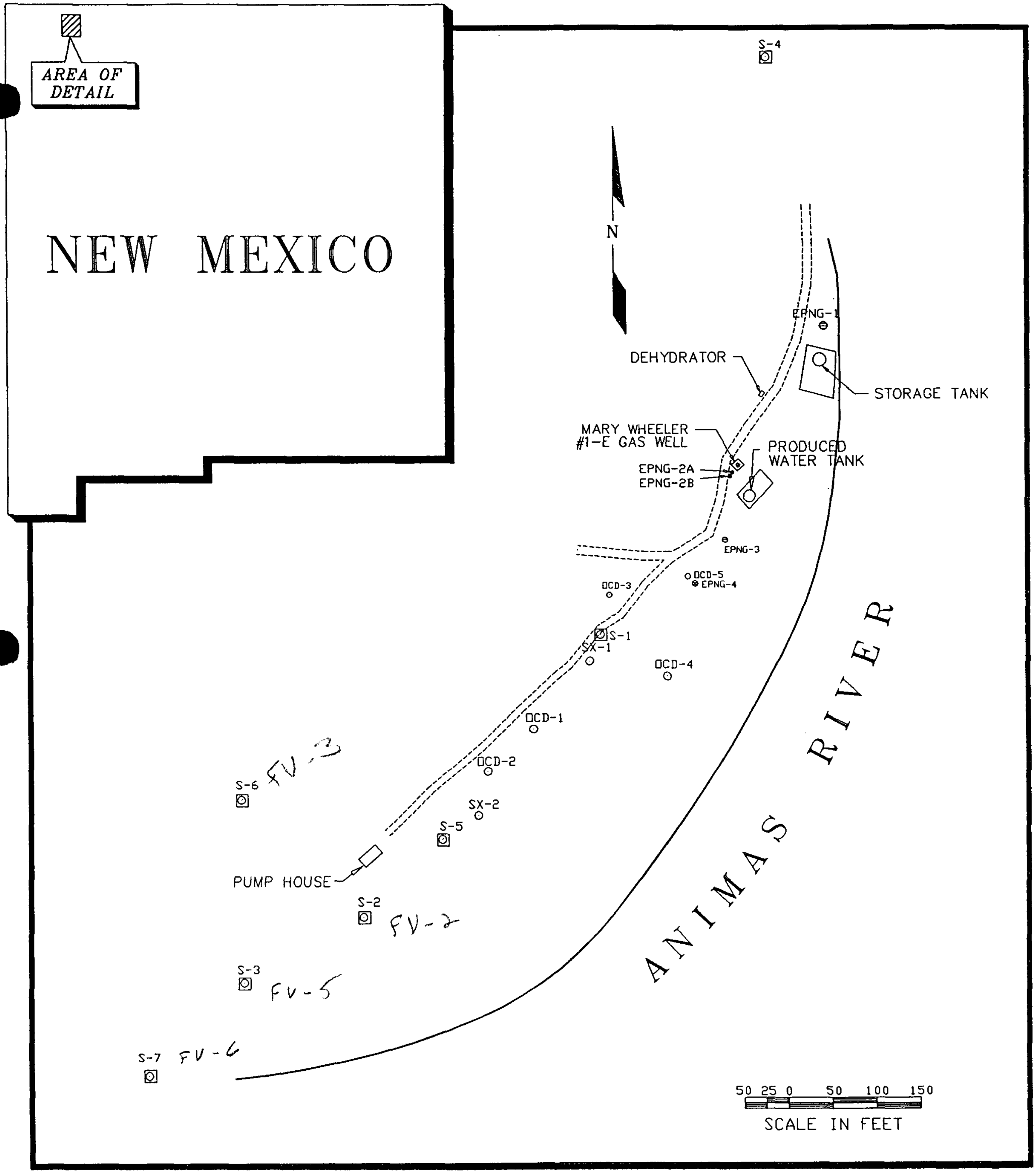

FIGURE 2-1. MAP SHOWING LOCATION OF THE MAÑANA – MARY WHEELER #1-E WELL SITE.

majority of the production wells/exploration wells are not actively being pumped.

Topography at the site is generally characterized as flat, as the production units and the water well field are located on a point bar deposit of the Animas River. There are numerous cottonwood trees scattered about the area, and there is a thick section of brush between the well field and the river. Surface deposits consist of cobbley sand, with the coarser-grained fractions approaching boulder-size dimensions. More detail regarding geologic conditions at the site can be found in Section 3.0.

Also present at the site are five groundwater monitoring wells installed by OCD in March of 1985. Of these five wells, two have filled-up with silt/sand (OCD-2 and OCD-4; see Plate 1) and are, in their present state, unusable. Five additional monitoring wells were installed by KWB&A as part of this investigation. These wells can also be found on Plate 1, and details regarding their method of construction can be found in Section 3.2.

2.2 CHRONOLOGY OF WELL SITE OPERATIONS: 1979 TO THE PRESENT

Table 2-1 contains a comprehensive listing of activities at the Manana Mary Wheeler #1-E gas well site, beginning with the drilling and subsequent start-up of the well, followed by the date when contamination was first suspected at S-1. Also described in this table, are the events that occurred in response to the investigation by OCD, and others, of the contamination incident. Following is a brief discussion of the more significant events listed in the table.

Permission was granted to Manana by OCD on December 26, 1979, to drill the Mary Wheeler #1-E gas well. Seven months later, on July 16, 1980, the well was placed on-line and began delivering natural gas via pipeline to El

Table 2-1. Manana - Mary Wheeler #1-E Well Site Contamination History.

Date	Event
12/26/79	Permission granted to Manana by OCD to drill Mary Wheeler #1-E gas well
Jan-80	Mary Wheeler #1-E gas well drilled
7/16/80	Mary Wheeler #1-E gas well placed into service
Jul-80	Vapor line from the still column, the glycol storage vent, and the liquid phase dump line all routed to an unlined pit immediately south of the dehydrator
Feb-83	Contamination in Flora Vista Water Users Association (FVWUA) production well S-1 first detected
Feb-83	Backhoe pits dug by FVWUA through August of 1983
Summer 1983	The vapor line from the still column is re-routed into a 55-gallon drum placed inside the unlined pit. The liquid phase dump line is re-routed to a pipeline leading to Manana's tank. The glycol storage vent is still positioned over unlined pit.
8/1/83	Chemical analysis of samples taken from FVWUA pits and from production wells S-1, -2, and -3
8/22/83	Chemical analysis of samples taken from production wells S-2, -3, and -4, and from the Animas River
8/23/83	Chemical analysis of samples taken from production well S-1, Manana's oil/water separator, El Paso Natural Gas' (EPNG) glycol dehydrator, and from a pit possibly dug at an earlier date by the FVWUA
Summer 1984	OCD attempts to install groundwater monitoring wells at the Mary Wheeler #1-E well site with a hollow-stem auger drilling rig; unfavorable geologic conditions led to failure of this effort
1/25/85	New Mexico congressman Don Silva requests information from OCD pertaining to the Flora Vista incident
2/28/85	Dave Boyer of OCD meets with Dick Thurstonson of the FVWUA and Richard Cheney of Lawrence A. Brewer & Associates, Inc. at the Mary Wheeler #1-E gas well location
3/19/85	OCD installs groundwater monitoring wells OCD-1 through OCD-5. Samples taken from the new monitoring wells and S-1, S-5, and the Animas River and a system composite is taken on March 20
6/28/85	OCD samples OCD-1 through OCD-5, and S-1; OCD wells are possibly contaminated by an air compressor used to develop wells
8/5/85	OCD samples S-5 and takes system composite sample
9/20/85	OCD samples S-5
9/21/85	OCD samples S-5 and OCD-1 through OCD-5; contaminants detected in OCD-1, -2, '-3, and -5, and S-5, are possibly a result of additional well development with a different air compressor. Fiberglass tank at the separator is also sampled
10/25/85	OCD samples S-1 and OCD-1 through OCD-5, takes system composite sample, and samples the fiberglass tank at the separator
1/17/86	OCD samples OCD-1 through OCD-5, and S-5, takes system composite sample, and samples the 55-gallon drum at the dehydrator
Jan-86	OCD completes progress report on Flora Vista incident
2/28/86	OCD samples the 55-gallon drum at the dehydrator
4/21/86	OCD begins a 72-hour pump test on S-1; samples also taken from OCD-1 through OCD-5, and S-1 and S-5
4/21/86	OCD samples S-5 and OCD-1 through OCD-5
4/22/86	OCD samples S-1
4/23/86	OCD samples fiberglass tank at the oil storage tank
4/24/86	OCD samples S-1
4/25/86	OCD samples S-5, OCD-1 through OCD-5, and takes a system composite sample; dichloromethane (a laboratory solvent) detected in composite sample was a possible result of vial contamination by sample bottle vendor
5/21/86	OCD takes a system composite sample, and samples the fiberglass tank at the oil storage tank
5/21/86	OCD conducts short-duration pump test (i.e., 5.6 hours) on S-1
Oct-86	OCD completes final report on the Flora Vista incident

Table 2-1 (cont.). Manana - Mary Wheeler #1-E Well Site Contamination History.

Date	Event
Dec-86	EPNG turns off dehydrator, disconnects vapor line from still column and glycol storage vent, and plugs all vents
3/27/87	W.B. Martin & Associates, Inc. conducts an investigation of the reserve pit area, and drills a boring 15 feet southwest of S-4
Spring 1987	EPNG returns dehydrator to service, re-installs vent lines, and routes same to 55-gallon drum inside unlined pit
Jun-87	EPNG back-fills unlined pit south of dehydrator, and removes the dehydrator from service
8/18/87	R.W. Blair, Jr. conducts trenching exercise in an effort to obtain the extent of subsurface contamination; investigation continues through 8/19/87
10/28/87	EPNG sends memorandum to OCD describing the history of the Mary Wheeler #1-E gas well operations
6/15/88	OCD sends EPNG memorandum outlining requirements for the Flora Vista contamination investigation and remedial action plan
9/15/88	Manana settles with the FVWUA for $25,000
2/14/89	OCD sends EPNG second memorandum outlining requirements for the Flora Vista contamination investigation and remedial action plan
6/2/89	Meeting between OCD, K.W. Brown & Associates, Inc. (KWB&A), and EPNG to collect information from OCD's files concerning the Flora Vista site, and to discuss the technical approach to be followed during the site investigation
6/12/89	KWB&A excavates trenches to evaluate the extent of subsurface contamination, and installs 5 groundwater monitoring wells to collect additional water quality data

Paso Natural Gas Company (EPNG). At this time, EPNG routed the vapor line from the still column, the glycol storage vent line, and the liquid phase dump line to an unlined pit located directly south of the dehydrator unit.

As of October, 1986, the Flora Vista Water Users Association served approximately 1,500 residents and small businesses through 431 connections. The average system delivery during 1983 was about 100,000 gallons per day (GPD). The FVWUA well field was first pressed into service in 1981, with two production wells, each equipped with pumps capable of delivering 60 to 70 gallons per minute (GPM) (Boyer, 1986).

In response to the degradation of the quality of water pumped from S-1, the FVWUA initiated an investigation to uncover the source of contamination, lasting from February of 1983 to August of that year. Although detailed information regarding this investigation is unavailable, it is believed that the FVWUA excavated several pits with a backhoe, and took soil and groundwater samples to be subjected to chemical analysis. Samples were also taken and analyzed of produced fluids contained in Manana's oil/water separator and in EPNG's dehydrator.

At some point in the summer of 1983, EPNG re-routed the vapor line from the still column into a 55-gallon drum, which it placed inside the unlined pit. In addition, El Paso re-routed the liquid phase dump line to a pipeline leading to Manana's tank. The glycol storage vent line remained positioned over the unlined pit.

In the summer of 1984, OCD attempted to install groundwater monitoring wells on-site with a hollow-stem auger. Due to the abundance of large cobbles and boulders in the subsurface, however, this operation was abandoned since the drilling rig could not penetrate the geologic material. In March of the following year (1985), OCD was successful in installing five monitoring wells with a backhoe. Additional information regarding this effort can be found in Section 2.3.3.

Groundwater samples were taken periodically by OCD from the monitoring wells, S-1, S-5, and the water supply system tap (representing a system composite), from March of 1985 to April of 1986. Occasionally, fluids were sampled from several of the production units throughout this period.

Efforts by OCD to develop the newly-installed groundwater monitoring wells in June and September of 1985 resulted in suspected contamination of the water inside the well casings, as gasoline-powered air compressors were used on each occasion to rapidly remove groundwater and sediment from each well. It is likely that gasoline combustion by-products produced by the air compressor entered the air stream, which subsequently contaminated the water inside the well. Thus, the chemical analyses of the groundwater samples taken on these dates cannot be deemed a reliable indicator of water quality during those times.

OCD completed a progress report on its activities at the Mary Wheeler #1-E well site in January of 1986 (Appendix B). A significant conclusion of that report indicated that no verifiable contamination was detected in 1985 in either the unused production wells or the monitoring wells, except for the periods in which the air compressors were used for well development. OCD recommended that exploratory excavating be done in an effort to identify the presence of oil or hydrocarbons between the dehydrator pit and S-1. Finally, OCD suggested that a 72-hour pump test on S-1 be conducted to evaluate the performance of the alluvial aquifer, and to verify that pumping S-1 would mobilize free-phase or dissolved hydrocarbons lying adjacent to that well's screen.

Beginning on April 22, 1986, OCD conducted a 72-hour pump test on S-1, in which that well would be pumped for 48 hours, and recovery would then be observed for 21 hours. Throughout the duration of the pump test, groundwater samples were withdrawn from the monitoring wells (i.e., OCD-1 through -5), S-1, S-5, and the supply system tap. Further information regarding the pump test can be found in Section 2.3.4.

OCD issued its final report on the Flora Vista project in October of 1986 (Appendix C). Conclusions of that report suggest that oil and dissolved hydrocarbons remain in the sediments immediately adjacent to S-1, and that pumping of this well at production rates would likely cause continued migration of contaminants into the wellbore. OCD recommended that S-5 be pumped for a period of time sufficient to sample fresh formation fluids, draw a sample of groundwater from this well, and analyze for aromatic hydrocarbons, chloride, and total dissolved solids (TDS). OCD intimated that additional extensive site work, including soil excavation, may be needed to determine the threat of contamination to other production wells.

In December, 1986, EPNG turned the dehydrator off, and disconnected the vapor line from the still column and the glycol storage vent line, and plugged all vents.

On March 27, 1987, W. B. Martin & Associates, Inc., of Farmington, NM, conducted a brief site investigation of the reserve pit area, and drilled a soil boring 15 feet to the southwest of S-4. The conclusions of this study are not clear at this time, however. A report describing this investigation is available in Appendix D.

EPNG, in the spring of 1987, returned the dehydrator to service, re-installed the vent lines, and routed these lines to the aforementioned 55-gallon drum placed inside the dehydrator pit.

In June of 1987, EPNG once again removed the dehydrator from service, and back-filled the unlined pit south of the dehydrator.

Two months later, on August 18, 1987, R. W. Blair, Jr., initiated a trenching exercise at the Mary Wheeler #1-E well site in an effort to ascertain the extent of subsurface contamination. Thirteen pits were dug with a backhoe and, of those 13, 6 were noted to contain oil or hydrocarbons. A copy of this report is available in Appendix E.

On June 15, 1988, OCD sent a memorandum to EPNG outlining its technical requirements for further study of the Flora Vista site, including remedial action. Included in this document is a requirement for additional study of S-5, the area accommodating the dehydrator pit and other pits (e.g., tank drain, blowdown), the area between S-1 and the Mary Wheeler #1-E well site, and the area between S-1 and the remaining production wells. There is also a request for an investigation of the reserve or "slush" pit. The location of this pit was not readily known at the outset of the instant investigation, as it had been covered over for several years prior to the issuance of this memo.

The FVWUA agreed to an out-of-court settlement of $25,000 with Manana in September, 1988.

OCD sent EPNG an additional memorandum on February 14, 1989, re-affirming its technical requirements for continued study and reclamation of the Mary Wheeler #1-E well site. This document followed the submission of a proposal by EPNG addressing the requirements listed in the June 15, 1988 memo.

On June 2, 1989, EPNG and K. W. Brown & Associates, Inc. (KWB&A), a consulting firm representing EPNG, met with OCD to exchange information pertinent to the Flora Vista project, and to discuss the technical approach to be followed during the site investigation.

Beginning on June 12, 1989, KWB&A initiated a site investigation, whereby several trenches were dug via backhoe, additional groundwater monitoring wells were installed with the aid of a rotary-wash drilling rig, and the requirements listed by OCD were addressed. Details regarding the site investigation are located in Section 3.0.

2.3 PREVIOUS INVESTIGATORY WORK

Having briefly reviewed the chronology of the Manana - Mary Wheeler #1-E well site, it is appropriate here to recount the details of work conducted to date at the well site by OCD, the FVWUA, and others. These efforts mainly involved attempts at identifying the source, or sources, of the hydrocarbon contamination first detected in S-1. Once these regions had been identified, ensuing investigations were aimed at characterizing the subsurface environment which had been impacted by the contamination event, or events.

2.3.1 FVWUA Groundwater Sampling

During the early 1980s, the FVWUA and its consultant, L. A. Brewer and Associates, Inc. (Farmington, New Mexico), conducted routine water quality sampling of its production water wells. It was through these efforts, and probably through complaints from water system users, that the contamination of S-1 was first detected. Table 2-2 provides a listing of the results of these early sampling episodes. The availability of water quality records is somewhat limited, and it is very likely that Table 2-2 is a subset of the entire FVWUA/Brewer & Associates, Inc. water quality data base from this time period.

2.3.2 Blair Trenching Exercise

On August 18 and 19, 1987, Dr. R. W. Blair, Jr., from the Department of Geology, Fort Lewis College, Durango, Colorado, representing Brewer &

Table 2-2. Analytical Data for Groundwater Samples Taken from Selected Production Wells.

Parameter	S-1		S-2		S-3	
	Date Sampled		Date Sampled		Date Sampled	
	8/10/83	N/A	8/22/83	N/A	10/8/81	8/22/83
Metals (ppm):						
Ag			<0.003			1.2
Al	2.21					
As	1.56		0.02			0.09
B	<0.004					
Ba	<0.005		<0.005			0.06
Co	<0.003					
Cd	<0.002		<0.002			<0.002
Cr	<0.005		<0.005			0.05
Cu	<0.002					
Fe	0.15	0.2		0.3		
Hg	0.63		<0.002			<0.002
Mn	0.32	0.57		0.7	1.39	
Mo	<0.005					
Ni	<0.01					
Pb	<0.001		<0.001			0.25
Se	<0.002		<0.002			<0.002
Zn	<0.004					
Soluble Cations (ppm):						
Ca					121	
K					1.7	
Mg	20.75				10	
Na					34	
Soluble Anions (ppm):						
Cl	10.4				1.6	
CN	0.001					
F	6.6		1.42		0.7	1.33
HCO3					164	
NO3 as N	0.5		0.6		0.6	0.75
SO4	200	180		210	32.5	
Organics (ppm):						
Phenols	0.4					
Oil & Grease	32.8					
Benzene	0.01					
Toluene	0.01					
TOC	125.07					
Others (ppm):						
Hardness (as CaCO3)		376		428	343	
pH	7.3				8.08	
TDS	558				400	

Note: Samples were taken by the Flora Vista Water Users Association and by L.A. Brewer & Associates, Inc.

Associates, Inc., who was, in turn, representing the FVWUA, conducted a trenching exercise in an effort to isolate the source of hydrocarbon contamination as detected in S-1. Thirteen trenches were excavated with a backhoe to a depth of 7 to 8 feet.

Groundwater was first noted to occur at a depth of between 5 and 6 feet below the ground surface. Groundwater samples were taken from each trench, and were sent to a laboratory to be analyzed for the presence of hydrocarbons. A partial summary of the analytical results is presented in Table 2-3.

At the conclusion of his study, Blair constructed a map showing the production units, the locations of all the trenches, S-1, OCD-5 (labeled as "monitor well M5" on his map), and the postulated boundary of the contaminated zone. Also shown on this map are the capture zones specific to S-1 as computed by OCD for pumping rates of 35 and 65 GPM. A copy of this report has been included in Appendix E.

2.3.3 OCD Monitoring Well Installation

The New Mexico Oil Conservation Division (OCD), on March 19 and 20, 1985, installed five groundwater monitoring wells in the alluvial aquifer underlying the Manana - Mary Wheeler #1-E well site. The locations of these monitoring wells can be found on Plate 1. The Oil Conservation Division originally assigned these wells the identifiers MW-1 through MW-5. To keep the origin of the wells easily identifiable, however, KWB&A has re-identified these wells as OCD-1 through OCD-5. Accordingly, the wells installed by KWB&A during the most recent site investigation (see Section 3.2) have been labeled EPNG-1, -2A, -2B, -3, and -4.

These five OCD wells were installed by excavating with a backhoe to a depth of approximately 8 feet below grade. According to OCD, wire-wound,

Table 2-3. Analytical Data for Groundwater Samples Taken from Selected Backhoe Pits During the Blair Investigation.

Parameter	Trench I.D. A-1 8/17/87 16:40 (ppb)	C-4 8/17/87 16:55 (ppb)	D-5 8/17/87 11:56 (ppb)	D-6 8/17/87 16:40 (ppb)	E-5 8/17/87 14:35 (ppb)	E-6 8/17/87 15:05 (ppb)	F-1 8/17/87 15:50 (ppb)
Aromatic Purgeables	3	ND	2	10			200
Halogenated Purgeables	ND	ND	ND	ND	ND	ND	ND
Aliphatic Hydrocarbons	ND						
Base Neutrals	ND		6400				
Benzene					110	200	700
Toluene					30	2000	110
Ethylbenzene						20	150
p-xylene					170	685	950
m-xylene					470	2200	3070
o-xylene					200	785	920
Naphthalene			<5	<10	<25		
2-Methylnaphthalene	<5		<5	<10	<300		
1-Methylnaphthalene	<5		<5	<25	<300		
Acenapthalene			36	<25	<500		
Acenaphthene			14	<25	<25		
Fluorene			20	<10	<200		
Anthracene			10	<10	<25		
Phenanthrene/Anthracene							
Fluoranthene			<10				
Pyrene			<10				
Benzo(a)Anthracene/Chrysene							
Dibenzo(a,h)Anthracene							
Phenols							
Phthalate esters							
Others			<10				

stainless-steel well screens, with a slot size of 0.07 inches, were installed in each well. As noted in a previous section, the slot size for these screens was too large for the material screened by the wells and, as a result, two of the monitoring wells (OCD-2 and -4) have been filled-in with silt and/or fine-grained sand. Nonetheless, groundwater samples were taken from each well, and returned to a laboratory for organics analysis.

On June 27, 1985, OCD returned to the site to develop the newly-installed monitoring wells with a gasoline-powered air compressor. Samples taken the following day indicated low or trace levels of hydrocarbons in three of the five wells. It is very probable that the air compressor introduced gasoline-combustion by-products into the monitoring wells, and these contaminants were present as dissolved constituents when sampling was done.

A second attempt at purging the wells prior to sampling, and at removing sediments that had accumulated in the wells, was also done with the aid of a gasoline-powered air compressor; this unit was not the same as the one used on June 27, however. Groundwater samples taken soon after purging with this compressor also showed low levels of contaminants. OCD subsequently tested the air compressor and found lubrication or combustion pollutants in the air line. Thus, OCD concluded that, once again, the samples taken during this period were not indicative of true groundwater quality, as the compressor introduced foreign contaminants into the wells.

After the monitoring wells had been installed, OCD continued to take groundwater samples from these, as well as S-1 and -5 and some of the production units, through May of 1986. These data are summarized in Table 2-4.

Table 2-4. Analytical Data for Groundwater Samples Taken from S-1 by OCD.

Parameter	3/20/85	6/28/85	4/22/86 19:50	4/22/86 20:10	4/22/86 20:15	4/23/86 13:10	4/23/86 13:10	4/24/86 13:20	4/24/86 14:00	4/25/86 10:50	4/28/86	5/21/86 13:40
Metals (ppm):												
Ag	<0.1						<0.1					
Al	<0.1						<0.1					
As												
B	<0.1						<0.1					
Ba	<0.1											
Cd	<0.1						<0.1					
Co	<0.1						<0.1					
Cr	<0.1						<0.1					
Cu	<0.1						<0.1					
Fe	<0.1						<0.1					
Hg												
Mn	0.47						0.39					
Mo	<0.1						<0.1					
Ni	<0.1						<0.1					
Pb	<0.1						<0.1					
Se												
Si	5.3						<3.8					
Sn	<0.1						<0.1					
Sr	2.7						3					
V	<0.1						<0.1					
Y	<0.1											
Zn	<0.1						<0.1					
Soluble Cations (ppm):												
Ca	110						150					
Mg	9.1						9.76					
Na							32.2					
Soluble Anions (ppm):												
Cl							16					
CN												
F												
NaHCO3							278.7					
NO3 (N)												
SO4							185					
Others:												
pH												
TDS												
EC (umhos/cm)							653.9					

Table 2-4 (cont.). Analytical Data for Groundwater Samples Taken from S-1 by OCD.

Parameter	3/20/85	6/28/85	4/22/86 19:50	4/22/86 20:10	4/22/86 20:15	4/23/86 13:10	4/23/86 13:10	4/24/86 13:20	4/24/86 14:00	4/25/86 10:50	4/28/86	5/21/86 13:40
Organics (ppb):												
Oil & Grease											0	
TOC	171.03	797.36	126.93	640.75								
Benzene	ND	ND	ND	ND	ND		1					1
Toluene	ND	6	ND	ND	1		ND					
Ethylbenzene	ND	ND	6	1	ND		ND					
p-xylene	ND	ND	7	1	ND		ND					
m-xylene	ND	ND	14	2	ND		ND					
o-xylene	ND	ND	1	ND	ND		ND					
Chloroform	ND	1										
Other trihalomethanes	ND	ND										
Methane (dissolved)		1.3ppm										
Dichloromethane						2	1	1	15	1		
Naphthalene												<5
2-Methylnaphthalene												<5
Acenapthalene												<5
Fluorene												<5
Phenanthrene/ Anthracene												<5
Fluoranthene												<5
Pyrene												<5
Benzo(a)Anthracene/ Chrysene												<5
Dibenzo(a,h) Anthracene												<10
Phenols												<50 ug/l
Phthalate esters						5 det.	2 det.					

2.3.4 OCD Pump Test

Beginning on April 21, 1986, OCD conducted a 72-hour duration pump test on the alluvial aquifer in which the water-supply and monitoring wells are completed. S-1 was used as the pumped well, and six observation wells, located from 30 to 200 feet from S-1 were employed for water level monitoring. At the outset, the test was to consist of 48 hours of pumping followed by 24 hours of recovery; in practice, however, only 21 hours of water level recovery were observed.

A centrifugal pump, equipped with a 25-foot-long intake hose, was used to rapidly withdraw water from S-1. Since this pump was rated at 350 GPM, it was necessary for OCD to install a valve for controlling the rate of discharge from the well. The initial discharge rate was set at 100 GPM.

The results of the test are summarized in Table 2-5. Significant findings of the study include the observation of an elongate cone-of-depression surrounding S-1. The observance of this phenomenon suggests that the alluvial aquifer is anisotropic in transmissivity, with the major axis of the transmissivity ellipse oriented in a northeast/southwest direction (i.e., N 45° E), which is roughly parallel to the river bank. Anisotropy is defined as having physical properties, such as transmissivity, that vary in different directions. Another explanation for the existence of a noncircular cone-of-depression is the influence of areas contributing recharge to the aquifer being pumped. In this case, the Animas River could be imparting an influence over the cone geometry.

As can be seen in Table 2-5, transmissivity is in the 14-15,000 GPD/FT range, and the storage coefficient, averaging 0.066, is indicative of unconfined to semiconfined aquifer conditions.

The following section contains a detailed discussion of KWB&A's site investigation of the Manana - Mary Wheeler #1-E well site.

Table 2-5. Summary of Results of Pump Test Conducted by OCD - April 21-25, 1986.

Well I.D.	Method of Analysis: Theis (Modified) T (GPD/FT)	Theis (Modified) S (-)	Jacob T (GPD/FT)	Jacob S (-)	Adjusted Time Drawdown T (GPD/FT)	Adjusted Time Drawdown S (-)	Dimensionless Time Recovery T (GPD/FT)	Dimensionless Time Recovery S (-)
S-1	8,014	N/A	7,196	N/A	9,429 (Step 1)	N/A	15,529	N/A
					5,500 (Step 2)	N/A		
					9,962 (Step 3)	N/A		
SX-1	14,614	0.0270	16,704	0.0190	13,200	0.0410	12,279	N/A
OCD-1	15,617	0.1000	N/A	N/A	NC	NC	ND	ND
OCD-3	14,855	0.0780	12,752	0.0700	NC	NC	ND	ND
OCD-4	15,227	0.0920	N/A	N/A	NC	NC	ND	ND
OCD-5	14,677	0.0970	N/A	N/A	NC	NC	ND	ND

Notes:

1. N/A - Not Applicable, NC - Not Calculated, ND - No Data
2. Storage coefficient cannot be calculated for the pumped well.
3. Low T values for S-1 during pumping are a result of well entrance losses.
4. Drawdown in OCD-2 was too small to permit T,S evaluation.

3.0 SITE INVESTIGATION

Starting on June 12, 1989, KWB&A initiated a site investigation at the Manana - Mary Wheeler #1-E well site, beginning with an orientation of the site, followed by groundwater level measurement of the existing wells, and excavation of a series of trenches aimed at corroborating Blair's findings of 1987 and confirming the continued presence of subsurface hydrocarbon contamination. Five new groundwater monitoring wells were installed, one in an upgradient position, one two-well cluster (downgradient), and two additional downgradient wells located inside the postulated boundary of the plume. Production wells S-1 and S-5 were stressed by pumping approximately 8,400 and 12,600 gallons from each in preparation for taking fresh formation-water samples. The final task of the investigation was to make excavations in what was believed to be the area where the reserve pit was located in an effort to locate this buried feature. Each of these tasks is discussed in turn in the sections that follow.

3.1 EXCAVATIONS

A total of seven trenches were dug with the aid of a backhoe at the site. Each trench was advanced to a depth necessary to expose the water table and any hydrocarbon staining. The location of each trench was guided by Blair's site map (Section 2.3.2), as it was undesirable to excavate an old trench where disturbance of the subsurface had occurred. Each pit location is plotted on Plate 1.

Once a trench had been excavated, soil samples were taken immediately to minimize the escape of volatile organic compounds from the pit. Then, the approximate dimensions of each trench were recorded, and significant observations of each were made. When lighting conditions permitted the observance of significant contrast between the clean and contaminated soil, photographs were taken of the interior of the pit (Appendix F).

In every case, it was impossible to determine the vertical extent of the hydrocarbon staining, as the co-mingling of groundwater with the hydrocarbon matter confounded any attempts at measuring this property. However, as hydrocarbon compounds are usually lighter than water, it is expected that, due to seasonal variations in water table altitude, most of the hydrocarbons bracket the average water table elevation. That is, there is probably a certain mass of hydrocarbon matter both above and below the water table. If there are any hydrocarbons present in a free-phase condition, it would be expected that a layer of oil floating on the water table could be visually discerned.

The following sections provide a discussion of each trench, including dimensions and significant observations. Laboratory results for the soil samples collected from each excavation can be found in Appendix G. A summary of the laboratory results is presented in Section 3.5.2.

3.1.1 Trench T-1

This pit, excavated on June 12, 1989 to a length of 125 feet, found oil occurring at a depth of approximately 4 feet below the ground surface, and groundwater at 5 feet. The material removed from the excavation can be characterized as a very poorly-sorted, cobbley coarse sand. Soil removed from the pit was stained a blue-black color, and there was a distinct petroleum odor emanating from the excavation. An examination of the water table showed an absence of a "rainbow sheen." The presence of hydrocarbon matter was indicated, however, by a film of tiny spherical oil droplets on the water table.

The excavation was terminated on the west for fear of damaging an adjacent alfalfa crop on that side of the gas well location. Oil was found from the westernmost limit of the excavation to within 15 feet of the easternmost end of the trench, yielding a minimum plume width of 110 feet.

Three soil samples were taken from T-1 at the level of the hydrocarbon staining, one from the western end of the excavation, one from the center, and one from the eastern portion of the pit (Plate 1).

3.1.2 Trench T-2

T-2, also dug on June 12, 1989, was approximately 80 feet in length. Oil and groundwater were found to be coincident in this excavation, and were both noted to occur at about 4 feet below grade. Due to the constant disturbance of the water table by the backhoe bucket, however, it is possible that the water table was actually 6 to 8 inches below the first occurrence of hydrocarbon staining. It was obvious that the lateral extent of the oil staining was less in T-2 than in T-1, suggesting that the plume had decreased in width between these trenches. It is estimated that the plume is 70 feet wide in T-2.

As in T-1, three soil samples, one from the western end of the pit, one from the center, and one from the eastern end of the trench, were collected.

3.1.3 Trench T-3

Located about 90 feet northeast of S-1, trench T-3 was excavated on June 13, 1989, and was approximately 70 feet long. The western end of T-3 saw an absence of oil, while the central portion of this pit found heavy hydrocarbon staining at about 4 feet; groundwater was first noted about 6 inches below this level. In the eastern one-fourth of T-3, there was a pronounced lack of oil, and the stratigraphy had changed to mostly sand with a lower proportion of cobbles. The plume width in T-3 is estimated at 40 feet.

Soil samples were taken from the western, central, and eastern sections of the excavation.

3.1.4 Trench T-4

Located about 15 feet southwest of S-1 and 15 feet northeast of SX-1, trench T-4 was excavated to a length of 70 feet. Groundwater in this pit occurred at the shallow depth of 3 feet below grade. There was no indication of hydrocarbon staining anywhere in the entire excavation. No hydrocarbon odors were present in the soil or groundwater, and no sheens could be discerned on the water surface.

The texture of the materials removed from T-4 were finer-grained than those taken from the previous three pits, and were characterized as coarse sand with a small percentage of gravel. There was an abundance of clayey sand and sandy clay in the upper section of the trench walls, representing overbank deposits laid down by the Animas River during high-stage periods. An abundance of black organic matter was noted in the sediments, and iron staining was apparent from the surface down to 6 to 8 inches above the water table.

Although no visual evidence supporting the presence of hydrocarbons could be noted, soil samples were taken slightly above the water table from the western, central, and eastern portions of the excavation.

3.1.5 Trench T-5

This trench, dug slightly north of T-1, south of the produced water tank, and in a direction parallel to the prevailing groundwater flow direction, was aimed at confirming the easternmost limit of the plume in this region of the site. Excavated to a length of only 17 feet, this pit found hydrocarbon staining at a depth of 3 feet below the ground surface. As with the previous excavations, groundwater was first detected a small distance below the first sighting of oil. A hydrocarbon odor was noted emanating from the trench, but its intensity was rather low. No other significant observations were noted.

One soil sample was collected from T-5 from the northernmost limit of the pit.

3.1.6 Trench T-6

The location for this trench was selected by a representative of OCD. Groundwater in this pit was first noted at a depth of 5 feet. In the eastern end of the excavation, the stratigraphy was characterized as a very plastic, gray to dark-brown clay, with black staining that appeared to be reduced organic matter; this material had no odor. The western limit of the trench exposed a sandy top soil underlain by a cobbley sand. There was no visual evidence supporting the presence of hydrocarbons anywhere in this 50-foot-long trench.

One sample was taken at each end of the pit.

3.1.7 Trench T-7

T-7, located approximately 240 feet southwest of S-1, was dug to a length of only 10 feet. The geologic materials encountered while advancing this trench were characterized as a brown, very plastic, sandy clay, with a black-stained clay coincident with the water table at about 3 feet below grade. Although there were no indications of oil present in the subsurface in T-7, one soil sample was collected from the eastern end of the pit.

3.1.8 Dehydrator Pit

Two excavations were made in the area believed to be the old unlined pit located directly south of the dehydrator (see Section 2.2). These pits were aimed at defining the limits of this buried feature, and in determining the strength of the source of the hydrocarbons found in the subsurface throughout the extent of the site.

The first excavation, oriented roughly northeast/southwest, was 46 feet long, and found visible evidence of hydrocarbon contamination in the middle 16-feet of the pit (Plate 1). Heavy blue-black hydrocarbon staining was evident beginning at about 12 inches below grade in this area. Groundwater was first seen at about 5.4 feet.

The second excavation, oriented transverse to the first and positioned so as to intersect the first trench, was dug to a length of 29 feet, and found evidence of hydrocarbons in the subsurface in the middle 20 feet of this trench.

A total of four samples were taken; each sample was taken at the limit of visible oil staining. Thus, one sample each was collected from the northeastern, northwestern, southeastern, and southwestern edges of the hydrocarbon plume as exposed by the trenches.

3.2 MONITORING WELLS

In an effort to evaluate the extent of groundwater contamination as manifested by the presence of dissolved hydrocarbon constituents, five monitoring wells were installed by KWB&A on June 14, 1989. Each boring was drilled by Mo-Te Drilling Company of Farmington, New Mexico, and was logged by KWB&A. The drilling equipment used to advance each boring consisted of a Mayhew 1500 rotary-wash drilling rig. Sampling of the geologic medium was not done for this investigation due primarily to the presence of large river cobbles; this condition precluded the use of conventional sampling equipment. A record of the materials encountered by the drill bit was made, however, by an examination of the cuttings that were removed from the borehole.

In order to penetrate the gravel and cobbles, which were very abundant at the site, and to prevent the hole from caving when the drill string was out, it was necessary to use a bentonite mud in the drilling process. Once the appropriate depth had been reached, the mud was circulated out of the borehole by flushing fresh water down through the drill pipe and up along the annular space. Once a clean borehole was established, the well casing was set.

Materials used to construct each well consisted of 2-inch I.D., schedule 40, flush-threaded PVC casing and well screen. Each screen was 5-feet long, was slotted over a distance of 4-feet, and had 0.010-inch-wide slots. One of the goals of this portion of the investigation was to install a well screen in each well so the middle portion of the screen straddled a level corresponding to the mean water table elevation. By accomplishing this, the water table could be clearly observed in each well with as much as $\pm$ 2 feet of change in the water table position; this is important for situations in which free-phase liquids are in contact with the water table. The material used to form the sand pack was a #10 silica sand, indicating that 98 to 100% of the grains in a sample of this material will pass through the U.S. Standard #10 sieve (2.0 mm). A bentonite seal was effected by using 0.25-inch, dehydrated bentonite pellets. The remainder of the annular space was occupied by a Type I & II Portland cement grout. To prevent unauthorized access to each well, a steel, lockable well cover was placed over the PVC casing and embedded in the concrete collar surrounding the casing; each of these units was equipped with a padlock, and each padlock could be opened with the same key.

The location for the upgradient well, identified as EPNG-1, was the first to be selected (Plate 1), since it is desirable, when drilling in an area suspected of having subsurface contamination, to begin in the least contaminated area to minimize cross-contamination of wells. Sand and cobbles were encountered from the surface down to the total depth (TD) of

10 feet for EPNG-1. There were no indications that a zone of hydrocarbon contamination had been penetrated by the drill stem.

A two-well cluster was chosen for installation in a position slightly downgradient of the gas wellhead (Plate 1). This piezometer nest was designed to determine the presence of a vertical hydraulic gradient beneath the site, if any, and to ascertain the existence of dissolved contaminants at a depth slightly below the water table. The shallow well bears the identification EPNG-2A, and the deeper well is designated EPNG-2B. Drilled to a TD of 10 feet, EPNG-2A found black-stained sediments at a depth of approximately 5 feet. Since EPNG-2B was only a few feet away from EPNG-2A, the same black-stained materials were noted in the cuttings removed from this borehole. EPNG-2B was designed to be the deeper well, and was drilled to a TD of 17 feet. The geologic materials met by the drill string in both borings were cobbley to gravelly sand.

EPNG-3, drilled slightly south of T-2 (Plate 1), saw oily-stained soil at a depth of 5 to 6 feet, and was drilled to a TD of 8 feet. Materials similar to those drilled through for installation of EPNG-1, -2A, and -2B were noted in EPNG-3.

The last well installed by KWB&A, EPNG-4, was located a few feet to the southeast of OCD-5. Oily-stained sediments were first penetrated in this boring at a depth of approximately 4 feet below grade. EPNG-4 was drilled to a TD of 8 feet.

Table 3-1 summarizes the construction details for each groundwater monitoring well. Geologic logs and well construction diagrams are available in Appendix I for each monitoring well.

Table 3-1. Summary of Groundwater Monitoring Well Construction Details.

Well Component	Feet, MSL/Feet									
	EPNG-1		EPNG-2A		EPNG-2B		EPNG-3		EPNG-4	
	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth	Elev.	Depth
Steel Cover	5,486.97	N/A	5,486.48	N/A	5,485.67	N/A	5,484.87	N/A	5,483.83	N/A
Well Casing	5,487.03	N/A	5,486.54	N/A	5,485.68	N/A	5,484.90	N/A	5,483.87	N/A
Pad	5,483.88	N/A	5,483.04	N/A	5,482.89	N/A	5,481.49	N/A	5,480.50	N/A
Grade	5,483.81	0.0	5,482.94	0.0	5,482.92	0.0	5,481.85	0.0	5,480.45	0.0
Top of Bentonite	5,481.81	2.0	5,480.44	2.5	5,474.92	8.0	5,481.85	1.5	5,478.95	1.5
Top of Sand	5,479.81	4.0	5,478.44	4.5	5,471.92	11.0	5,480.35	2.5	5,477.95	2.5
Top of Screen	5,479.31	4.5	5,477.94	5.0	5,470.92	12.0	5,479.35	3.0	5,477.45	3.0
Bottom of Screen	5,475.31	8.5	5,473.94	9.0	5,466.92	16.0	5,478.85	7.0	5,473.45	7.0
TD	5,473.81	10.0	5,472.94	10.0	5,462.92	20.0	5,474.85	8.0	5,471.95	8.5

3.3 RESERVE PIT

Three trenches were excavated with a backhoe in the area believed to be the location of the old reserve pit. This area was chosen based on discussions with OCD and EPNG personnel. The first trench, identified as RP-1, was dug to a depth of 4 feet and a length of 12 feet, and found an oily layer of soil from 2 to 3 feet, and a sandy bentonitic layer from 3 to 4 feet (Plate 1). One soil sample was taken from the oily horizon (RP-1A) and one from the bentonite layer (RP-1B).

The second trench, labeled as RP-2, was 10 feet long, and was excavated to a depth of 3.5 feet. A piece of scrap pipe was unearthed at about 3 feet below grade, and a massive gray clay with black staining along bedding planes was noted from 3.3 to 3.5 feet. No hydrocarbon odors were detected in the soil sample (RP-2) taken from the gray clay horizon, or in any other places in the excavation.

Excavated approximately 5 feet southeast of the terminus of RP-2, the third and final trench, RP-3, found conditions very similar to those noted in RP-2. A piece of concrete debris was dug up from a level of about 3.5 feet, which corresponded to the maximum excavated depth for this pit. Due to the visible soil conditions similar to those observed in RP-2, no soil samples were taken from RP-3.

3.4 SAMPLING AND ANALYSIS

As briefly discussed in previous sections, soil and groundwater samples were collected from the newly-excavated trenches and from the newly-installed monitoring wells. A total of 24 soil samples and 11 groundwater samples were collected from the Manana - Mary Wheeler #1-E well site. Each sample was subjected to a chemical analysis for identical suites of parameters. In general, three analyses were run on each sample:

indicator parameters, organics, and inorganics. Table 3-2 lists the individual inorganic and metals parameters measured on each sample, and Table 3-3 list the organic compounds.

3.4.1 Soil Sampling

The general procedure followed for soil sampling was to acquire a backhoe bucketful of soil from the level at which a sample was desired. Samples of soil were collected from the bucket with a clean, decontaminated, stainless-steel scoop, and placed into a similarly clean stainless-steel bowl. The sampler was careful to screen the sample of large rocks and other debris prior to filling the sample containers.

Since volatile organics were to be measured, a 40-ml clear glass vial with a Teflon septum was filled immediately after the backhoe operator removed the bucket from the excavation. Next, a 250-ml amber glass jar was filled, and then a sealable plastic bag was filled with soil. Each container was labeled with a sample I.D., date, time, and chemical analysis to be performed on the sample, and placed on ice in an ice chest. A note was made of the sampling location in the field logbook.

The contractor's backhoe bucket was inspected prior to the first excavation and was found to be free of soil from any previous site work. Prior to each excavation, the bucket was inspected by KWB&A for loose soil or oily debris that could have resulted in cross-contamination of the trenches. Additionally, it was believed that the action of removing the overburden material and back-filling of the trenches sufficiently cleaned the bucket to forego steam-cleaning between excavations. At no time was the backhoe observed to be leaking any kind of oil or hydraulic fluids.

3.4.2 Groundwater Sampling

Groundwater sampling was limited to the newly-installed monitoring wells, the OCD-series wells, and selected water production wells. Sampling

Table 3-2. Inorganic Analytical Parameters Measured on Soil and Groundwater Samples.

Indicator Parameters		Soluble Cations		Soluble Anions		Metals	
Soil	**Water**	**Soil**	**Water**	**Soil**	**Water**	**Soil**	**Water**
EC	EC	Calcium	Calcium	Chloride	Chloride	Barium	Barium
Oil & Grease	Oil & Grease	Magnesium	Magnesium	CO3	CO3	Cadmium	Cadmium
pH	pH	Potassium	Potassium	HCO3	HCO3	Chromium	Chromium
	SAR	Sodium	Sodium	Sulfate	Sulfate	Selenium	Selenium
	TDS (180c)				Sulfide		
	TDS (Calc.)				Sulfite		
	Total Alk.						

Table 3-3. Organic Analytical Parameters Measured on Soil and Groundwater Samples.

Aromatic Volatile Organics	Halogenated Volatile Organics	Polynuclear Aromatic Hydrocarbons	Chlorinated Hydrocarbons	Glycols
Benzene	Chloromethane	Naphthalene	1,3-Dichlorobenzene	Ethylene Glycol
Toluene	Bromomethane	Acenaphthalene	1,4-Dichlorobenzene	Diethylene Glycol
Ethylbenzene	Dichlorodifluoromethane	Acenaphthene	1,2-Dichlorobenzene	
Chlorobenzene	Vinyl Chloride	Fluorene	Hexachlorobutadiene	
p,m-Xylene	Chloroethane	Phenanthrene	1,2,4-Trichlorobenzene	
o-Xylene	Methylene Chloride	Anthracene	Hexachlorocyclopentadiene	
1,4 Dichlorobenzene	1,1-Dichloroethene	Fluoranthene	2-Chloronapthalene	
1,3 Dichlorobenzene	Trichlorofluoromethane	Pyrene	Hexachlorobenzene	
1,2 Dichlorobenzene	1,1-Dichloroethane	Benzo(a)Anthracene		
	trans-1,2-Dichloroethene	Chrysene		
	Chloroform	Benzo(b)fluoranthene		
	1,2-Dichloroethane	Benzo(k)fluoranthene		
	1,1,1-Trichloroethane	Benzo(a)pyrene		
	Carbon Tetrachloride	Dibenzo(a,h)anthracene		
	Bromodichloromethane	Indeno(1,2,3-cd)pyrene		
	1,2-Dichloropropane	Benzo(ghi)perylene		
	cis-1,3-Dichloropropene	Benzo(j)fluoranthene		
	trans-1,3-Dichloropropene	Dibenz(a,h)acridine		
	Trichloroethene (TCE)	Dibenz(a,j)acridine		
	Dibromochloromethane	Dibenz(a,e)pyrene		
	1,1,2-Trichloroethane	Dibenz(a,h)pyrene		
	2-Chloroethylvinyl ether	Dibenz(a,i)pyrene		
	Bromoform	3-Methylcholanthrene		
	1,1,2,2-Tetrachloroethane			
	Tetrachloroethene (PCE)			
	Chlorobenzene			
	1,3-Dichlorobenzene			
	1,2-Dichlorobenzene			
	1,4-Dichlorobenzene			

of groundwater found in the trenches was not performed since the backhoe bucket generally induced significant disturbance of the formation material. In general, it is asserted that any groundwater sample taken from the trenches would not have been representative of formation water quality.

Groundwater sampling generally involved drawing a significant volume of water from each well in an effort to obtain a fresh sample representative of formation conditions. The newly-installed groundwater monitoring wells, EPNG-1, -2A, -2B, -3, and -4, were first "developed" by submerging a 1-inch I.D. PVC air compressor discharge line below the water level in each well and applying air pressure to the line. This action served to violently remove water and bentonite drilling mud remnants from the well, thereby purging a large volume of water in a short period of time. The air compressor used for this exercise was equipped with a dry-element filter that prevented any oil, water, or combustion by-products from entering the discharge stream.

As mentioned previously, OCD-2 and -4 had become filled with silt and/or sand since their installation. Each of these wells was developed using the above-mentioned procedure in an effort to remove the accumulated sediments.

The production wells S-1 ands S-5 were scheduled to be sampled during the site investigation. Based on an inspection of these wells at the outset of the investigation, it was obvious that they had not been pumped for quite some time. Thus, a centrifugal pump was to be used to rapidly remove a large volume of groundwater from these wells in preparation for acquiring samples.

The pump used to develop S-1 and S-5 was rated at 85 GPM; a well-site calibration showed, however, that, at the current level of lift at approximately 20 feet, only 70 GPM could be realized with the unit. This rate of flow was deemed adequate to properly remove the necessary volume of water in a short amount of time.

S-5 began pumping at about 10:45 am on June 14, 1989. The initial slug of water pumped from the well was colored black, but there was no hydrocarbon odor detected in the discharge. The dark color of the water can probably be attributed to decaying organic matter inside the well casing, since this well did not have any type of cover or seal. The water discharging from the well turned to a clear color within 2 minutes, however.

The pump was left to run unattended for a period of about 2 hours. Upon returning to S-5, it was noted that the pump had stopped running, apparently due to an exhaustion of its fuel supply. It was estimated that in excess of 5,000 gallons of water had been purged from the well.

Pumping of S-5 was resumed on the afternoon of June 15, 1989, with the same centrifugal pump. This time, S-5 was pumped for a period of 45 minutes at a rate of about 70 GPM, yielding a volume of water removed from the well of 3,150 gallons. Once the pump was stopped, an electronic depth-to-water meter was used to measure the rate of recovery of the water level inside the well (Figure 3-1).

Following the recovery test of S-5, the pump was set-up on S-1, and started. The first slug of water pumped from the well was tainted with an orange or rusty color; there were no odors noted in the discharge, however. After about 5 minutes of continuous pumping, the water was flowing clear from the well. As with S-5, after 45 minutes of pumping, the rate of water level recovery was monitored in S-1 (Figure 3-2).

Approximately 25 gallons of groundwater were removed from EPNG-1 with a bailer prior to acquisition of a sample. It was noted that the water collected for a sample from this well was turbid.

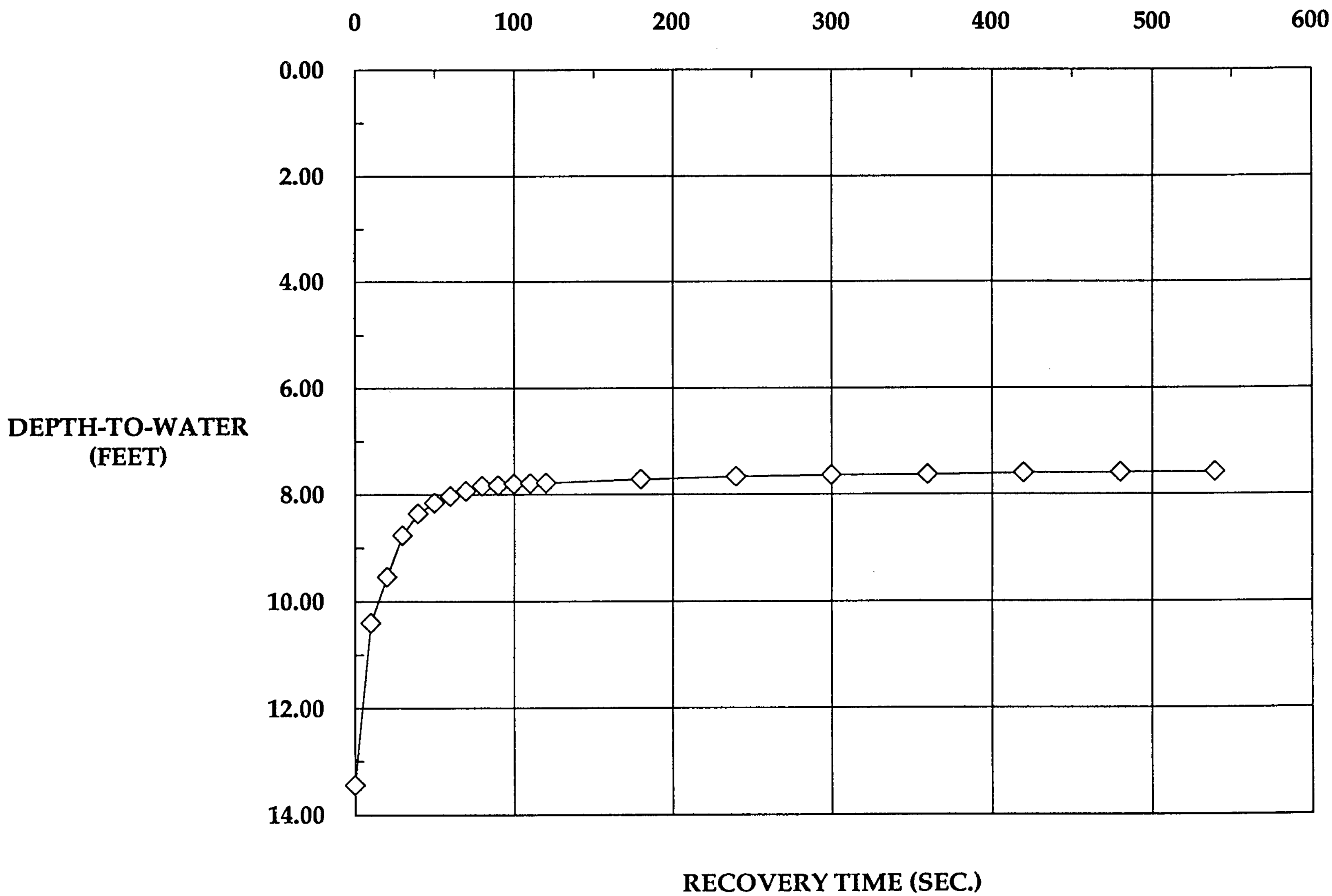

Figure 3-1. Graph of Water Level Recovery Versus Time for Water Production Well S-5.

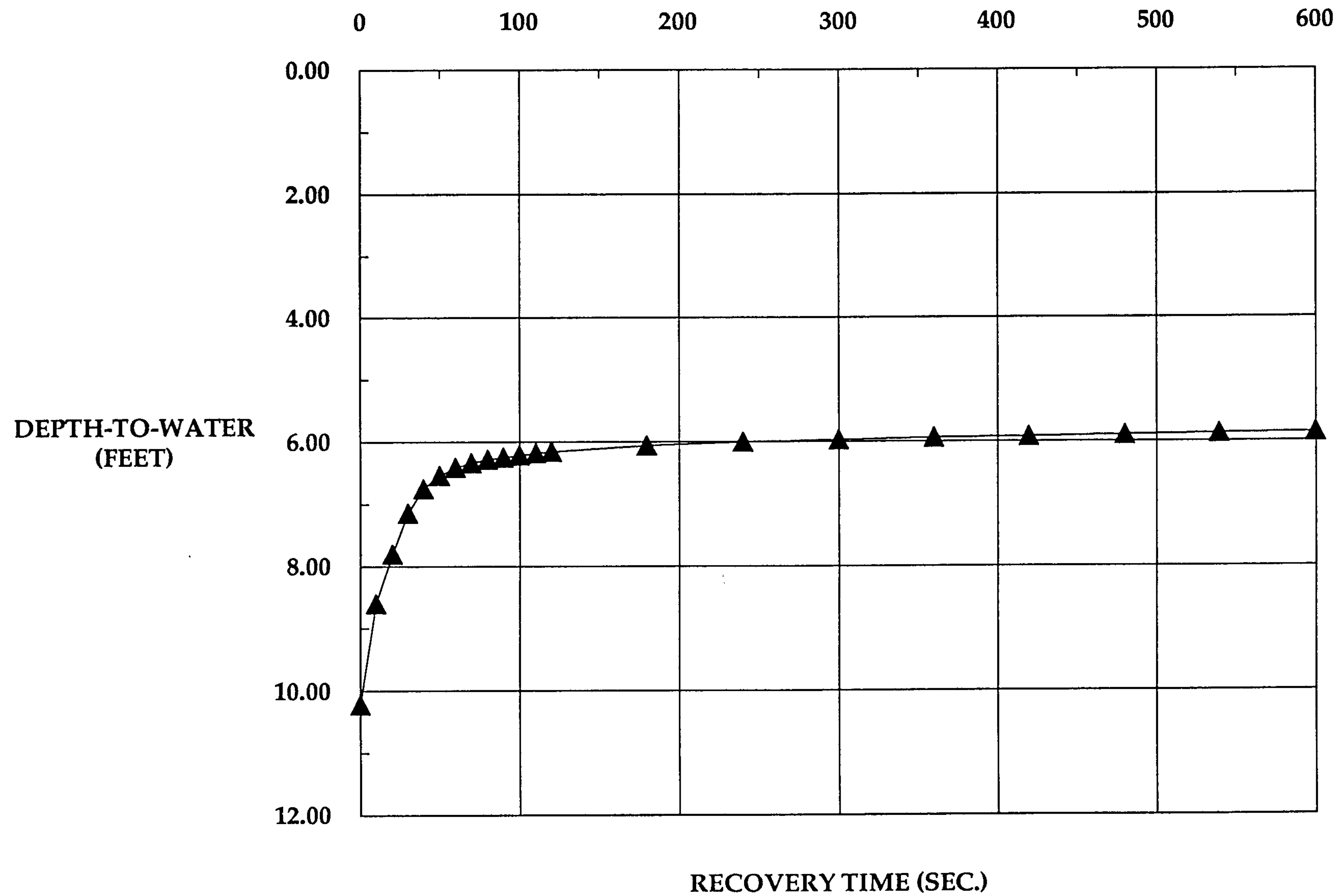

Figure 3-2. Graph of Water Level Recovery Versus Time for Water Production Well S-1.

Forty gallons were purged from EPNG-2A with the aid of an Isco bladder pump prior to collecting a sample. The water collected was initially slightly muddy and turbid, but changed to slightly gray with a very faint hydrocarbon odor. A duplicate sample, identified as KWBA-1, was taken from this well.

EPNG-2B, the deeper well in the EPNG-2 cluster, was pumped for a period of time, with the bladder pump, sufficient to remove 45 gallons prior to acquisition of a groundwater sample. The water was initially muddy, but cleared after about 15 gallons had been purged. No odors or oil were noted in the samples collected.

About 80 gallons were drawn from EPNG-3 before a sample of groundwater was collected. The water purged from the well was relatively clear with a light gray tint, and a slight hydrocarbon odor.

The last of the newly-installed wells, EPNG-4, was purged of 70 gallons prior to taking a sample. The first 30 or 40 gallons removed were black and had a slight oil sheen; the remaining 30 or 40 gallons, however, were clear and free of any odors.

Approximately 15 gallons of groundwater were purged from OCD-1 with a clean, decontaminated PVC bailer. The water removed from the well was very rusty, and there was a great deal of sand and gravel, as well as live ants, in the well. The water collected for a sample was turbid and devoid of any hydrocarbon odors, but there was a light film noted on the surface of the water.

Roots were found to have grown into the well casing of OCD-2, resulting in some difficulty in getting a bailer down into the well. The water was still turbid after purging 20 gallons.

Since this well was clearly located outside the boundary of the plume, it was decided to forego sampling of OCD-3.

An attempt to bail OCD-4 found that the well casing had somehow become bent, precluding the introduction of either the Isco pump or a bailer. As a result, this well was not sampled.

S-1 was pumped for an additional hour on June 16, 1989, prior to collection of a groundwater sample. The sample was taken with a clean, decontaminated PVC bailer. However, as the bailer was raised from the well, it encountered a protrusion on the inside of the steel well casing below the water line, and rusty flakes of steel fell into the well.

S-5 was also pumped for an additional hour on June 16, 1989, in preparation for collecting a fresh formation-water sample. The water collected with a bailer from this well had a distinct septic odor.

A field blank, labeled KWBA-2, consisted of a sample of deionized water that was collected at the end of the groundwater sampling exercise.

It is generally recognized that fresh formation water has been sampled when pH, EC, and temperature have reached constant values for repeated episodes of post-purging groundwater sampling. Thus, in keeping with this concept, field measurements of pH, EC, and temperature were made prior to collection of a sample to insure that these parameters had stabilized.

The water samples were placed into two glass 1-liter containers, one Mason jar, two 40-ml glass vials with Teflon septa, and a 250-ml glass container. All water samples scheduled for the metals analysis were filtered through a 0.45-micron membrane and preserved with nitric acid prior to being placed into the appropriate jars. Each container was labeled with a sample I.D., date, time, and type of analysis to be performed, and placed on ice in an ice chest.

Chain-of-custody procedures were followed for all samples, both soil and water.

3.5 RESULTS AND DISCUSSION

3.5.1 Groundwater

Plate 2 depicts the water table configuration in the alluvial aquifer upon which the Manana - Mary Wheeler #1-E well site rests. The prevailing groundwater flow direction is in a southerly direction and, assuming an effective porosity of 40%, moves at an average linear rate of 2 to 3 feet per day.

The predominant constituents found in groundwater samples taken from the OCD-series wells, the newly-installed EPNG-series wells, and S-1 and S-5, were the aromatic volatile organics, with the principal species of this group being the BTEX, or benzene/toluene/ethylbenzene/xylene group (Table 3-4). The number of BTEX values was insufficient to warrant the construction of any type of contour, or isopleth, map. Instead, a map showing the locations of groundwater samples and the corresponding numerical analytical values is available in Plate 3.

As illustrated by Plate 3, the highest BTEX levels were found in wells screened inside the limits of visible hydrocarbon staining, with the highest concentrations occurring in EPNG-2A and EPNG-3. The former well is located approximately 50 feet south of the estimated location of the dehydrator pit, while the latter is located less than 30 feet west/southwest of the estimated location of the reserve pit.

A sample collected from the upgradient monitoring well, EPNG-1, was found to have a concentration of 0.34 ug/l of p,m-xylene. Since the nearest production unit to this well is the oil storage tank (Plate 1), which is located about 30 feet south of EPNG-1, it is not clear from which source this contaminant derives.

An analysis of samples taken from EPNG-1, S-1, and OCD-1 indicated the presence of methylene chloride, a commonly-used laboratory solvent, at

Table 3-4. Analytical Results for Groundwater Samples.

Constituent	NM WQCC Standard (ug/l)	Concentration (ug/l) PPB											
		EPNG-1	EPNG-2A	EPNG-2B	EPNG-3	EPNG-4	OCD-1	OCD-2	OCD-3	OCD-4	OCD-5	S-1	S-5
Aromatic Volatile Organics:													
Benzene	10	ND	8.1	1.6	0.4	0.95	ND	ND	NS	NS	NS	ND	0.26
Ethylbenzene	75	ND	37.4	1.2	4.3	ND	ND	ND	NS	NS	NS	ND	ND
Methylene Chloride	100	2.1	ND	ND	ND	ND	1.3	ND	NS	NS	NS	1.6	ND
Toluene	75	ND	ND	ND	0.33	ND	ND	ND	NS	NS	NS	ND	0.32
Xylene (total)	62	0.34	192.4	12.1	13.54	ND	ND	ND	NS	NS	NS	ND	ND
Polynuclear Aromatic Hydrocarbons:													
Benzo(b)fluoranthene	see note 3	ND	ND	ND	ND	0.002	ND	ND	NS	NS	NS	ND	ND
Indeno(1,2,3-cd)pyrene	"	ND	ND	ND	ND	0.006	ND	ND	NS	NS	NS	ND	ND

2ppb
6ppb

Notes:

1. WQCC standard, Section 3-103, as amended through December 24, 1987
2. ND - not detected, NS - well not sampled
3. PAHs: total napthalene plus monomethylnapthalenes = 30 ug/l

levels slightly above the detection limit of 1.0 ug/l. The presence of this compound can probably be attributed to its use in decontaminating the sample containers by the analytical laboratory.

Benzene and toluene were both detected at levels slightly above the analytical detection limit of 0.20 ug/l in S-5. Since there were no recorded hits of volatiles in OCD-2, which lies between the production units and S-5, and since water samples collected from S-1 and OCD-1, also lying between the production units and S-5, did not show the presence of either benzene or toluene, the mechanism responsible for the introduction of these contaminants near S-5 is not clear.

The compounds benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene were the only polynuclear aromatic (PNA) compounds detected in water samples; these constituents were detected at levels slightly above the detection limit in EPNG-4, which is located on the approximate centerline and in the downgradient extremity of the visible plume (Plate 4).

There were no recorded hits of either ethylene or diethylene glycol, or any of the chlorinated organics.

3.5.2 Soil

The BTEX, or aromatic volatile organics in general, for the soil samples taken from the trenches, were found to be of the same order of magnitude as those measured on the water samples (Table 3-5; Plate 5). The largest values were recorded for samples taken from the vicinity of the dehydrator pit, and from the area around what is believed to be the location of the reserve pit.

A sample collected from an area near EPNG-1 (Plate 5) thought to be devoid of soil contamination (i.e., a "background" area), indicated the presence of 1,2-dichloropropane at a level of 0.61 ug/g; the detection limit for this compound is 0.60 ug/g, however. An analysis of a duplicate

Table 3-5. **Analytical Results for Soil Samples.**

Constituent	NM WQCC Standard (ug/g)	Concentration (ug/g) ppm											
		BG-1	T-1E	T-1C	T-1W	T-2E	T-2C	T-2W	T-3E	T-3C	T-3W	T-4E	T-4C
Aromatic Volatile Organics:													
Benzene	see note 1	ND	ND	ND	ND	0.22	ND	ND	ND	ND	ND	ND	ND
Chlororbenzene	"	ND	ND	ND	ND	ND	ND	ND	ND	0.19	ND	ND	ND
Ethylbenzene	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	"	ND	ND	0.16	ND	0.33	0.26	ND	ND	ND	ND	ND	ND
Vinyl Chloride	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	"	ND	0.98	ND	0.73	ND	0.94	ND	ND	ND	ND	ND	ND
Polynuclear Aromatic Hydrocarbons:													
Acenapthene	see note 1	ND	ND	ND	ND	3.584	ND	ND	ND	ND	ND	ND	ND
Chrysene	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	"	ND	ND	ND	0.165	ND	ND	ND	ND	ND	ND	ND	ND
Napthalene	"	ND	ND	ND	ND	3.901	ND	ND	ND	ND	ND	ND	ND

Notes:

1. WQCC standard not available
2. ND - not detected

Table 3-5 (cont.). Analytical Results for Soil Samples.

Constituent	NM WQCC Standard (ug/g)	Concentration (ug/g) ppm											
		T-4W	T-5	T-6E	T-6W	T-7	P-N	P-S	P-E	P-W	RP-1A	RP-1B	RP-2
Aromatic Volatile Organics:													
Benzene	see note 1	ND	ND	ND	ND	ND	ND	ND	ND	2.6	ND	ND	ND
Chlorobenzene	"	ND	ND	ND	ND	ND	ND	0.37	ND	ND	ND	ND	ND
Ethylbenzene	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	"	ND	ND	ND	ND	ND	1.2	ND	ND	34.3	ND	ND	ND
Vinyl Chloride	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.3	ND
Xylene (total)	"	ND	ND	ND	ND	ND	17.8	0.76	2.1	177.2	ND	ND	ND
Polynuclear Aromatic Hydrocarbons:													
Acenapthene	see note 1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	"	ND	ND	ND	ND	ND	0.118	ND	ND	ND	ND	ND	ND
Fluoranthene	"	ND	ND	ND	ND	ND	0.178	ND	ND	ND	ND	ND	ND
Napthalene	"	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

1. WQCC standard not available
2. ND - not detected

sample did not indicate the presence of this halogenated volatile organic compound. As with the water sample results, there were insufficient data points to justify the development of a contour map for the volatile organic compounds.

There were no volatile organics detected in samples taken downgradient of trench T-3.

Plate 6 depicts the spatial distribution of oil and grease in samples taken during the trenching exercise. As illustrated by this map, there are three principal areas of concern on-site: the area of the dehydrator pit, the area downgradient of the speculated-location of the reserve pit, and an area downgradient of the production units, centered on the southeastern limit of trench T-6.

ADD. Inv. needed

It is possible that the latter zone developed by the downgradient migration of a "slug" of oil and grease that originated near the production units. There are insufficient data to definitively establish the location of this source, however. The general distribution of oil and grease in this area suggests that, at some point in time, a large volume of oily material was released to the subsurface for a finite interval of time. At the end of this time period, the strength (or concentration) of the oil and grease-bearing matter was dramatically reduced, thereby resulting in the present-day distribution of oil and grease. In the absence of information regarding the onset and duration of the release of the oily material, it is impossible to calculate the rate of migration of this mass.

There were three recorded hits of PNA compounds in the soil samples (Plate 7). The highest concentrations noted were for a soil sample taken from trench T-2 in its southeasternmost-extremity (T-2E), where the compounds detected were naphthalene (3.901 mg/kg) and acenaphthene (3.584 mg/kg). This sample was located on a line between the sampling points for the area of the reserve pit. None of the reserve pit samples indicated the presence of PNAs, however. Additionally, T-2E was taken from an area noted to be free of subsurface hydrocarbon staining.

The other two samples indicating the presence of PNAs were located near the dehydrator pit in samples P-N (Pit-North) and T-1W (western end of trench 1). The compounds detected were fluoranthene (0.165 mg/kg) in T-1W, and fluoranthene (0.178 mg/kg) and chrysene (0.118 mg/kg) in P-N.

There were no recorded hits of either ethylene or diethylene glycol, or any of the chlorinated organics.

The principal heavy metal of interest in this investigation was chromium, as this element forms a significant component of the drilling mud additive chromium-lignosulfonate (Dames and Moore, 1982). Although no information was available regarding the composition of the drilling mud used to drill the Manana - Mary Wheeler #1-E gas well, the analytical data for the soil samples taken in and near the drilling mud reserve pit (i.e., the RP-series samples) suggest that this additive was indeed used on this occasion.

It is worth noting that the range of chromium concentration in soil is 1-1,000 ppm, with the average being 100 ppm (Brown et al., 1983). In the instant case, however, it appears that the native chromium concentration is significantly lower than 100 ppm, at around 5 to 10 ppm. The heaviest concentrations of chromium found at the Manana - Mary Wheeler #1-E well site were in samples RP-1A, RP-1B, and RP-2, which were collected from an area believed to be the location of the drilling mud reserve pit.

A metal of less-significant interest than chromium, barium, occurs naturally in soils at a level of between 100 and 3,000 ppm, and is a component of the drilling mud additive barite (Brown et al., 1983). Barium concentrations measured in soil samples taken from the trenches fell well within the range of naturally-occurring barium, at approximately 400 ppm. The RP-series samples did not suggest the presence of barium at elevated levels. In fact, RP-1A indicated the lowest recorded barium concentration of 28 ppm.

Perhaps a better indicator of the presence of drilling mud than barium, chloride was found at levels above the average in RP-1A and -1B. Since sodium chloride is a common additive to saltwater-based drilling muds (Dames and Moore, 1982), the elevated levels of chloride in these samples suggests the presence of drilling mud in this area.

Plate 8 was developed on the basis of the aforementioned findings, and provides an estimate for the locations of the dehydrator pit and the drilling mud reserve pit. Since the sampling density was insufficient to provide a detailed location for each of these features, these units have been approximately plotted on Plate 8, and their exact boundaries may be significantly different from those presented on the map.

4.0 RISK ASSESSMENT

In establishing priorities for remediation or monitoring, it is important to consider the health risk associated with a specific sample or location. In most cases, relatively high concentrations of contaminants must be present to constitute an acute health hazard. However, extremely low dose levels of chronic toxicants can present a significant risk if exposure occurs over the lifetime of the organism. The chemical constituents and concentrations of soil and water samples have been reviewed in order to estimate their chronic toxic potential. The lifetime cancer risk associated with consumption of the various chemicals detected in soil and groundwater samples at the Manana - Mary Wheeler #1-E well site has been estimated using the procedures of Crouch et al. (1983). This procedure can be used to estimate the risk of individual chemicals, as was done for the soil samples; or, the procedure can be used to estimate the cumulative cancer risk for mixtures of chemicals, as was done for the groundwater samples. The risk equation takes into account the carcinogenic potential of each chemical, the variability of the data used to estimate carcinogenic potential, and the concentration of the chemical. The major limitations of this equation are that extrapolations must be made from the high dose used in animal testing to the low dose which occurs in most environmental samples; and, extrapolations must be made from the animal species in which toxicity testing was conducted and humans for which the risk is being estimated.

For groundwater, the risk equation assumes that a 70 kg human will consume 2 liters of water per day for an entire lifetime. The equation can be used to estimate the mean, median, and 98th percentile risk. The mean risk is typically used to assess the hazard of individual chemicals or mixtures in most groundwater samples. The median risk is usually less than the mean risk, and should only be used if the risk of human exposure is extremely low; while, the 98th percentile risk is a conservative estimate and can be used if potable water wells are believed to be within the plume of contaminated groundwater. For the purposes of this review, the mean risk will be used.

4.1 SOIL

The results from the estimation of risk for individual chemicals detected in the soil are provided in Table 4-1. The oral rat lethal dose or tumorigenic dose for chrysene and acenaphthene could not be located in the literature. However, chrysene is described as a potential carcinogen (Lewis and Tatken, 1984). Thus, the carcinogenic potential for chrysene should be comparable to that for fluoranthene. In addition, a comparison based on chemical structure suggests that the carcinogenic potential of acenaphthene should be comparable to naphthalene. The adsorptive properties of soil should prevent a significant amount of these chemicals from reaching groundwater. However, in order to provide a higher level of security, soil samples will be considered to present a potential risk to human health if the soil concentration incurs an estimated risk of greater than 10 in a million. OK 1 in 100,000

Three soil samples contained a concentration of chemical with an estimated risk above a mean of 100 in a million. 1 in 10,000 Soil sample P-N contained Pit North 178 ppb fluoranthene which incurs an estimated risk of 148 in a million (Table 4-1). The risk associated with chrysene is likely equal to that for fluoranthene in this soil sample. The estimated risk associated with fluoranthene in soil sample T-1W is 137 in a million; this sample also contained xylene at a concentration which incurs an estimated risk of 1 in

Table 4-1. Risk Factors for Soil Samples Collected at the Manana - Mary Wheeler #1-E Well Site.

Sample I.D.	Constituent	Conc. (ppb)	Mean R	Median R	98th Percentile R98
P-N	Fluoranthene	178	1.48E-04	2.21E-06	7.29E-04
	Chrysene	118			
T-1W	Fluoranthene	165	1.37E-04	2.05E-06	6.76E-04
T-2E	Napthalene	3,901	2.79E-05	2.65E-06	2.04E-04
	Acenapthene	3,584			
BG-1	1,2-Dichloropropane	610	7.07E-06	1.03E-07	3.45E-05
P-N	Toluene	1,200	1.61E-06	4.23E-07	1.10E-05
	Xylene	17,800	2.54E-05	7.05E-06	1.73E-04
P-W	Benzene	2,600	3.20E-06	1.04E-06	2.09E-05
	Toluene	34,300	4.59E-05	1.24E-05	3.15E-04
	Xylene	177,200	2.52E-04	7.02E-05	1.72E-03
P-S	Chlorobenzene	370	3.37E-06	1.48E-07	2.20E-05
	Xylene	760	1.08E-06	3.01E-07	7.38E-06
P-E	Xylene	2,100	2.99E-06	8.32E-07	2.04E-05
T-1W	Xylene	730	1.04E-06	2.89E-07	7.09E-06
T-1C	Toluene	160	2.14E-07	5.76E-08	1.47E-06
T-1E	Xylene	980	1.40E-06	3.88E-07	9.52E-06
RP-1B	Vinyl chloride	4,300	1.14E-04	3.44E-05	7.64E-04
T-2C	Toluene	260	3.48E-07	9.36E-08	2.39E-06
		940	1.40E-06	3.72E-07	9.13E-06
T-2E	Benzene	220	2.71E-07	8.80E-08	1.77E-06
	Toluene	350	4.68E-07	1.26E-07	3.47E-06
T-3C	Chlorobenzene	190	1.73E-06	7.60E-08	1.13E-05

Benzene 3.2×10^{-6} Mean
1.04×10^{-6} Median
20.8×10^{-6} 98th

a million (Table 4-1). The maximum risk associated with a soil sample at the Manana - Mary Wheeler #1-E well site was 252 in a million for xylene in soil sample P-W. This sample also had a relatively high risk for toluene (45.9 in a million). The concentration of vinyl chloride in soil sample RP-1B incurs an estimated risk of 114 in a million (Table 4-1). This soil may present the greatest risk of those investigated, as vinyl chloride is a suspected human carcinogen with a high vapor pressure. Thus, the potential for exposure via either air or groundwater exists.

Other soil samples with chemicals at a concentration which incurs an estimated risk of greater than 10 in a million include T-2E (naphthalene's risk is 28 in a million), P-N (xylene's risk is 25 in a million), and P-W (toluene's risk is 46 in a million). Thus, the soil sampling locations for which chemical concentrations suggest the greatest estimated carcinogenic risk appear to be P-N, T-1W, P-W and RP-1B (Table 4-1).

4.2 GROUNDWATER

The presence of toxic chemicals in groundwater presents a more imminent risk to human health than does their presence in soil. Thus, any groundwater sample with a mean risk of greater than 1 in a million may indicate the need for continued monitoring at a minimum. At the conclusion of the risk assessment, it was noted that the maximum carcinogenic risk estimated for groundwater at the Mary Wheeler #1-E site is no greater than that estimated for drinking water from several large cities. The concentration of indeno(1,2,3-c,d)pyrene in sample EPNG-4 incurs an estimated risk of 14.8 in a million. Methylene chloride, which has been suggested to have been introduced by the analytical laboratory, incurs an estimated risk of 47.8 in a million at a concentration of 2100 ppb in water sample EPNG-1 (Table 4-2). The maximum estimated risk for a water sample

Table 4-2. Risk Factors for Water Samples Collected at the Manana - Mary Wheeler #1-E Well Site.

Sample I.D.	Constituent	Conc. (ppb)	Mean R	Median R	98th Percentile R98
EPNG-1	Methylene chloride	2.1 2,100	4.78E-05	2.10E-06	3.12E-04
	Xylene	0.34 340	4.83E-07	1.35E-07	3.30E-06
EPNG-2A	Benzene	8.1 8,100	9.98E-06	3.24E-06	6.51E-05
	Ethylbenzene	37.4 37,400	1.89E-05	5.09E-06	1.30E-04
	Xylene	192.4 192,400	2.74E-04	7.62E-05	1.87E-03
EPNG-2B	Benzene	1.6 1,600	1.97E-06	6.40E-07	1.29E-05
	Ethylbenzene	1.2 1,200	6.06E-07	1.63E-07	4.17E-06
	Xylene	12.1 12,100	1.72E-05	4.79E-06	1.18E-04
EPNG-3	Benzene	0.4 400	4.93E-07	1.60E-07	3.21E-06
	Ethylbenzene	4.3 4,300	5.85E-07	2.17E-06	1.49E-05
	Xylene	13.54 13,540	1.93E-05	5.36E-06	1.32E-04
	Toluene	0.33 330	4.41E-07	1.19E-07	3.03E-06
EPNG-4	Benzene	0.95 950	1.17E-06	3.80E-07	7.63E-06
	Benzo(b)fluoranthene	2	5.50E-07	7.44E-08	4.06E-06
	Indeno(1,2,3-cd)pyrene	6	1.48E-05	2.23E-07	7.37E-05
S-5	Benzene	0.260 260	3.20E-07	1.04E-07	2.09E-06
	Toluene	0.320 320	4.28E-07	1.15E-07	2.94E-06

concentration values
1000 x high
(eg 8.1 ppb vs 8,100 at #-2A

2.74×10^{-4}
274×10^{-6}

was incurred by sample EPNG-2A. For this sample, the concentration of xylene yields an estimated cancer risk of 274 in a million, and ethylbenzene 18.9 in a million (Table 4-2). Xylene in samples EPNG-2B and EPNG-3 is present at concentrations which incur estimated risks of 17.2 in a million and 19.3 in a million, respectively.

The mean estimated cumulative cancer risk for the mixtures of chemicals in the groundwater samples (see Table 4-3) ranged from a low of 1.8 x 10^{-4} in a million for sample OCD-1 to the high of 301 in a million for the mixture of chemicals in sample EPNG-2A. Samples EPNG-4, S-1, OCD-1, and S-5 had an estimated risk of less than one in a million. Crouch et al. (1983) suggest that a person exposed to a risk of 1 in a million per year has a life expectancy reduced by only one day. In addition, their review of drinking water quality from cities in the United States indicates that the mean annual cancer risk was greater than one in a million for all 25 cities investigated (Crouch et al., 1983).

Five groundwater samples incurred an estimated risk which was appreciably greater than 1 in a million. In three of the more contaminated samples (EPNG-2A, EPNG-2B and EPNG-3), the majority of the risk estimated for the mixture was associated with the presence of xylene. Xylene has been found to induce tumors when fed to rats (Maltoni et al., 1985). These data indicate that several wells at the Manana - Mary Wheeler #1-E well site may present a threat to human health if the plume of contamination reaches wells used for the production of drinking water. However, drinking water from 5 of 25 cities reviewed by Crouch et al. (1983) had estimated cancer risks of greater than 100 in a million.

Table 4-3. Estimated Cumulative Cancer Risk of Drinking Groundwater from Selected Wells at the Manana - Mary Wheeler #1-E Well SIte.

Well I.D.	Risk (x 10^6)*		
	Mean	Median	98th Percentile
EPNG-1	48.8	2.7	375
EPNG-2A	301	107	2040
EPNG-2B	19.8	7.56	134
EPNG-3	22.5	8.4	148
EPNG-4	13	0.59	93.2
OCD-1	1.80E-04	5.40E-06	1.10E-03
S-1	2.20E-04	6.60E-06	1.33E-03
S-5	0.75	0.03	4.48

*** Carcinogenic risk estimated using procedures of Crouch et al. (1983) based on a 70-kg human consuming 2-l of water per day for 70 years.**

5.0 CONCLUSIONS

The investigation of the Manana - Mary Wheeler #1-E well site began with a desktop effort, whereby existing information from OCD and EPNG files was compiled and studied in an effort to guide the subsequent field work and analytical testing.

Following this task, trenches were excavated via backhoe to expose the unsaturated, cobbley sand beneath the site to aid in the evaluation of the extent of subsurface hydrocarbon contamination. At the outset, the intent of this task was to dig trenches transverse to the principal direction of migration of the plume so that the lateral and vertical extent of this feature could be mapped. Additionally, this methodology was used to investigate the area thought to have accommodated the drilling mud reserve pit. A structured soil sampling program was conducted concurrent with the trenching exercise, in which a sample of soil was collected from the saturated/unsaturated zone interface at three locations in the trenches: one at each end, and one in the approximate center of the pit.

Once the excavation phase was complete, four new groundwater monitoring wells were installed at about the same level as the existing OCD-series wells. With the exception of the upgradient well, these wells were positioned inside the area where hydrocarbon staining was visible. Each of these new monitoring wells, in addition to selected OCD wells and Flora Vista Water Users Association production wells, was pumped or bailed for a period of time deemed to be sufficient to collect groundwater samples representative of formation water quality.

Each sample, for both soil and water, was submitted to an analytical laboratory where it was subjected to seven major chemical analyses:

1. Inorganics (soluble cations/anions, pH, EC, etc.);

2. Heavy metals (barium, cadmium, chromium, and selenium);

3. Aromatic volatile organics;

4. Halogenated volatile organics;

5. Chlorinated hydrocarbons;

6. Ethylene and diethylene glycol; and

7. Polynuclear aromatic hydrocarbons.

5.1 DEHYDRATOR PIT

Visual inspection of the dehydrator pit area, exposed during trenching activities, indicated the presence of hydrocarbon contamination of the soil between the ground surface and the water table. Oily materials were noted from a level as shallow as 12 inches below the ground surface, to as deep as 5.4 feet, which coincided with the water table in this area.

The major constituents detected in soil samples taken from the trenches were oil and grease; the aromatic volatiles, benzene, toluene, xylene, and chlorobenzene; and the polynuclear aromatic hydrocarbons, fluoranthene and chrysene.

Based on the results of the soil and groundwater sampling and analysis program, and on a review of the operating records of the production units, it appears that the principal source for the hydrocarbon contamination at the Manana - Mary Wheeler #1-E well site is the unlined dehydrator pit. The result of discharging hydrocarbon liquids into the pit was the development of a plume of oily material that, over the course of the three years that the practice was in operation, seeped through the coarse-grained, high-permeability materials comprising the bottom and side slopes of the pit. This plume subsequently moved through the unsaturated zone and ultimately migrated to a level coincident with the water table. The bulk motion of the flowing groundwater carried the plume downgradient toward the production well field.

5.2 DRILLING MUD RESERVE PIT

The contrast in chromium concentration between soil samples taken near the area believed to be the reserve pit, and the balance of the soil samples, suggests that chromium is present in this area at levels above what is considered to be characteristic of background conditions. Also, owing to the fact that chromium is a component of certain drilling mud additives, it appears likely that the trenches excavated in this area were located, at least in part, inside the boundaries of the drilling mud reserve pit. Additional evidence supporting this assertion includes the observance of relatively-high oil and grease, and chloride, concentrations in the soil samples taken from this area. Buried debris, such as concrete fragments and scrap pipe, unearthed during the trenching effort, serves to temper the claim that the reserve pit had been identified during the site investigation. ?

why - everything is buried when pit closed?

5.3 GROUNDWATER

An analysis of groundwater samples collected from the newly-installed monitoring wells, OCD's monitoring wells, and selected production wells, indicates that the greatest concentration of volatile organic compounds lies within the bounds of the visible hydrocarbon plume.

Methylene chloride, a commonly-used laboratory solvent, was detected in three groundwater samples, all of which are located outside the plume boundaries. It is very likely that the identification of this compound can be attributed to its usage in sample container decontamination by the analytical laboratory.

6.0 REMEDIAL ACTION PLAN

This section is aimed at addressing the procedures necessary to implement reclamation measures at the Manana - Mary Wheeler #1-E well site. As mandated by the New Mexico Oil Conservation Division, El Paso Natural Gas Company must meet the following clean-up criteria (Boyer, 1988):

1. Dissolved, emulsified, and free-floating petroleum, and other organic and inorganic water contaminants, must be removed from the groundwater such that:

   a) the water quality standards of Section 3-103 of the New Mexico Water Quality Control Commission Regulations (as amended through December 24, 1987) are met; and

   b) the USEPA drinking water standards for public water supplies in effect as of June 15, 1988; and

   c) undesirable odors attributable to loss of petroleum or other fluids from the site are not present in groundwater.

2. The unsaturated (vadose) zone in the vicinity of the contamination shall not contain drilling muds, inorganic salts, heavy metals, or hydrocarbons in quantities sufficient to recontaminate groundwater. Contamination shall be deemed to occur if State or Federal numerical standards are exceeded, or through continued presence or reappearance of oil or grease, or undesirable odors in the water supply. Such recontamination shall not be allowed to occur as a result of seasonal rises in the water table, drainage, recharge events, or in any other manner. Soils contaminated with drilling muds, salts, heavy metals, or hydrocarbons, and needing to be removed to prevent continued or future contamination of groundwater, shall be excavated and disposed in locations approved in advance by OCD. Clean fill material may need to be provided to replace contaminated soils. Pumping of the affected water supply well for some length of time may be necessary to verify successful clean-up.

The sections that follow will address each of these concerns.

6.1 RECLAMATION TECHNOLOGIES

The principal technology proposed for implementation at the site is excavation, via heavy equipment, of contaminated soils. Although several alternative technologies were considered, such as <u>in situ</u> soil treatment and injection of surfactants, it was EPNG's contention that these types of actions would not unequivocally satisfy the above-listed criterion. Thus, a more traditional approach has been adopted.

6.1.1 Contaminated Soil

Soils considered to be contaminated at the Manana - Mary Wheeler #1-E well site include the plume of visible hydrocarbon staining (including the dehydrator pit area), and the reserve pit. EPNG proposes that these areas be fully excavated such that all visible contaminated materials are removed. OK

Determination of what constitutes contamination will, in large part, be guided by three criterion. The first will be the results of the site investigations, which are discussed in this report. This information will establish the first area to be addressed in the remedial action process.

The second criterion will be visual evidence. In many areas, determination of where subsurface contamination exists is clearly evident upon visual inspection of the subsurface. Therefore, that material which can be categorized as contaminated using visual means will be excavated.

The third criterion will be laboratory results. To verify that the excavation process is successfully removing the contaminated material, soil samples will be collected concurrent with the excavation operations to quantify the level of contamination. The sum total of following these criteria will, to a large degree, insure that the contaminated materials are removed.

To accomplish the removal of the contaminated soil, EPNG will use conventional heavy equipment to strip the uncontaminated overburden material to facilitate access to the underlying contaminated soil. As the clean overburden is removed, it will be stock-piled on-site, with the intent of replacing it in the excavation once clean-up activities are completed.

As the contaminated material is removed from the excavation, it will assume one of two dispositions: 1) the contaminated soil will be stock-piled on-site while it awaits testing and ultimate removal to a designated treatment/disposal site, or 2) the contaminated soil will be placed directly into awaiting trucks for delivery to the treatment/disposal site. The first option provides a means for screening the soils that are removed from the site, which subsequently precludes the unnecessary disposal of clean soil. In either case, the intent of the removal of the contaminated soil will be to render the site "clean" within the framework established by the applicable guidelines, as stated in the preceding section.

Where & how stored? Liners?

2nd option best

6.1.2 Contaminated Groundwater

In its present state, the groundwater that is resident in the alluvial aquifer beneath the Manana - Mary Wheeler #1-E well site has been impacted in two principal areas: 1) the area surrounding the zone of visible hydrocarbon staining, and 2) the area adjacent to S-5. However, none of the measured contaminants were found to exceed WQCC standards. Thus, no action regarding groundwater is needed.

Discuss

??

During excavation, water will be made turbid w/disturbance and some HC will likely discharge - Must pump to capture

Pump & sample S1 @ May spm for time to verify no odors, sheens, etc.

6.2 DISPOSITION OF WASTE

Remediation of the site will generate large amounts of soil needing treatment and/or disposal. Hence, all soil, documented as contaminated through the aforementioned screening procedure, will be removed from the site for disposal at an acceptable location. The facility selected to receive the excavated soil will be presented to OCD for approval prior to the commencement of remedial activities.

OK

6.3 MONITORING

Throughout the remedial action process, samples will be collected to verify the effectiveness of the clean-up effort. The intent of the sampling exercise is to verify, quantitatively, the condition of the site during and after remediation of the site. More specifically, the intent of the soil and groundwater samples will be to document adherence to the WQCC standards. and [illegible]

6.3.1 Soil

During the remediation process, soil samples will be periodically taken to verify that contaminated soil has been completely excavated. The principal objective of the soil sampling exercise is to demonstrate the equivalent of "clean closure." In addition to establishing the condition of the site, the samples collected for analysis will serve as a tool for guiding the excavation program.

Dewatering to allow excavations? Visual Obs? Skim Slotting [illegible] at remove soil

Once the soil exhibiting visual evidence of contamination has been completely stripped with the earth-moving equipment, soil samples will be taken from the surface of the bottom of the excavation. These samples will be collected with decontaminated, stainless-steel scoops or spatulas, placed into appropriate containers, and delivered to the on-site mobile laboratory for analysis. The actual procedures used to acquire soil samples will be consistent with those described in Section 3.4.1.

Immediately after sampling, the location where the sample was taken, time, date, and depth of the sample below grade and below the bottom of the excavation, will be recorded on a map of the site and in the field logbook. If the presence of contaminants is confirmed at the conclusion of the laboratory analysis, this information will be used to direct continued excavation operations. This cycle will be repeated until the soil samples comply with WQCC standards.

6.3.2 Groundwater

Groundwater samples will be collected prior to the start of any of the clean-up tasks; this will establish baseline groundwater quality conditions. Since many of the monitoring wells currently inplace at the Manana - Mary Wheeler #1-E well site are located in areas where excavation is required, it follows that, for complete clean-up, these wells will be necessarily removed during the remediation effort.

Downgradient wells to track "dissolved" water Trans. LP?

It is proposed that replacement monitoring wells be installed in strategically-chosen areas at the conclusion of all excavation activities. These wells, as well as those that remain after the earthwork, will serve to provide EPNG with information regarding the behavior of the plume across the site in response to the recovery effort.

At the conclusion of the excavation activities, all available groundwater monitoring wells will be sampled in accordance with the procedures described in Section 3.4.2. The frequency with which these samples are taken from both the recovery and monitoring wells is addressed in Section 6.3.4.

6.3.3 Analytical Parameters

Hydrocarbon liquids constitute the primary contaminant of concern at the Manana - Mary Wheeler #1-E well site. For this reason, it is proposed that the list of constituents to be measured on soil and water samples be limited to the BTEX compounds, total petroleum hydrocarbons (TPH), and certain indicator parameters, such as pH and EC. The data presented in Section 3.5 indicate that these parameters were the most commonly-observed during the site investigation. Measurement of these constituents will provide evidence for the persistence or absence of petroleum-based or petroleum-derived compounds in the subsurface.

Cn PAH soils only

As mentioned previously, an on-site mobile laboratory will be utilized to effect rapid turnaround times for sample analyses (e.g., less than 24 hours). By maximizing turnaround times, the maximum use of the earth-moving equipment can be made in the least amount of time. Additionally, the length of time that any excavation remains open will be minimized by acquiring verification sampling results rapidly.

The analytical protocols used during the implementation of remedial measures will be consistent with those reported in SW-846.

6.3.4 <u>Sampling Frequency</u>

Before any remedial activities are begun, the oversight/monitoring team will collect groundwater samples from all of the EPNG- and OCD-series monitoring wells, and from S-1 and S-5. Additional groundwater sampling will be deferred until the conclusion of all excavation activities. At this time, replacement groundwater monitoring wells will be installed and sampled. Any monitoring wells remaining on-site will be sampled, in addition to S-1 and S-5, and the recovery wells.

Sample S-1 S-5 alone

It is proposed that subsequent groundwater samples be taken quarterly in an effort to verify that constituent concentrations (Section 6.3.3) remain below WQCC standards. If, for two consecutive quarters, the constituent concentrations remain below WQCC standards, EPNG proposes that groundwater sampling be discontinued.

Pull wells? NOT during ops 26 gpd wells?

The collection of soil samples will be performed on a daily basis during excavation operations. Each day, samples will be collected by the oversight/monitoring team, and delivered to the field laboratory for analysis. Soil sampling will be terminated after all contaminated soils have been fully excavated.

6.3.5 <u>Quality Control</u>

The quality control program to be followed for implementation of this plan calls for a multi-pronged approach, consisting primarily of analytical laboratory accuracy and precision verification, and documentation/ reporting.

To verify the accuracy and precision of the laboratory results reported both during and after remediation, standard quality control measures will be employed. The procedures to be adopted include the use of known spike samples, the analysis of duplicate samples, and the submittal of blind control blanks. All of the quality control data will be included with the laboratory results in support of the analytical efforts.

A field logbook will be maintained by the oversight/monitoring team during the remedial action plan implementation. This book will provide a means for permanently recording information such as prevailing weather conditions, personnel present on-site, location of samples, estimates for daily soil removals, and other significant observations. The field logbook will represent a complete record of the events that occurred throughout the implementation of the remedial action plan.

As a companion document to the field logbook, the site map will serve as a medium for recording such data as sample location, time, date, and depth. This map will be prepared by the oversight team prior to entering the field, and will be plotted to a scale that will adequately accommodate detailed entries. As with the field logbook, the site map will constitute a permanent record of the remediation activities.

Extensive use of photography will be made to provide additional documentation of the remediation process. Color 35 mm slides will be taken of each segment of the remediation program, such as excavation and stock-piling of overburden, excavation and loading of contaminated soil into transport vehicles, soil and groundwater sampling activities, and back-filling of excavations with clean soil. Since many photographs will be taken, the camera used will be equipped with a means of placing a time and date stamp directly onto the film (i.e., a "data back"). Details regarding each photograph will be entered into the field logbook.

At the end of each work day, reports will be prepared by the monitoring/oversight team from the field logbook and the site map. These reports will include such information as the number and location of samples taken that day, estimates of the volumes of overburden excavated and stock-piled, and estimates of the volume of contaminated soil transported to the disposal facility.

At the conclusion of the excavation efforts, the oversight/monitoring team will prepare a detailed report of the entire remedial action program as executed by EPNG and its contractors. This document will consist of tabulations of analytical data, excavated earth volumes, groundwater elevations, and other significant findings of the program. All photographs will be compiled and properly labeled with identifiers, and an attendant photograph log will prepared. A copy of the field logbook will be attached to the report as an appendix.

In an effort to enhance communications between OCD and EPNG, the oversight/monitoring team will prepare quarterly reports describing the status of the groundwater quality specific to the Manana - Mary Wheeler #1-E well site. These documents will contain summary tables and graphs of the data generated during the groundwater monitoring program. Along with the data, the reports will provide narrative descriptions and data interpretations. If the data are sufficient, isopleth maps of selected constituents will also be presented.

APPENDIX A
Plates

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-1 East
Laboratory Number: C89021
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 06/23/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-1 Center
Laboratory Number: C89022
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 06/26/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID:	T-1 West	Date Sampled:	06/12/89
Laboratory Number:	C89023	Date Received:	06/19/89
Analysis Requested:	8100	Date Extracted:	06/23/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	0.165	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

JMH

Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-2 East
Laboratory Number: C89024
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 07/17/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	3.901	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	3.584	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-2 Center
Laboratory Number: C89025
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-2 West
Laboratory Number: C89026
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 06/26/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-3 East
Laboratory Number: C89027
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

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Route 3, Box 256
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Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-3 Center
Laboratory Number: C89028
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

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Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-3 West
Laboratory Number: C89029
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

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Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-4 East
Laboratory Number: C89030
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

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Reviewed by Jack Morgan, Organic Chemist

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Route 3, Box 256
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Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-4 Center
Laboratory Number: C89031
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/26/89
Date Analyzed: 07/17/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

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Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-4 West
Laboratory Number: C89032
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/26/89
Date Analyzed: 07/17/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

JMK

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Inter-Mountain Laboratories, Inc.

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Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-5
Laboratory Number: C89033
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/27/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

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Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit North
Laboratory Number: C89034
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/27/89
Date Analyzed: 07/17/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	0.178	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	0.118	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

JM

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit South
Laboratory Number: C89035
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/15/89
Date Extracted: 06/27/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

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Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit East
Laboratory Number: C89036
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/27/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

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Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit West
Laboratory Number: C89037
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/19/89
Date Extracted: 06/27/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

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Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-6 East
Laboratory Number: C89038
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 06/26/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

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College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-6 East DUPLICATE
Laboratory Number: C89045
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/23/89
Date Analyzed: 06/26/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-6 West
Laboratory Number: C89039
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/30/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-7
Laboratory Number: C89040
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/30/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP1-A
Laboratory Number: C89041
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/27/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP1-B
Laboratory Number: C89042
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/27/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP1-B DUPLICATE
Laboratory Number: C89049
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/30/89
Date Analyzed: 07/31/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP-2
Laboratory Number: C89043
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/30/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP-2 DUPLICATE
Laboratory Number: C89050
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/30/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: BG-1
Laboratory Number: C89044
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/19/89
Date Extracted: 06/30/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.180	mg/kg
Acenaphthalene	ND	0.230	mg/kg
Acenaphthene	ND	0.180	mg/kg
Fluorene	ND	0.100	mg/kg
Phenanthrene	ND	0.100	mg/kg
Anthracene	ND	0.100	mg/kg
Fluoranthene	ND	0.100	mg/kg
Pyrene	ND	0.100	mg/kg
Benzo(a)Anthracene	ND	0.100	mg/kg
Chrysene	ND	0.100	mg/kg
Benzo(b)fluoranthene	ND	0.100	mg/kg
Benzo(k)fluoranthene	ND	0.100	mg/kg
Benzo(a)pyrene	ND	0.100	mg/kg
Dibenzo(a,h)anthracene	ND	0.100	mg/kg
Indeno(1,2,3-cd)pyrene	ND	0.100	mg/kg
Benzo(ghi)perylene	ND	0.100	mg/kg
Benzo(j)fluoranthene	ND	0.100	mg/kg
Dibenz(a,h)acridine	ND	0.100	mg/kg
Dibenz(a,j)acridine	ND	0.100	mg/kg
Dibenz(a,e)pyrene	ND	0.100	mg/kg
Dibenz(a,h)pyrene	ND	0.100	mg/kg
Dibenz(a,i)pyrene	ND	0.100	mg/kg
3-Methylcholanthrene	ND	0.100	mg/kg

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by Jack Morgan, Organic Chemist

GLYCOLS
(Soil)

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T1-East	Date Sampled:	06/12/89
Laboratory Number:	C89021	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T1-Center	Date Sampled:	06/12/89
Laboratory Number:	C89022	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T1-West	Date Sampled:	06/12/89
Laboratory Number:	C89023	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T2-East	Date Sampled:	06/12/89
Laboratory Number:	C89024	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T2-Center	Date Sampled:	06/12/89
Laboratory Number:	C89025	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: T2-West
Laboratory Number: C89026
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/16/89
Date Extracted: 06/19/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T3-East	Date Sampled:	06/12/89
Laboratory Number:	C89027	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T3-Center	Date Sampled:	06/12/89
Laboratory Number:	C89028	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T3-West	Date Sampled:	06/12/89
Laboratory Number:	C89029	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

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Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T4-East	Date Sampled:	06/13/89
Laboratory Number:	C89030	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T4-Center	Date Sampled:	06/13/89
Laboratory Number:	C89031	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T4-West	Date Sampled:	06/13/89
Laboratory Number:	C89032	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T5	Date Sampled:	06/13/89
Laboratory Number:	C89033	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

____
Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: Pit North
Laboratory Number: C89034
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	Pit South	Date Sampled:	06/13/89
Laboratory Number:	C89035	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	Pit East	Date Sampled:	06/13/89
Laboratory Number:	C89036	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: Pit West
Laboratory Number: C89037
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

____

Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T6-East	Date Sampled:	06/15/89
Laboratory Number:	C89038	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: T6-West
Laboratory Number: C89039
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	T7	Date Sampled:	06/15/89
Laboratory Number:	C89040	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: RP1-A
Laboratory Number: C89041
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	RP1-B	Date Sampled:	06/15/89
Laboratory Number:	C89042	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	07/06/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	RP2	Date Sampled:	06/15/89
Laboratory Number:	C89043	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	07/06/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	BG-1	Date Sampled:	06/15/89
Laboratory Number:	C89044	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	07/06/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: T6-East
Laboratory Number: C89045
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/19/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: T7
Laboratory Number: C89047
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/21/89
Date Analyzed: 07/01/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: RP1-A
Laboratory Number: C89048
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/19/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: RF1-B
Laboratory Number: C89049
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/21/89
Date Analyzed: 07/06/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	RP2	Date Sampled:	06/15/89
Laboratory Number:	C89050	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Soil	Date Analyzed:	07/06/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	13-Weast	Date Sampled:	06/13/89
Laboratory Number:	C89027	Date Received:	06/16/89
Analysis Requested:	Glycols	Date Extracted:	06/19/89
Sample Matrix:	Soil	Date Analyzed:	07/05/89
Preservative:	None		
Condition:	Cool		

Parameter	Spike Added	Sample Result	Spiked Sample Result	Percent Recovery
Ethylene Glycol	300	ND	161	54
Diethylene Glycol	0	ND	ND	

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in mg/kg.

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: T7
Laboratory Number: C89047
Analysis Requested: Glycols
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/21/89
Date Analyzed: 07/06/89

Parameter	Spike Added	Sample Result	Spiked Sample Result	Percent Recovery
Ethylene Glycol	300	ND	243	81
Diethylene Glycol	0	ND	ND	

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in mg/kg.

Reviewed by

____
Jack M. Morgan
Organic Analyst

CHLORINATED HYDROCARBONS
(Soil)

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-1 East		Date Sampled:	06/12/89
Laboratory Number:	C89021	Date Received:	06/16/89
Analysis Requested:	8120	Date Extracted:	06/23/89
Sample Matrix:	Soil	Date Analyzed:	07/24/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-1 Center
Laboratory Number: C89022
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 07/24/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-1 West
Laboratory Number: C89023
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 08/02/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID:	T-2 East	Date Sampled:	06/12/89
Laboratory Number:	C89024	Date Received:	06/16/89
Analysis Requested:	8120	Date Extracted:	06/23/89
Sample Matrix:	Soil	Date Analyzed:	08/02/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-2 Center
Laboratory Number: C89025
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 08/02/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-2 West
Laboratory Number: C89026
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 08/02/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-3 East
Laboratory Number: C89027
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/12/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 07/24/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID:	T-3 Center	Date Sampled:	06/13/89
Laboratory Number:	C89028	Date Received:	06/16/89
Analysis Requested:	8120	Date Extracted:	06/23/89
Sample Matrix:	Soil	Date Analyzed:	07/24/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-3 West
Laboratory Number: C89029
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 07/24/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-4 East
Laboratory Number: C89030
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/26/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-4 Center
Laboratory Number: C89031
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/26/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-4 West
Laboratory Number: C89032
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/26/89
Date Analyzed: 07/24/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-5		Date Sampled:	06/13/89
Laboratory Number:	C89033	Date Received:	06/16/89
Analysis Requested:	8120	Date Extracted:	06/29/89
Sample Matrix:	Soil	Date Analyzed:	07/24/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

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Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit North
Laboratory Number: C89034
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/29/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit South
Laboratory Number: C89035
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/29/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit East
Laboratory Number: C89036
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/27/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: Pit West
Laboratory Number: C89037
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/27/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-6 East
Laboratory Number: C89038
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 08/02/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-6 West
Laboratory Number: C89039
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/30/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

iml
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Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-7
Laboratory Number: C89040
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/27/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP1-A
Laboratory Number: C89041
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/29/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP1-B
Laboratory Number: C89042
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/29/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP2
Laboratory Number: C89043
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/30/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: BG-1
Laboratory Number: C89044
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/30/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-6 East DUPLICATE
Laboratory Number: C89045
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP1-B	DUPLICATE	Date Sampled:	06/15/89
Laboratory Number:	C89049	Date Received:	06/16/89
Analysis Requested:	8120	Date Extracted:	06/30/89
Sample Matrix:	Soil	Date Analyzed:	07/25/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: T-6 West DUPLICATE
Laboratory Number: C89046
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/23/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	2.4	mg/kg
1,4-Dichlorobenzene	ND	2.4	mg/kg
1,2-Dichlorobenzene	ND	1.08	mg/kg
Hexachlorobutadiene	ND	0.70	mg/kg
1,2,4-Trichlorobenzene	ND	0.05	mg/kg
Hexachlorocyclopentadiene	ND	0.70	mg/kg
2-Chloronapthalene	ND	0.89	mg/kg
Hexachlorobenzene	ND	0.05	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: RP1-B SPIKE
Laboratory Number: C89042
Analysis Requested: 8120
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/30/89
Date Analyzed: 07/25/89

Parameter	Add	Found	Percent Recovery	Det. Limit	Units
1,3-Dichlorobenzene	1429	1351	47%	0.025	mg/kg
1,4-Dichlorobenzene	1429	1351	47%	0.025	mg/kg
1,2-Dichlorobenzene	1429	557	39%	0.025	mg/kg
Hexachlorobutadiene	1429	573	40%	0.025	mg/kg
1,2,4-Trichlorobenze	1429	434	30%	0.025	mg/kg
2-Chloronapthalene	1429	1205	42%	0.025	mg/kg
Hexachlorobenzene	1429	574	40%	0.025	mg/kg

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

VOLATILES
(Soil)

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T1-East	Date Sampled:	06/12/89
Laboratory Number:	C89021	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/24/89
Sample Matrix:	Soil	Date Analyzed:	06/24/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.80	ug/g
Bromomethane	ND	0.80	ug/g
Dichlorodifluoromethane	ND	0.80	ug/g
Vinyl Chloride	ND	0.80	ug/g
Chloroethane	ND	0.80	ug/g
Methylene Chloride	ND	0.80	ug/g
1,1-Dichloroethene	ND	0.80	ug/g
Trichlorofluoromethane	ND	0.80	ug/g
1,1-Dichloroethane	ND	0.80	ug/g
trans-1,2-Dichloroethene	ND	0.80	ug/g
Chloroform	ND	0.80	ug/g
1,2-Dichloroethane	ND	0.80	ug/g
1,1,1-Trichloroethane	ND	0.80	ug/g
Carbon Tetrachloride	ND	0.80	ug/g
Bromodichloromethane	ND	0.80	ug/g
1,2-Dichloropropane	ND	0.80	ug/g
cis-1,3-Dichloropropene	ND	0.80	ug/g
trans-1,3-Dichloropropene	ND	0.80	ug/g
Trichloroethene (TCE)	ND	0.80	ug/g
Dibromochloromethane	ND	0.80	ug/g
1,1,2-Trichloroethane	ND	0.80	ug/g
2-Chloroethylvinyl ether	ND	0.80	ug/g
Bromoform	ND	0.80	ug/g
1,1,2,2-Tetrachloroethane	ND	0.80	ug/g
Tetrachloroethene (PCE)	ND	0.80	ug/g
Chlorobenzene	ND	0.80	ug/g
1,3-Dichlorobenzene	ND	0.80	ug/g
1,2-Dichlorobenzene	ND	0.80	ug/g
1,4-Dichlorobenzene	ND	0.80	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates | Report Date: 06/30/89

Sample ID:	T1-East	Date Sampled:	06/12/89
Laboratory Number:	C89021	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/24/89
Sample Matrix:	Soil	Date Analyzed:	06/24/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/g
Toluene	ND	0.20	ug/g
Ethylbenzene	ND	0.20	ug/g
Chlorobenzene	ND	0.20	ug/g
p,m-Xylene	0.98	0.20	ug/g
o-Xylene	ND	0.20	ug/g
1,4 Dichlorobenzene	ND	0.20	ug/g
1,3 Dichlorobenzene	ND	0.20	ug/g
1,2 Dichlorobenzene	ND	0.20	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T1-Center	Date Sampled:	06/12/89
Laboratory Number:	C89022	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/24/89
Sample Matrix:	Soil	Date Analyzed:	06/24/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.70	ug/g
Bromomethane	ND	0.70	ug/g
Dichlorodifluoromethane	ND	0.70	ug/g
Vinyl Chloride	ND	0.70	ug/g
Chloroethane	ND	0.70	ug/g
Methylene Chloride	ND	0.70	ug/g
1,1-Dichloroethene	ND	0.70	ug/g
Trichlorofluoromethane	ND	0.70	ug/g
1,1-Dichloroethane	ND	0.70	ug/g
trans-1,2-Dichloroethene	ND	0.70	ug/g
Chloroform	ND	0.70	ug/g
1,2-Dichloroethane	ND	0.70	ug/g
1,1,1-Trichloroethane	ND	0.70	ug/g
Carbon Tetrachloride	ND	0.70	ug/g
Bromodichloromethane	ND	0.70	ug/g
1,2-Dichloropropane	ND	0.70	ug/g
cis-1,3-Dichloropropene	ND	0.70	ug/g
trans-1,3-Dichloropropene	ND	0.70	ug/g
Trichloroethene (TCE)	ND	0.70	ug/g
Dibromochloromethane	ND	0.70	ug/g
1,1,2-Trichloroethane	ND	0.70	ug/g
2-Chloroethylvinyl ether	ND	0.70	ug/g
Bromoform	ND	0.70	ug/g
1,1,2,2-Tetrachloroethane	ND	0.70	ug/g
Tetrachloroethene (PCE)	ND	0.70	ug/g
Chlorobenzene	ND	0.70	ug/g
1,3-Dichlorobenzene	ND	0.70	ug/g
1,2-Dichlorobenzene	ND	0.70	ug/g
1,4-Dichlorobenzene	ND	0.70	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates | Report Date: 06/30/89

Sample ID:	T1-Center	Date Sampled:	06/12/89
Laboratory Number:	C89022	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/24/89
Sample Matrix:	Soil	Date Analyzed:	06/24/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.14	ug/g
Toluene	0.16	0.14	ug/g
Ethylbenzene	ND	0.14	ug/g
Chlorobenzene	ND	0.14	ug/g
p,m-Xylene	ND	0.14	ug/g
o-Xylene	ND	0.14	ug/g
1,4 Dichlorobenzene	ND	0.14	ug/g
1,3 Dichlorobenzene	ND	0.14	ug/g
1,2 Dichlorobenzene	ND	0.14	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T1-West	Date Sampled:	06/12/89
Laboratory Number:	C89023	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.51	ug/g
Bromomethane	ND	0.51	ug/g
Dichlorodifluoromethane	ND	0.51	ug/g
Vinyl Chloride	ND	0.51	ug/g
Chloroethane	ND	0.51	ug/g
Methylene Chloride	ND	0.51	ug/g
1,1-Dichloroethene	ND	0.51	ug/g
Trichlorofluoromethane	ND	0.51	ug/g
1,1-Dichloroethane	ND	0.51	ug/g
trans-1,2-Dichloroethene	ND	0.51	ug/g
Chloroform	ND	0.51	ug/g
1,2-Dichloroethane	ND	0.51	ug/g
1,1,1-Trichloroethane	ND	0.51	ug/g
Carbon Tetrachloride	ND	0.51	ug/g
Bromodichloromethane	ND	0.51	ug/g
1,2-Dichloropropane	ND	0.51	ug/g
cis-1,3-Dichloropropene	ND	0.51	ug/g
trans-1,3-Dichloropropene	ND	0.51	ug/g
Trichloroethene (TCE)	ND	0.51	ug/g
Dibromochloromethane	ND	0.51	ug/g
1,1,2-Trichloroethane	ND	0.51	ug/g
2-Chloroethylvinyl ether	ND	0.51	ug/g
Bromoform	ND	0.51	ug/g
1,1,2,2-Tetrachloroethane	ND	0.51	ug/g
Tetrachloroethene (PCE)	ND	0.51	ug/g
Chlorobenzene	ND	0.51	ug/g
1,3-Dichlorobenzene	ND	0.51	ug/g
1,2-Dichlorobenzene	ND	0.51	ug/g
1,4-Dichlorobenzene	ND	0.51	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T1-West	Date Sampled:	06/12/89
Laboratory Number:	C89023	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.10	ug/g
Toluene	ND	0.10	ug/g
Ethylbenzene	ND	0.10	ug/g
Chlorobenzene	ND	0.10	ug/g
p,m-Xylene	0.73	0.10	ug/g
o-Xylene	ND	0.10	ug/g
1,4 Dichlorobenzene	ND	0.10	ug/g
1,3 Dichlorobenzene	ND	0.10	ug/g
1,2 Dichlorobenzene	ND	0.10	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T2-East	Date Sampled:	06/12/89
Laboratory Number:	C89024	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/23/89
Sample Matrix:	Soil	Date Analyzed:	06/23/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.84	ug/g
Bromomethane	ND	0.84	ug/g
Dichlorodifluoromethane	ND	0.84	ug/g
Vinyl Chloride	ND	0.84	ug/g
Chloroethane	ND	0.84	ug/g
Methylene Chloride	ND	0.84	ug/g
1,1-Dichloroethene	ND	0.84	ug/g
Trichlorofluoromethane	ND	0.84	ug/g
1,1-Dichloroethane	ND	0.84	ug/g
trans-1,2-Dichloroethene	ND	0.84	ug/g
Chloroform	ND	0.84	ug/g
1,2-Dichloroethane	ND	0.84	ug/g
1,1,1-Trichloroethane	ND	0.84	ug/g
Carbon Tetrachloride	ND	0.84	ug/g
Bromodichloromethane	ND	0.84	ug/g
1,2-Dichloropropane	ND	0.84	ug/g
cis-1,3-Dichloropropene	ND	0.84	ug/g
trans-1,3-Dichloropropene	ND	0.84	ug/g
Trichloroethene (TCE)	ND	0.84	ug/g
Dibromochloromethane	ND	0.84	ug/g
1,1,2-Trichloroethane	ND	0.84	ug/g
2-Chloroethylvinyl ether	ND	0.84	ug/g
Bromoform	ND	0.84	ug/g
1,1,2,2-Tetrachloroethane	ND	0.84	ug/g
Tetrachloroethene (PCE)	ND	0.84	ug/g
Chlorobenzene	ND	0.84	ug/g
1,3-Dichlorobenzene	ND	0.84	ug/g
1,2-Dichlorobenzene	ND	0.84	ug/g
1,4-Dichlorobenzene	ND	0.84	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T2-East	Date Sampled:	06/12/89
Laboratory Number:	C89024	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/23/89
Sample Matrix:	Soil	Date Analyzed:	06/23/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	0.22	0.17	ug/g
Toluene	0.35	0.17	ug/g
Ethylbenzene	ND	0.17	ug/g
Chlorobenzene	ND	0.17	ug/g
p,m-Xylene	ND	0.17	ug/g
o-Xylene	ND	0.17	ug/g
1,4 Dichlorobenzene	ND	0.17	ug/g
1,3 Dichlorobenzene	ND	0.17	ug/g
1,2 Dichlorobenzene	ND	0.17	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T2-Center	Date Sampled:	06/12/89
Laboratory Number:	C89025	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/24/89
Sample Matrix:	Soil	Date Analyzed:	06/24/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.78	ug/g
Bromomethane	ND	0.78	ug/g
Dichlorodifluoromethane	ND	0.78	ug/g
Vinyl Chloride	ND	0.78	ug/g
Chloroethane	ND	0.78	ug/g
Methylene Chloride	ND	0.78	ug/g
1,1-Dichloroethene	ND	0.78	ug/g
Trichlorofluoromethane	ND	0.78	ug/g
1,1-Dichloroethane	ND	0.78	ug/g
trans-1,2-Dichloroethene	ND	0.78	ug/g
Chloroform	ND	0.78	ug/g
1,2-Dichloroethane	ND	0.78	ug/g
1,1,1-Trichloroethane	ND	0.78	ug/g
Carbon Tetrachloride	ND	0.78	ug/g
Bromodichloromethane	ND	0.78	ug/g
1,2-Dichloropropane	ND	0.78	ug/g
cis-1,3-Dichloropropene	ND	0.78	ug/g
trans-1,3-Dichloropropene	ND	0.78	ug/g
Trichloroethene (TCE)	ND	0.78	ug/g
Dibromochloromethane	ND	0.78	ug/g
1,1,2-Trichloroethane	ND	0.78	ug/g
2-Chloroethylvinyl ether	ND	0.78	ug/g
Bromoform	ND	0.78	ug/g
1,1,2,2-Tetrachloroethane	ND	0.78	ug/g
Tetrachloroethene (PCE)	ND	0.78	ug/g
Chlorobenzene	ND	0.78	ug/g
1,3-Dichlorobenzene	ND	0.78	ug/g
1,2-Dichlorobenzene	ND	0.78	ug/g
1,4-Dichlorobenzene	ND	0.78	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T2-Center	Date Sampled:	06/12/89
Laboratory Number:	C89025	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/24/89
Sample Matrix:	Soil	Date Analyzed:	06/24/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.16	ug/g
Toluene	0.26	0.16	ug/g
Ethylbenzene	ND	0.16	ug/g
Chlorobenzene	ND	0.16	ug/g
p,m-Xylene	0.94	0.16	ug/g
o-Xylene	ND	0.16	ug/g
1,4 Dichlorobenzene	ND	0.16	ug/g
1,3 Dichlorobenzene	ND	0.16	ug/g
1,2 Dichlorobenzene	ND	0.16	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T2-West	Date Sampled:	06/12/89
Laboratory Number:	C89026	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/22/89
Sample Matrix:	Soil	Date Analyzed:	06/22/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.98	ug/g
Bromomethane	ND	0.98	ug/g
Dichlorodifluoromethane	ND	0.98	ug/g
Vinyl Chloride	ND	0.98	ug/g
Chloroethane	ND	0.98	ug/g
Methylene Chloride	ND	0.98	ug/g
1,1-Dichloroethene	ND	0.98	ug/g
Trichlorofluoromethane	ND	0.98	ug/g
1,1-Dichloroethane	ND	0.98	ug/g
trans-1,2-Dichloroethene	ND	0.98	ug/g
Chloroform	ND	0.98	ug/g
1,2-Dichloroethane	ND	0.98	ug/g
1,1,1-Trichloroethane	ND	0.98	ug/g
Carbon Tetrachloride	ND	0.98	ug/g
Bromodichloromethane	ND	0.98	ug/g
1,2-Dichloropropane	ND	0.98	ug/g
cis-1,3-Dichloropropene	ND	0.98	ug/g
trans-1,3-Dichloropropene	ND	0.98	ug/g
Trichloroethene (TCE)	ND	0.98	ug/g
Dibromochloromethane	ND	0.98	ug/g
1,1,2-Trichloroethane	ND	0.98	ug/g
2-Chloroethylvinyl ether	ND	0.98	ug/g
Bromoform	ND	0.98	ug/g
1,1,2,2-Tetrachloroethane	ND	0.98	ug/g
Tetrachloroethene (PCE)	ND	0.98	ug/g
Chlorobenzene	ND	0.98	ug/g
1,3-Dichlorobenzene	ND	0.98	ug/g
1,2-Dichlorobenzene	ND	0.98	ug/g
1,4-Dichlorobenzene	ND	0.98	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates

Report Date: 06/30/89

Sample ID:	T2-West	Date Sampled:	06/12/89
Laboratory Number:	C89026	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/22/89
Sample Matrix:	Soil	Date Analyzed:	06/22/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/g
Toluene	ND	0.20	ug/g
Ethylbenzene	ND	0.20	ug/g
Chlorobenzene	ND	0.20	ug/g
p,m-Xylene	ND	0.20	ug/g
o-Xylene	ND	0.20	ug/g
1,4 Dichlorobenzene	ND	0.20	ug/g
1,3 Dichlorobenzene	ND	0.20	ug/g
1,2 Dichlorobenzene	ND	0.20	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T3-East	Date Sampled:	06/13/89
Laboratory Number:	C89027	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/22/89
Sample Matrix:	Soil	Date Analyzed:	06/22/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.92	ug/g
Bromomethane	ND	0.92	ug/g
Dichlorodifluoromethane	ND	0.92	ug/g
Vinyl Chloride	ND	0.92	ug/g
Chloroethane	ND	0.92	ug/g
Methylene Chloride	ND	0.92	ug/g
1,1-Dichloroethene	ND	0.92	ug/g
Trichlorofluoromethane	ND	0.92	ug/g
1,1-Dichloroethane	ND	0.92	ug/g
trans-1,2-Dichloroethene	ND	0.92	ug/g
Chloroform	ND	0.92	ug/g
1,2-Dichloroethane	ND	0.92	ug/g
1,1,1-Trichloroethane	ND	0.92	ug/g
Carbon Tetrachloride	ND	0.92	ug/g
Bromodichloromethane	ND	0.92	ug/g
1,2-Dichloropropane	ND	0.92	ug/g
cis-1,3-Dichloropropene	ND	0.92	ug/g
trans-1,3-Dichloropropene	ND	0.92	ug/g
Trichloroethene (TCE)	ND	0.92	ug/g
Dibromochloromethane	ND	0.92	ug/g
1,1,2-Trichloroethane	ND	0.92	ug/g
2-Chloroethylvinyl ether	ND	0.92	ug/g
Bromoform	ND	0.92	ug/g
1,1,2,2-Tetrachloroethane	ND	0.92	ug/g
Tetrachloroethene (PCE)	ND	0.92	ug/g
Chlorobenzene	ND	0.92	ug/g
1,3-Dichlorobenzene	ND	0.92	ug/g
1,2-Dichlorobenzene	ND	0.92	ug/g
1,4-Dichlorobenzene	ND	0.92	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates

Report Date: 06/30/89

Sample ID: T3-East
Laboratory Number: C89027
Analysis Requested: 8020
Sample Matrix: Soil
Preservative: Cool
Condition: Appears Good

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/22/89
Date Analyzed: 06/22/89

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.18	ug/g
Toluene	ND	0.18	ug/g
Ethylbenzene	ND	0.18	ug/g
Chlorobenzene	ND	0.18	ug/g
p,m-Xylene	ND	0.18	ug/g
o-Xylene	ND	0.18	ug/g
1,4 Dichlorobenzene	ND	0.18	ug/g
1,3 Dichlorobenzene	ND	0.18	ug/g
1,2 Dichlorobenzene	ND	0.18	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T3-Center	Date Sampled:	06/13/89
Laboratory Number:	C89028	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.60	ug/g
Bromomethane	ND	0.60	ug/g
Dichlorodifluoromethane	ND	0.60	ug/g
Vinyl Chloride	ND	0.60	ug/g
Chloroethane	ND	0.60	ug/g
Methylene Chloride	ND	0.60	ug/g
1,1-Dichloroethene	ND	0.60	ug/g
Trichlorofluoromethane	ND	0.60	ug/g
1,1-Dichloroethane	ND	0.60	ug/g
trans-1,2-Dichloroethene	ND	0.60	ug/g
Chloroform	ND	0.60	ug/g
1,2-Dichloroethane	ND	0.60	ug/g
1,1,1-Trichloroethane	ND	0.60	ug/g
Carbon Tetrachloride	ND	0.60	ug/g
Bromodichloromethane	ND	0.60	ug/g
1,2-Dichloropropane	ND	0.60	ug/g
cis-1,3-Dichloropropene	ND	0.60	ug/g
trans-1,3-Dichloropropene	ND	0.60	ug/g
Dibromochloromethane	ND	0.60	ug/g
1,1,2-Trichloroethane	ND	0.60	ug/g
2-Chloroethylvinyl ether	ND	0.60	ug/g
Bromoform	ND	0.60	ug/g
1,1,2,2-Tetrachloroethane	ND	0.60	ug/g
Tetrachloroethene (PCE)	ND	0.60	ug/g
Chlorobenzene	ND	0.60	ug/g
1,3-Dichlorobenzene	ND	0.60	ug/g
1,2-Dichlorobenzene	ND	0.60	ug/g
1,4-Dichlorobenzene	ND	0.60	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T3-Center	Date Sampled:	06/13/89
Laboratory Number:	C89028	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.12	ug/g
Toluene	ND	0.12	ug/g
Ethylbenzene	ND	0.12	ug/g
Chlorobenzene	0.19	0.12	ug/g
p,m-Xylene	ND	0.12	ug/g
o-Xylene	ND	0.12	ug/g
1,4 Dichlorobenzene	ND	0.12	ug/g
1,3 Dichlorobenzene	ND	0.12	ug/g
1,2 Dichlorobenzene	ND	0.12	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T3-West	Date Sampled:	06/13/89
Laboratory Number:	C89029	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.54	ug/g
Bromomethane	ND	0.54	ug/g
Dichlorodifluoromethane	ND	0.54	ug/g
Vinyl Chloride	ND	0.54	ug/g
Chloroethane	ND	0.54	ug/g
Methylene Chloride	ND	0.54	ug/g
1,1-Dichloroethene	ND	0.54	ug/g
Trichlorofluoromethane	ND	0.54	ug/g
1,1-Dichloroethane	ND	0.54	ug/g
trans-1,2-Dichloroethene	ND	0.54	ug/g
Chloroform	ND	0.54	ug/g
1,2-Dichloroethane	ND	0.54	ug/g
1,1,1-Trichloroethane	ND	0.54	ug/g
Carbon Tetrachloride	ND	0.54	ug/g
Bromodichloromethane	ND	0.54	ug/g
1,2-Dichloropropane	ND	0.54	ug/g
cis-1,3-Dichloropropene	ND	0.54	ug/g
trans-1,3-Dichloropropene	ND	0.54	ug/g
Trichloroethene (TCE)	ND	0.54	ug/g
Dibromochloromethane	ND	0.54	ug/g
1,1,2-Trichloroethane	ND	0.54	ug/g
2-Chloroethylvinyl ether	ND	0.54	ug/g
Bromoform	ND	0.54	ug/g
1,1,2,2-Tetrachloroethane	ND	0.54	ug/g
Tetrachloroethene (PCE)	ND	0.54	ug/g
Chlorobenzene	ND	0.54	ug/g
1,3-Dichlorobenzene	ND	0.54	ug/g
1,2-Dichlorobenzene	ND	0.54	ug/g
1,4-Dichlorobenzene	ND	0.54	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates | Report Date: 06/30/89

Sample ID:	T3-West	Date Sampled:	06/13/89
Laboratory Number:	C89029	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.11	ug/g
Toluene	ND	0.11	ug/g
Ethylbenzene	ND	0.11	ug/g
Chlorobenzene	ND	0.11	ug/g
p,m-Xylene	ND	0.11	ug/g
o-Xylene	ND	0.11	ug/g
1,4 Dichlorobenzene	ND	0.11	ug/g
1,3 Dichlorobenzene	ND	0.11	ug/g
1,2 Dichlorobenzene	ND	0.11	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T4-East	Date Sampled:	06/13/89
Laboratory Number:	C89030	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.50	ug/g
Bromomethane	ND	0.50	ug/g
Dichlorodifluoromethane	ND	0.50	ug/g
Vinyl Chloride	ND	0.50	ug/g
Chloroethane	ND	0.50	ug/g
Methylene Chloride	ND	0.50	ug/g
1,1-Dichloroethene	ND	0.50	ug/g
Trichlorofluoromethane	ND	0.50	ug/g
1,1-Dichloroethane	ND	0.50	ug/g
trans-1,2-Dichloroethene	ND	0.50	ug/g
Chloroform	ND	0.50	ug/g
1,2-Dichloroethane	ND	0.50	ug/g
1,1,1-Trichloroethane	ND	0.50	ug/g
Carbon Tetrachloride	ND	0.50	ug/g
Bromodichloromethane	ND	0.50	ug/g
1,2-Dichloropropane	ND	0.50	ug/g
cis-1,3-Dichloropropene	ND	0.50	ug/g
trans-1,3-Dichloropropene	ND	0.50	ug/g
Trichloroethene (TCE)	ND	0.50	ug/g
Dibromochloromethane	ND	0.50	ug/g
1,1,2-Trichloroethane	ND	0.50	ug/g
2-Chloroethylvinyl ether	ND	0.50	ug/g
Bromoform	ND	0.50	ug/g
1,1,2,2-Tetrachloroethane	ND	0.50	ug/g
Tetrachloroethene (PCE)	ND	0.50	ug/g
Chlorobenzene	ND	0.50	ug/g
1,3-Dichlorobenzene	ND	0.50	ug/g
1,2-Dichlorobenzene	ND	0.50	ug/g
1,4-Dichlorobenzene	ND	0.50	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T4-East	Date Sampled:	06/13/89
Laboratory Number:	C89030	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.10	ug/g
Toluene	ND	0.10	ug/g
Ethylbenzene	ND	0.10	ug/g
Chlorobenzene	ND	0.10	ug/g
p,m-Xylene	ND	0.10	ug/g
o-Xylene	ND	0.10	ug/g
1,4 Dichlorobenzene	ND	0.10	ug/g
1,3 Dichlorobenzene	ND	0.10	ug/g
1,2 Dichlorobenzene	ND	0.10	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T4-Center	Date Sampled:	06/13/89
Laboratory Number:	C89031	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.61	ug/g
Bromomethane	ND	0.61	ug/g
Dichlorodifluoromethane	ND	0.61	ug/g
Vinyl Chloride	ND	0.61	ug/g
Chloroethane	ND	0.61	ug/g
Methylene Chloride	ND	0.61	ug/g
1,1-Dichloroethene	ND	0.61	ug/g
Trichlorofluoromethane	ND	0.61	ug/g
1,1-Dichloroethane	ND	0.61	ug/g
trans-1,2-Dichloroethene	ND	0.61	ug/g
Chloroform	ND	0.61	ug/g
1,2-Dichloroethane	ND	0.61	ug/g
1,1,1-Trichloroethane	ND	0.61	ug/g
Carbon Tetrachloride	ND	0.61	ug/g
Bromodichloromethane	ND	0.61	ug/g
1,2-Dichloropropane	ND	0.61	ug/g
cis-1,3-Dichloropropene	ND	0.61	ug/g
trans-1,3-Dichloropropene	ND	0.61	ug/g
Trichloroethene (TCE)	ND	0.61	ug/g
Dibromochloromethane	ND	0.61	ug/g
1,1,2-Trichloroethane	ND	0.61	ug/g
2-Chloroethylvinyl ether	ND	0.61	ug/g
Bromoform	ND	0.61	ug/g
1,1,2,2-Tetrachloroethane	ND	0.61	ug/g
Tetrachloroethene (PCE)	ND	0.61	ug/g
Chlorobenzene	ND	0.61	ug/g
1,3-Dichlorobenzene	ND	0.61	ug/g
1,2-Dichlorobenzene	ND	0.61	ug/g
1,4-Dichlorobenzene	ND	0.61	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates — Report Date: 06/30/89

Sample ID:	T4-Center	Date Sampled:	06/13/89
Laboratory Number:	C89031	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.11	ug/g
Toluene	ND	0.11	ug/g
Ethylbenzene	ND	0.11	ug/g
Chlorobenzene	ND	0.11	ug/g
p,m-Xylene	ND	0.11	ug/g
o-Xylene	ND	0.11	ug/g
1,4 Dichlorobenzene	ND	0.11	ug/g
1,3 Dichlorobenzene	ND	0.11	ug/g
1,2 Dichlorobenzene	ND	0.11	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T4-West	Date Sampled:	06/13/89
Laboratory Number:	C89032	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.61	ug/g
Bromomethane	ND	0.61	ug/g
Dichlorodifluoromethane	ND	0.61	ug/g
Vinyl Chloride	ND	0.61	ug/g
Chloroethane	ND	0.61	ug/g
Methylene Chloride	ND	0.61	ug/g
1,1-Dichloroethene	ND	0.61	ug/g
Trichlorofluoromethane	ND	0.61	ug/g
1,1-Dichloroethane	ND	0.61	ug/g
trans-1,2-Dichloroethene	ND	0.61	ug/g
Chloroform	ND	0.61	ug/g
1,2-Dichloroethane	ND	0.61	ug/g
1,1,1-Trichloroethane	ND	0.61	ug/g
Carbon Tetrachloride	ND	0.61	ug/g
Bromodichloromethane	ND	0.61	ug/g
1,2-Dichloropropane	ND	0.61	ug/g
cis-1,3-Dichloropropene	ND	0.61	ug/g
trans-1,3-Dichloropropene	ND	0.61	ug/g
Trichloroethene (TCE)	ND	0.61	ug/g
Dibromochloromethane	ND	0.61	ug/g
1,1,2-Trichloroethane	ND	0.61	ug/g
2-Chloroethylvinyl ether	ND	0.61	ug/g
Bromoform	ND	0.61	ug/g
1,1,2,2-Tetrachloroethane	ND	0.61	ug/g
Tetrachloroethene (PCE)	ND	0.61	ug/g
Chlorobenzene	ND	0.61	ug/g
1,3-Dichlorobenzene	ND	0.61	ug/g
1,2-Dichlorobenzene	ND	0.61	ug/g
1,4-Dichlorobenzene	ND	0.61	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T4-West	Date Sampled:	06/13/89
Laboratory Number:	C89032	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.10	ug/g
Toluene	ND	0.10	ug/g
Ethylbenzene	ND	0.10	ug/g
Chlorobenzene	ND	0.10	ug/g
p,m-Xylene	ND	0.10	ug/g
o-Xylene	ND	0.10	ug/g
1,4 Dichlorobenzene	ND	0.10	ug/g
1,3 Dichlorobenzene	ND	0.10	ug/g
1,2 Dichlorobenzene	ND	0.10	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T5	Date Sampled:	06/13/89
Laboratory Number:	C89033	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.61	ug/g
Bromomethane	ND	0.61	ug/g
Dichlorodifluoromethane	ND	0.61	ug/g
Vinyl Chloride	ND	0.61	ug/g
Chloroethane	ND	0.61	ug/g
Methylene Chloride	ND	0.61	ug/g
1,1-Dichloroethene	ND	0.61	ug/g
Trichlorofluoromethane	ND	0.61	ug/g
1,1-Dichloroethane	ND	0.61	ug/g
trans-1,2-Dichloroethene	ND	0.61	ug/g
Chloroform	ND	0.61	ug/g
1,2-Dichloroethane	ND	0.61	ug/g
1,1,1-Trichloroethane	ND	0.61	ug/g
Carbon Tetrachloride	ND	0.61	ug/g
Bromodichloromethane	ND	0.61	ug/g
1,2-Dichloropropane	ND	0.61	ug/g
cis-1,3-Dichloropropene	ND	0.61	ug/g
trans-1,3-Dichloropropene	ND	0.61	ug/g
Trichloroethene (TCE)	ND	0.61	ug/g
Dibromochloromethane	ND	0.61	ug/g
1,1,2-Trichloroethane	ND	0.61	ug/g
2-Chloroethylvinyl ether	ND	0.61	ug/g
Bromoform	ND	0.61	ug/g
1,1,2,2-Tetrachloroethane	ND	0.61	ug/g
Tetrachloroethene (PCE)	ND	0.61	ug/g
Chlorobenzene	ND	0.61	ug/g
1,3-Dichlorobenzene	ND	0.61	ug/g
1,2-Dichlorobenzene	ND	0.61	ug/g
1,4-Dichlorobenzene	ND	0.61	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates

Report Date: 06/30/89

Sample ID: T5
Laboratory Number: C89033
Analysis Requested: 8020
Sample Matrix: Soil
Preservative: Cool
Condition: Appears Good

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/26/89
Date Analyzed: 06/26/89

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.12	ug/g
Toluene	ND	0.12	ug/g
Ethylbenzene	ND	0.12	ug/g
Chlorobenzene	ND	0.12	ug/g
p,m-Xylene	ND	0.12	ug/g
o-Xylene	ND	0.12	ug/g
1,4 Dichlorobenzene	ND	0.12	ug/g
1,3 Dichlorobenzene	ND	0.12	ug/g
1,2 Dichlorobenzene	ND	0.12	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	Pit North	Date Sampled:	06/13/89
Laboratory Number:	C89034	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.2	ug/g
Bromomethane	ND	1.2	ug/g
Dichlorodifluoromethane	ND	1.2	ug/g
Vinyl Chloride	ND	1.2	ug/g
Chloroethane	ND	1.2	ug/g
Methylene Chloride	ND	1.2	ug/g
1,1-Dichloroethene	ND	1.2	ug/g
Trichlorofluoromethane	ND	1.2	ug/g
1,1-Dichloroethane	ND	1.2	ug/g
trans-1,2-Dichloroethene	ND	1.2	ug/g
Chloroform	ND	1.2	ug/g
1,2-Dichloroethane	ND	1.2	ug/g
1,1,1-Trichloroethane	ND	1.2	ug/g
Carbon Tetrachloride	ND	1.2	ug/g
Bromodichloromethane	ND	1.2	ug/g
1,2-Dichloropropane	ND	1.2	ug/g
cis-1,3-Dichloropropene	ND	1.2	ug/g
trans-1,3-Dichloropropene	ND	1.2	ug/g
Trichloroethene (TCE)	ND	1.2	ug/g
Dibromochloromethane	ND	1.2	ug/g
1,1,2-Trichloroethane	ND	1.2	ug/g
2-Chloroethylvinyl ether	ND	1.2	ug/g
Bromoform	ND	1.2	ug/g
1,1,2,2-Tetrachloroethane	ND	1.2	ug/g
Tetrachloroethene (PCE)	ND	1.2	ug/g
Chlorobenzene	ND	1.2	ug/g
1,3-Dichlorobenzene	ND	1.2	ug/g
1,2-Dichlorobenzene	ND	1.2	ug/g
1,4-Dichlorobenzene	ND	1.2	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	Pit North	Date Sampled:	06/13/89
Laboratory Number:	C89034	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.23	ug/g
Toluene	1.2	0.23	ug/g
Ethylbenzene	ND	0.23	ug/g
Chlorobenzene	ND	0.23	ug/g
p,m-Xylene	15.6	0.23	ug/g
o-Xylene	2.2	0.23	ug/g
1,4 Dichlorobenzene	ND	0.23	ug/g
1,3 Dichlorobenzene	ND	0.23	ug/g
1,2 Dichlorobenzene	ND	0.23	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	Pit South	Date Sampled:	06/13/89
Laboratory Number:	C89035	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.70	ug/g
Bromomethane	ND	0.70	ug/g
Dichlorodifluoromethane	ND	0.70	ug/g
Vinyl Chloride	ND	0.70	ug/g
Chloroethane	ND	0.70	ug/g
Methylene Chloride	ND	0.70	ug/g
1,1-Dichloroethene	ND	0.70	ug/g
Trichlorofluoromethane	ND	0.70	ug/g
1,1-Dichloroethane	ND	0.70	ug/g
trans-1,2-Dichloroethene	ND	0.70	ug/g
Chloroform	ND	0.70	ug/g
1,2-Dichloroethane	ND	0.70	ug/g
1,1,1-Trichloroethane	ND	0.70	ug/g
Carbon Tetrachloride	ND	0.70	ug/g
Bromodichloromethane	ND	0.70	ug/g
1,2-Dichloropropane	ND	0.70	ug/g
cis-1,3-Dichloropropene	ND	0.70	ug/g
trans-1,3-Dichloropropene	ND	0.70	ug/g
Trichloroethene (TCE)	ND	0.70	ug/g
Dibromochloromethane	ND	0.70	ug/g
1,1,2-Trichloroethane	ND	0.70	ug/g
2-Chloroethylvinyl ether	ND	0.70	ug/g
Bromoform	ND	0.70	ug/g
1,1,2,2-Tetrachloroethane	ND	0.70	ug/g
Tetrachloroethene (PCE)	ND	0.70	ug/g
Chlorobenzene	ND	0.70	ug/g
1,3-Dichlorobenzene	ND	0.70	ug/g
1,2-Dichlorobenzene	ND	0.70	ug/g
1,4-Dichlorobenzene	ND	0.70	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	Pit South	Date Sampled:	06/13/89
Laboratory Number:	C89035	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.13	ug/g
Toluene	ND	0.13	ug/g
Ethylbenzene	ND	0.13	ug/g
Chlorobenzene	0.37	0.13	ug/g
p,m-Xylene	0.76	0.13	ug/g
o-Xylene	ND	0.13	ug/g
1,4 Dichlorobenzene	ND	0.13	ug/g
1,3 Dichlorobenzene	ND	0.13	ug/g
1,2 Dichlorobenzene	ND	0.13	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	Pit East	Date Sampled:	06/13/89
Laboratory Number:	C89036	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/22/89
Sample Matrix:	Soil	Date Analyzed:	06/22/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.2	ug/g
Bromomethane	ND	1.2	ug/g
Dichlorodifluoromethane	ND	1.2	ug/g
Vinyl Chloride	ND	1.2	ug/g
Chloroethane	ND	1.2	ug/g
Methylene Chloride	ND	1.2	ug/g
1,1-Dichloroethene	ND	1.2	ug/g
Trichlorofluoromethane	ND	1.2	ug/g
1,1-Dichloroethane	ND	1.2	ug/g
trans-1,2-Dichloroethene	ND	1.2	ug/g
Chloroform	ND	1.2	ug/g
1,2-Dichloroethane	ND	1.2	ug/g
1,1,1-Trichloroethane	ND	1.2	ug/g
Carbon Tetrachloride	ND	1.2	ug/g
Bromodichloromethane	ND	1.2	ug/g
1,2-Dichloropropane	ND	1.2	ug/g
cis-1,3-Dichloropropene	ND	1.2	ug/g
trans-1,3-Dichloropropene	ND	1.2	ug/g
Trichloroethene (TCE)	ND	1.2	ug/g
Dibromochloromethane	ND	1.2	ug/g
1,1,2-Trichloroethane	ND	1.2	ug/g
2-Chloroethylvinyl ether	ND	1.2	ug/g
Bromoform	ND	1.2	ug/g
1,1,2,2-Tetrachloroethane	ND	1.2	ug/g
Tetrachloroethene (PCE)	ND	1.2	ug/g
Chlorobenzene	ND	1.2	ug/g
1,3-Dichlorobenzene	ND	1.2	ug/g
1,2-Dichlorobenzene	ND	1.2	ug/g
1,4-Dichlorobenzene	ND	1.2	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates

Report Date: 06/30/89

Sample ID: Pit East
Laboratory Number: C89036
Analysis Requested: 8020
Sample Matrix: Soil
Preservative: Cool
Condition: Appears Good

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/22/89
Date Analyzed: 06/22/89

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.24	ug/g
Toluene	ND	0.24	ug/g
Ethylbenzene	ND	0.24	ug/g
Chlorobenzene	ND	0.24	ug/g
p,m-Xylene	1.6	0.24	ug/g
o-Xylene	0.5	0.24	ug/g
1,4 Dichlorobenzene	ND	0.24	ug/g
1,3 Dichlorobenzene	ND	0.24	ug/g
1,2 Dichlorobenzene	ND	0.24	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	Pit West	Date Sampled:	06/13/89
Laboratory Number:	C89037	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.62	ug/g
Bromomethane	ND	0.62	ug/g
Dichlorodifluoromethane	ND	0.62	ug/g
Vinyl Chloride	ND	0.62	ug/g
Chloroethane	ND	0.62	ug/g
Methylene Chloride	ND	0.62	ug/g
1,1-Dichloroethene	ND	0.62	ug/g
Trichlorofluoromethane	ND	0.62	ug/g
1,1-Dichloroethane	ND	0.62	ug/g
trans-1,2-Dichloroethene	ND	0.62	ug/g
Chloroform	ND	0.62	ug/g
1,2-Dichloroethane	ND	0.62	ug/g
1,1,1-Trichloroethane	ND	0.62	ug/g
Carbon Tetrachloride	ND	0.62	ug/g
Bromodichloromethane	ND	0.62	ug/g
1,2-Dichloropropane	ND	0.62	ug/g
cis-1,3-Dichloropropene	ND	0.62	ug/g
trans-1,3-Dichloropropene	ND	0.62	ug/g
Trichloroethene (TCE)	ND	0.62	ug/g
Dibromochloromethane	ND	0.62	ug/g
1,1,2-Trichloroethane	ND	0.62	ug/g
2-Chloroethylvinyl ether	ND	0.62	ug/g
Bromoform	ND	0.62	ug/g
1,1,2,2-Tetrachloroethane	ND	0.62	ug/g
Tetrachloroethene (PCE)	ND	0.62	ug/g
Chlorobenzene	ND	0.62	ug/g
1,3-Dichlorobenzene	ND	0.62	ug/g
1,2-Dichlorobenzene	ND	0.62	ug/g
1,4-Dichlorobenzene	ND	0.62	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	Pit West	Date Sampled:	06/13/89
Laboratory Number:	C89037	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	2.6	0.12	ug/g
Toluene	34.3	0.12	ug/g
Ethylbenzene	ND	0.12	ug/g
Chlorobenzene	ND	0.12	ug/g
p,m-Xylene	152	0.12	ug/g
o-Xylene	25.2	0.12	ug/g
1,4 Dichlorobenzene	ND	0.12	ug/g
1,3 Dichlorobenzene	ND	0.12	ug/g
1,2 Dichlorobenzene	ND	0.12	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T6-East	Date Sampled:	06/15/89
Laboratory Number:	C89038	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.64	ug/g
Bromomethane	ND	0.64	ug/g
Dichlorodifluoromethane	ND	0.64	ug/g
Vinyl Chloride	ND	0.64	ug/g
Chloroethane	ND	0.64	ug/g
Methylene Chloride	ND	6.4	ug/g
1,1-Dichloroethene	ND	0.64	ug/g
Trichlorofluoromethane	ND	0.64	ug/g
1,1-Dichloroethane	ND	0.64	ug/g
trans-1,2-Dichloroethene	ND	0.64	ug/g
Chloroform	ND	0.64	ug/g
1,2-Dichloroethane	ND	0.64	ug/g
1,1,1-Trichloroethane	ND	0.64	ug/g
Carbon Tetrachloride	ND	0.64	ug/g
Bromodichloromethane	ND	0.64	ug/g
1,2-Dichloropropane	ND	0.64	ug/g
cis-1,3-Dichloropropene	ND	0.64	ug/g
trans-1,3-Dichloropropene	ND	0.64	ug/g
Trichloroethene (TCE)	ND	0.64	ug/g
Dibromochloromethane	ND	0.64	ug/g
1,1,2-Trichloroethane	ND	0.64	ug/g
2-Chloroethylvinyl ether	ND	0.64	ug/g
Bromoform	ND	0.64	ug/g
1,1,2,2-Tetrachloroethane	ND	0.64	ug/g
Tetrachloroethene (PCE)	ND	0.64	ug/g
Chlorobenzene	ND	0.64	ug/g
1,3-Dichlorobenzene	ND	0.64	ug/g
1,2-Dichlorobenzene	ND	0.64	ug/g
1,4-Dichlorobenzene	ND	0.64	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T6-East	Date Sampled:	06/15/89
Laboratory Number:	C89038	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.13	ug/g
Toluene	ND	0.13	ug/g
Ethylbenzene	ND	0.13	ug/g
Chlorobenzene	ND	0.13	ug/g
p,m-Xylene	ND	0.13	ug/g
o-Xylene	ND	0.13	ug/g
1,4 Dichlorobenzene	ND	0.13	ug/g
1,3 Dichlorobenzene	ND	0.13	ug/g
1,2 Dichlorobenzene	ND	0.13	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T6-West	Date Sampled:	06/15/89
Laboratory Number:	C89039	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/27/89
Sample Matrix:	Soil	Date Analyzed:	06/27/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.58	ug/g
Bromomethane	ND	0.58	ug/g
Dichlorodifluoromethane	ND	0.58	ug/g
Vinyl Chloride	ND	0.58	ug/g
Chloroethane	ND	0.58	ug/g
Methylene Chloride	ND	0.58	ug/g
1,1-Dichloroethene	ND	0.58	ug/g
Trichlorofluoromethane	ND	0.58	ug/g
1,1-Dichloroethane	ND	0.58	ug/g
trans-1,2-Dichloroethene	ND	0.58	ug/g
Chloroform	ND	0.58	ug/g
1,2-Dichloroethane	ND	0.58	ug/g
1,1,1-Trichloroethane	ND	0.58	ug/g
Carbon Tetrachloride	ND	0.58	ug/g
Bromodichloromethane	ND	0.58	ug/g
1,2-Dichloropropane	ND	0.58	ug/g
cis-1,3-Dichloropropene	ND	0.58	ug/g
trans-1,3-Dichloropropene	ND	0.58	ug/g
Trichloroethene (TCE)	ND	0.58	ug/g
Dibromochloromethane	ND	0.58	ug/g
1,1,2-Trichloroethane	ND	0.58	ug/g
2-Chloroethylvinyl ether	ND	0.58	ug/g
Bromoform	ND	0.58	ug/g
1,1,2,2-Tetrachloroethane	ND	0.58	ug/g
Tetrachloroethene (PCE)	ND	0.58	ug/g
Chlorobenzene	ND	0.58	ug/g
1,3-Dichlorobenzene	ND	0.58	ug/g
1,2-Dichlorobenzene	ND	0.58	ug/g
1,4-Dichlorobenzene	ND	0.58	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates   Report Date: 06/30/89

Sample ID: T6-West
Laboratory Number: C89039
Analysis Requested: 8020
Sample Matrix: Soil
Preservative: Cool
Condition: Appears Good

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/27/89
Date Analyzed: 06/27/89

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.12	ug/g
Toluene	ND	0.12	ug/g
Ethylbenzene	ND	0.12	ug/g
Chlorobenzene	ND	0.12	ug/g
p,m-Xylene	ND	0.12	ug/g
o-Xylene	ND	0.12	ug/g
1,4 Dichlorobenzene	ND	0.12	ug/g
1,3 Dichlorobenzene	ND	0.12	ug/g
1,2 Dichlorobenzene	ND	0.12	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	T7	Date Sampled:	06/15/89
Laboratory Number:	C89040	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/29/89
Sample Matrix:	Soil	Date Analyzed:	06/29/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.71	ug/g
Bromomethane	ND	0.71	ug/g
Dichlorodifluoromethane	ND	0.71	ug/g
Vinyl Chloride	ND	0.71	ug/g
Chloroethane	ND	0.71	ug/g
Methylene Chloride	ND	7.1	ug/g
1,1-Dichloroethene	ND	0.71	ug/g
Trichlorofluoromethane	ND	0.71	ug/g
1,1-Dichloroethane	ND	0.71	ug/g
trans-1,2-Dichloroethene	ND	0.71	ug/g
Chloroform	ND	0.71	ug/g
1,2-Dichloroethane	ND	0.71	ug/g
1,1,1-Trichloroethane	ND	0.71	ug/g
Carbon Tetrachloride	ND	0.71	ug/g
Bromodichloromethane	ND	0.71	ug/g
1,2-Dichloropropane	ND	0.71	ug/g
cis-1,3-Dichloropropene	ND	0.71	ug/g
trans-1,3-Dichloropropene	ND	0.71	ug/g
Trichloroethene (TCE)	ND	0.71	ug/g
Dibromochloromethane	ND	0.71	ug/g
1,1,2-Trichloroethane	ND	0.71	ug/g
2-Chloroethylvinyl ether	ND	0.71	ug/g
Bromoform	ND	0.71	ug/g
1,1,2,2-Tetrachloroethane	ND	0.71	ug/g
Tetrachloroethene (PCE)	ND	0.71	ug/g
Chlorobenzene	ND	0.71	ug/g
1,3-Dichlorobenzene	ND	0.71	ug/g
1,2-Dichlorobenzene	ND	0.71	ug/g
1,4-Dichlorobenzene	ND	0.71	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates   Report Date: 06/30/89

Sample ID:	T7	Date Sampled:	06/15/89
Laboratory Number:	C89040	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/29/89
Sample Matrix:	Soil	Date Analyzed:	06/29/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.14	ug/g
Toluene	ND	0.14	ug/g
Ethylbenzene	ND	0.14	ug/g
Chlorobenzene	ND	0.14	ug/g
p,m-Xylene	ND	0.14	ug/g
o-Xylene	ND	0.14	ug/g
1,4 Dichlorobenzene	ND	0.14	ug/g
1,3 Dichlorobenzene	ND	0.14	ug/g
1,2 Dichlorobenzene	ND	0.14	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	RP1-A	Date Sampled:	06/15/89
Laboratory Number:	C89041	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.71	ug/g
Bromomethane	ND	0.71	ug/g
Dichlorodifluoromethane	ND	0.71	ug/g
Vinyl Chloride	ND	0.71	ug/g
Chloroethane	ND	0.71	ug/g
Methylene Chloride	ND	0.71	ug/g
1,1-Dichloroethene	ND	0.71	ug/g
Trichlorofluoromethane	ND	0.71	ug/g
1,1-Dichloroethane	ND	0.71	ug/g
trans-1,2-Dichloroethene	ND	0.71	ug/g
Chloroform	ND	0.71	ug/g
1,2-Dichloroethane	ND	0.71	ug/g
1,1,1-Trichloroethane	ND	0.71	ug/g
Carbon Tetrachloride	ND	0.71	ug/g
Bromodichloromethane	ND	0.71	ug/g
1,2-Dichloropropane	ND	0.71	ug/g
cis-1,3-Dichloropropene	ND	0.71	ug/g
trans-1,3-Dichloropropene	ND	0.71	ug/g
Trichloroethene (TCE)	ND	0.71	ug/g
Dibromochloromethane	ND	0.71	ug/g
1,1,2-Trichloroethane	ND	0.71	ug/g
2-Chloroethylvinyl ether	ND	0.71	ug/g
Bromoform	ND	0.71	ug/g
1,1,2,2-Tetrachloroethane	ND	0.71	ug/g
Tetrachloroethene (PCE)	ND	0.71	ug/g
Chlorobenzene	ND	0.71	ug/g
1,3-Dichlorobenzene	ND	0.71	ug/g
1,2-Dichlorobenzene	ND	0.71	ug/g
1,4-Dichlorobenzene	ND	0.71	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates — Report Date: 06/30/89

Sample ID: RP1-A — Date Sampled: 06/15/89
Laboratory Number: C89041 — Date Received: 06/16/89
Analysis Requested: 8020 — Date Extracted: 06/28/89
Sample Matrix: Soil — Date Analyzed: 06/28/89
Preservative: Cool
Condition: Appears Good

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.14	ug/g
Toluene	ND	0.14	ug/g
Ethylbenzene	ND	0.14	ug/g
Chlorobenzene	ND	0.14	ug/g
p,m-Xylene	ND	0.14	ug/g
o-Xylene	ND	0.14	ug/g
1,4 Dichlorobenzene	ND	0.14	ug/g
1,3 Dichlorobenzene	ND	0.14	ug/g
1,2 Dichlorobenzene	ND	0.14	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	RP1-B	Date Sampled:	06/15/89
Laboratory Number:	C89042	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/29/89
Sample Matrix:	Soil	Date Analyzed:	06/29/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.2	ug/g
Bromomethane	ND	1.2	ug/g
Dichlorodifluoromethane	ND	1.2	ug/g
Vinyl Chloride	ND	1.2	ug/g
Chloroethane	4.3	1.2	ug/g
Methylene Chloride	ND	12.3	ug/g
1,1-Dichloroethene	ND	1.2	ug/g
Trichlorofluoromethane	ND	1.2	ug/g
1,1-Dichloroethane	ND	1.2	ug/g
trans-1,2-Dichloroethene	ND	1.2	ug/g
Chloroform	ND	1.2	ug/g
1,2-Dichloroethane	ND	1.2	ug/g
1,1,1-Trichloroethane	ND	1.2	ug/g
Carbon Tetrachloride	ND	1.2	ug/g
Bromodichloromethane	ND	1.2	ug/g
1,2-Dichloropropane	ND	1.2	ug/g
cis-1,3-Dichloropropene	ND	1.2	ug/g
trans-1,3-Dichloropropene	ND	1.2	ug/g
Trichloroethene (TCE)	ND	1.2	ug/g
Dibromochloromethane	ND	1.2	ug/g
1,1,2-Trichloroethane	ND	1.2	ug/g
2-Chloroethylvinyl ether	ND	1.2	ug/g
Bromoform	ND	1.2	ug/g
1,1,2,2-Tetrachloroethane	ND	1.2	ug/g
Tetrachloroethene (PCE)	ND	1.2	ug/g
Chlorobenzene	ND	1.2	ug/g
1,3-Dichlorobenzene	ND	1.2	ug/g
1,2-Dichlorobenzene	ND	1.2	ug/g
1,4-Dichlorobenzene	ND	1.2	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	RP1-B	Date Sampled:	06/15/89
Laboratory Number:	C89042	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/29/89
Sample Matrix:	Soil	Date Analyzed:	06/29/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.25	ug/g
Toluene	ND	0.25	ug/g
Ethylbenzene	ND	0.25	ug/g
Chlorobenzene	ND	0.25	ug/g
p,m-Xylene	ND	0.25	ug/g
o-Xylene	ND	0.25	ug/g
1,4 Dichlorobenzene	ND	0.25	ug/g
1,3 Dichlorobenzene	ND	0.25	ug/g
1,2 Dichlorobenzene	ND	0.25	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates Report Date: 07/07/89

Sample ID: RP2 Date Sampled: 06/15/89
Laboratory Number: C89043 Date Received: 06/16/89
Analysis Requested: Volatile Halocarbons Date Extracted: 06/29/89
Sample Matrix: Soil Date Analyzed: 06/29/89
Preservative: None
Condition: Cool

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.1	ug/g
Bromomethane	ND	1.1	ug/g
Dichlorodifluoromethane	ND	1.1	ug/g
Vinyl Chloride	ND	1.1	ug/g
Chloroethane	ND	1.1	ug/g
Methylene Chloride	ND	11.1	ug/g
1,1-Dichloroethene	ND	1.1	ug/g
Trichlorofluoromethane	ND	1.1	ug/g
1,1-Dichloroethane	ND	1.1	ug/g
trans-1,2-Dichloroethene	ND	1.1	ug/g
Chloroform	ND	1.1	ug/g
1,2-Dichloroethane	ND	1.1	ug/g
1,1,1-Trichloroethane	ND	1.1	ug/g
Carbon Tetrachloride	ND	1.1	ug/g
Bromodichloromethane	ND	1.1	ug/g
1,2-Dichloropropane	ND	1.1	ug/g
cis-1,3-Dichloropropene	ND	1.1	ug/g
trans-1,3-Dichloropropene	ND	1.1	ug/g
Trichloroethene (TCE)	ND	1.1	ug/g
Dibromochloromethane	ND	1.1	ug/g
1,1,2-Trichloroethane	ND	1.1	ug/g
2-Chloroethylvinyl ether	ND	1.1	ug/g
Bromoform	ND	1.1	ug/g
1,1,2,2-Tetrachloroethane	ND	1.1	ug/g
Tetrachloroethene (PCE)	ND	1.1	ug/g
Chlorobenzene	ND	1.1	ug/g
1,3-Dichlorobenzene	ND	1.1	ug/g
1,2-Dichlorobenzene	ND	1.1	ug/g
1,4-Dichlorobenzene	ND	1.1	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	RP2	Date Sampled:	06/15/89
Laboratory Number:	C89043	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/29/89
Sample Matrix:	Soil	Date Analyzed:	06/29/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.23	ug/g
Toluene	ND	0.23	ug/g
Ethylbenzene	ND	0.23	ug/g
Chlorobenzene	ND	0.23	ug/g
p,m-Xylene	ND	0.23	ug/g
o-Xylene	ND	0.23	ug/g
1,4 Dichlorobenzene	ND	0.23	ug/g
1,3 Dichlorobenzene	ND	0.23	ug/g
1,2 Dichlorobenzene	ND	0.23	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	BG-1	Date Sampled:	06/15/89
Laboratory Number:	C89044	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.60	ug/g
Bromomethane	ND	0.60	ug/g
Dichlorodifluoromethane	ND	0.60	ug/g
Vinyl Chloride	ND	0.60	ug/g
Chloroethane	ND	0.60	ug/g
Methylene Chloride	ND	0.60	ug/g
1,1-Dichloroethene	ND	0.60	ug/g
Trichlorofluoromethane	ND	0.60	ug/g
1,1-Dichloroethane	ND	0.60	ug/g
trans-1,2-Dichloroethene	ND	0.60	ug/g
Chloroform	ND	0.60	ug/g
1,2-Dichloroethane	ND	0.60	ug/g
1,1,1-Trichloroethane	ND	0.60	ug/g
Carbon Tetrachloride	ND	0.60	ug/g
Bromodichloromethane	ND	0.60	ug/g
1,2-Dichloropropane	0.61	0.60	ug/g
cis-1,3-Dichloropropene	ND	0.60	ug/g
trans-1,3-Dichloropropene	ND	0.60	ug/g
Trichloroethene (TCE)	ND	0.60	ug/g
Dibromochloromethane	ND	0.60	ug/g
1,1,2-Trichloroethane	ND	0.60	ug/g
2-Chloroethylvinyl ether	ND	0.60	ug/g
Bromoform	ND	0.60	ug/g
1,1,2,2-Tetrachloroethane	ND	0.60	ug/g
Tetrachloroethene (PCE)	ND	0.60	ug/g
Chlorobenzene	ND	0.60	ug/g
1,3-Dichlorobenzene	ND	0.60	ug/g
1,2-Dichlorobenzene	ND	0.60	ug/g
1,4-Dichlorobenzene	ND	0.60	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	BG-1	Date Sampled:	06/15/89
Laboratory Number:	C89044	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.12	ug/g
Toluene	ND	0.12	ug/g
Ethylbenzene	ND	0.12	ug/g
Chlorobenzene	ND	0.12	ug/g
p,m-Xylene	ND	0.12	ug/g
o-Xylene	ND	0.12	ug/g
1,4 Dichlorobenzene	ND	0.12	ug/g
1,3 Dichlorobenzene	ND	0.12	ug/g
1,2 Dichlorobenzene	ND	0.12	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Client: KW Brown and Associates

Report Date: 07/07/89

Sample ID: T5
Laboratory Number: C89033
Analysis Requested: 8010
Sample Matrix: Soil
Preservative: Cool
Condition: Appears Good

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/26/89
Date Analyzed: 06/26/89

Parameter	Spike Added	Sample Result	Spiked Sample	Percent Recovery
Chloroform	9.67	ND	9.87	102
1,2-Dichloroethane	9.67	ND	9.23	95.5
1,2-Dichloropropane	9.67	ND	7.70	78.5
1,1,2,2-Tetrachloroethane	9.67	ND	8.47	87.6

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/g.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Client: KW Brown and Associates

Report Date: 06/30/89

Sample ID: T5
Laboratory Number: C89033
Analysis Requested: 8020
Sample Matrix: Soil
Preservative: Cool
Condition: Appears Good

Date Sampled: 06/13/89
Date Received: 06/16/89
Date Extracted: 06/26/89
Date Analyzed: 06/26/89

Parameter	Spike Added	Sample Result	Spiked Sample Result	Percent Recovery
Benzene	9.67	ND	8.69	89.9
Toluene	9.67	ND	8.67	89.7
Ethylbenzene	9.67	ND	9.12	94.3
Chlorobenzene	9.67	ND	9.07	93.8

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/g.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Client: KW Brown and Associates   Report Date: 06/30/89

Sample ID: Pit-North   Date Sampled: 06/13/89
Laboratory Number: C89034   Date Received: 06/16/89
Analysis Requested: 8020   Date Extracted: 06/26/89
Sample Matrix: Soil   Date Analyzed: 06/26/89
Preservative: Cool
Condition: Appears Good

Parameter	Spike Added	Sample Result	Spiked Sample Result	Percent Recovery
Benzene	14.3	ND	13.2	92.3
Toluene	14.3	1.2	14.7	94.6
Ethylbenzene	14.3	ND	14.5	108
Chlorobenzene	14.3	ND	14.1	98.6

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/g.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Report Date: 06/30/89

Client: KW Brown and Associates

Sample ID:	RP1-A	Date Sampled:	06/15/89
Laboratory Number:	C89041	Date Received:	06/16/89
Analysis Requested:	8010	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Spike Added	Sample Result	Spiked Sample	Percent Recovery
trans-1,2-Dichloroethene	8.82	ND	8.47	96.0
1,2-Dichloroethane	8.82	ND	9.07	103
Trichloroethene (TCE)	8.82	ND	7.43	88.3
Tetrachloroethene (PCE)	8.82	ND	8.72	98.8

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/g.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Report Date: 06/30/89

Client: KW Brown and Associates

Sample ID: RP1-A
Laboratory Number: C89041
Analysis Requested: 8020
Sample Matrix: Soil
Preservative: Cool
Condition: Appears Good

Date Sampled: 06/15/89
Date Received: 06/16/89
Date Extracted: 06/28/89
Date Analyzed: 06/28/89

Parameter	Spike Added	Sample Result	Spiked Sample Result	Percent Recovery
Benzene	8.82	ND	7.76	87.9
Toluene	8.82	ND	7.81	88.6
Ethylbenzene	8.82	ND	8.10	91.4
Chlorobenzene	8.82	ND	8.00	90.7

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/g.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
METHOD BLANK

Client:	KW Brown and Associates	Report Date:	NA
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	NA
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/28/89
Sample Matrix:	NA	Date Analyzed:	06/28/89
Preservative:	NA		
Condition:	NA		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
METHOD BLANK

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	NA
Analysis Requested:	8020	Date Extracted:	06/28/89
Sample Matrix:	NA	Date Analyzed:	06/28/89
Preservative:	NA		
Condition:	NA		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.2	ug/l
Toluene	ND	0.2	ug/l
Ethylbenzene	ND	0.2	ug/l
Chlorobenzene	ND	0.2	ug/l
p,m-Xylene	ND	0.2	ug/l
o-Xylene	ND	0.2	ug/l
1,4 Dichlorobenzene	ND	0.2	ug/l
1,3 Dichlorobenzene	ND	0.2	ug/l
1,2 Dichlorobenzene	ND	0.2	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
METHOD BLANK

Client:	KW Brown and Associates	Report Date:	NA
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	NA
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/29/89
Sample Matrix:	NA	Date Analyzed:	06/29/89
Preservative:	NA		
Condition:	NA		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).
ND - Parameter not detected at the stated detection limit.
Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
METHOD BLANK

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	NA
Analysis Requested:	8020	Date Extracted:	06/29/89
Sample Matrix:	NA	Date Analyzed:	06/29/89
Preservative:	NA		
Condition:	NA		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.2	ug/l
Toluene	ND	0.2	ug/l
Ethylbenzene	ND	0.2	ug/l
Chlorobenzene	ND	0.2	ug/l
p,m-Xylene	ND	0.2	ug/l
o-Xylene	ND	0.2	ug/l
1,4 Dichlorobenzene	ND	0.2	ug/l
1,3 Dichlorobenzene	ND	0.2	ug/l
1,2 Dichlorobenzene	ND	0.2	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX DUPLICATE

Client: KW Brown and Associates Report Date: 06/30/89

Sample ID: T3-Center Date Sampled: 06/13/89
Laboratory Number: C89028 Date Received: 06/16/89
Analysis Requested: 8010 Date Extracted: 06/26/89
Sample Matrix: Soil Date Analyzed: 06/26/89
Preservative: Cool
Condition: Appears Good

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.59	ug/g
Bromomethane	ND	0.59	ug/g
Dichlorodifluoromethane	ND	0.59	ug/g
Vinyl Chloride	ND	0.59	ug/g
Chloroethane	ND	0.59	ug/g
Methylene Chloride	ND	0.59	ug/g
Trichlorofluoromethane	ND	0.59	ug/g
1,1-Dichloroethene	ND	0.59	ug/g
1,1-Dichloroethane	ND	0.59	ug/g
trans-1,2-Dichloroethene	ND	0.59	ug/g
Chloroform	ND	0.59	ug/g
1,2-Dichloroethane	ND	0.59	ug/g
1,1,1-Trichloroethane	ND	0.59	ug/g
Carbon Tetrachloride	ND	0.59	ug/g
Bromodichloromethane	ND	0.59	ug/g
1,2-Dichloropropane	ND	0.59	ug/g
Trichloroethene (TCE)	ND	0.59	ug/g
cis-1,3-Dichloropropene	ND	0.59	ug/g
trans-1,3-Dichloropropene	ND	0.59	ug/g
Dibromochloromethane	ND	0.59	ug/g
1,1,2-Trichloroethane	ND	0.59	ug/g
2-Chloroethylvinyl ether	ND	0.59	ug/g
Bromoform	ND	0.59	ug/g
1,1,2,2-Tetrachloroethane	ND	0.59	ug/g
Tetrachloroethene (PCE)	ND	0.59	ug/g
Chlorobenzene	ND	0.59	ug/g
1,3-Dichlorobenzene	ND	0.59	ug/g
1,2-Dichlorobenzene	ND	0.59	ug/g
1,4-Dichlorobenzene	ND	0.59	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).
ND - Parameter not detected at the stated detection limit.

Reviewed by

JMM

Jack M. Morgan, Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX DUPLICATE

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	T3-Center	Date Sampled:	06/13/89
Laboratory Number:	C89028	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/26/89
Sample Matrix:	Soil	Date Analyzed:	06/26/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.12	ug/g
Toluene	ND	0.12	ug/g
Ethylbenzene	ND	0.12	ug/g
Chlorobenzene	0.14	0.12	ug/g
p,m-Xylene	ND	0.12	ug/g
o-Xylene	ND	0.12	ug/g
1,4 Dichlorobenzene	ND	0.12	ug/g
1,3 Dichlorobenzene	ND	0.12	ug/g
1,2 Dichlorobenzene	ND	0.12	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	BG-1	Date Sampled:	06/15/89
Laboratory Number:	C89051	Date Received:	06/16/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	0.60	ug/g
Bromomethane	ND	0.60	ug/g
Dichlorodifluoromethane	ND	0.60	ug/g
Vinyl Chloride	ND	0.60	ug/g
Chloroethane	ND	0.60	ug/g
Methylene Chloride	ND	0.60	ug/g
1,1-Dichloroethene	ND	0.60	ug/g
Trichlorofluoromethane	ND	0.60	ug/g
1,1-Dichloroethane	ND	0.60	ug/g
trans-1,2-Dichloroethene	ND	0.60	ug/g
Chloroform	ND	0.60	ug/g
1,2-Dichloroethane	ND	0.60	ug/g
1,1,1-Trichloroethane	ND	0.60	ug/g
Carbon Tetrachloride	ND	0.60	ug/g
Bromodichloromethane	ND	0.60	ug/g
1,2-Dichloropropane	ND	0.60	ug/g
cis-1,3-Dichloropropene	ND	0.60	ug/g
trans-1,3-Dichloropropene	ND	0.60	ug/g
Trichloroethene (TCE)	ND	0.60	ug/g
Dibromochloromethane	ND	0.60	ug/g
1,1,2-Trichloroethane	ND	0.60	ug/g
2-Chloroethylvinyl ether	ND	0.60	ug/g
Bromoform	ND	0.60	ug/g
1,1,2,2-Tetrachloroethane	ND	0.60	ug/g
Tetrachloroethene (PCE)	ND	0.60	ug/g
Chlorobenzene	ND	0.60	ug/g
1,3-Dichlorobenzene	ND	0.60	ug/g
1,2-Dichlorobenzene	ND	0.60	ug/g
1,4-Dichlorobenzene	ND	0.60	ug/g

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Client:	KW Brown and Associates	Report Date:	06/30/89
Sample ID:	BG-1	Date Sampled:	06/15/89
Laboratory Number:	C89044	Date Received:	06/16/89
Analysis Requested:	8020	Date Extracted:	06/28/89
Sample Matrix:	Soil	Date Analyzed:	06/28/89
Preservative:	Cool		
Condition:	Appears Good		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.12	ug/g
Toluene	ND	0.12	ug/g
Ethylbenzene	ND	0.12	ug/g
Chlorobenzene	ND	0.12	ug/g
p,m-Xylene	ND	0.12	ug/g
o-Xylene	ND	0.12	ug/g
1,4 Dichlorobenzene	ND	0.12	ug/g
1,3 Dichlorobenzene	ND	0.12	ug/g
1,2 Dichlorobenzene	ND	0.12	ug/g

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

APPENDIX H
Analytical Data - Water

Inter·Mountain Laboratories, Inc.

Route 3, Box 256 College Station, TX 77840 Tel. (409) 776-8945

Login - 8907003 Water

K.W. BROWN & ASSOCIATES, INC.

P.O. # - 25603

Project: EPNG FLORA VISTA - 63712

7/18/89

Lab #	Location	pH, S.U.	EC, umhos/cm		TDS, 180c mg/l	TDS, Calc. mg/l	SAR	Total ALK mg/l	Oil & Grease, mg/l	Sulfite mg/l	Sulfide mg/l	HCO3 mg/l	CO3 mg/l	Chloride mg/l	Sulfate mg/l	Calcium mg/l
89052	EPNG - 1	7.7	2120	.84	1780	1630	1.31	313	2.0	< 2	< 1	382	0	33	894	386
89053	EPNG - 2A	7.7	1770	.86	1520	1460	0.74	295	1.5	< 2	< 1	360	0	44	775	376
89054	EPNG - 2B	7.6	1710	.84	1440	1370	0.73	269	< 1.0	< 2	< 1	328	0	33	746	354
89055	EPNG - 3	7.7	2140	.88	1890	1800	0.93	277	< 1.0	< 2	< 1	337	0	49	1030	440
89056	EPNG - 4	7.8	1970	.85	1670	1610	1.10	281	< 1.0	< 2	< 1	342	0	27	914	365
89056	EPNG 4 DUP	7.9	1970	.85	1670	1590	1.09	278	< 1.0	< 2	< 1	339	0	27	903	356
89057	OCD - 1	8.0	1360	.78	1060	999	0.62	311	< 1.0	< 2	< 1	379	0	27	454	264
89058	OCD - 2	7.6	1430	.81	1160	1090	0.55	296	4.1	< 2	< 1	361	0	16	544	302
89059	S - 1	7.8	943		674	658	0.38	231	< 1.0	< 2	< 1	281	0	27	270	189
89060	S - 5	7.8	927		600	608	0.54	252	< 1.0	< 2	< 1	308	0	22	228	153
89060	S-5 DUP	7.7	932		600	607	0.52	253	< 1.0	< 2	< 1	308	0	22	229	153
89061	KWBA - 1	7.7	1800		1490	1440	0.74	282	1.3	< 2	< 1	344	0	44	778	360
89062	KWBA - 2	6.2	4		1	4.5	0.00	1.9	< 1.0	< 2	< 1	2.3	0	0	2.5	1

2250

Inter·Mountain Laboratories, Inc.

Route 3, Box 256 College Station, TX 77840 Tel. (409) 776-8945

Login - 8907003 K.W. BROWN & ASSOCIATES, INC.

P.O. # - 25603 Project: EPNG FLORA VISTA - 63712 7/18/89

Lab #	Location	Magnesium mg/l	Potassium mg/l	Sodium mg/l	Cation Sum	Anion Sum	Difference %	Barium mg/l	Cadmium mg/l	Chromium mg/l	Selenium mg/l
89052	EPNG - 1	23	2	98	25.46	25.80	0.66	< 0.5	0.010	0.03	< 0.001
89053	EPNG - 2A	26	1.8	55	23.30	23.26	0.09	< 0.5	0.010	0.02	< 0.001
89054	EPNG - 2B	18	1.4	52	21.44	21.84	0.09	< 0.5	0.010	0.02	< 0.001
89055	EPNG - 3	35	1.9	75	28.10	28.29	0.34	< 0.5	0.010	0.02	< 0.001
89056	EPNG - 4	46	1.9	84	25.72	25.41	0.60	< 0.5	0.010	0.03	< 0.001
89056	EPNG 4 DUP	49	1.8	83	25.48	25.12	0.71	< 0.5	0.010	0.02	< 0.001
89057	OCD - 1	23	1.8	39	16.83	16.43	1.20	< 0.5	0.010	0.02	< 0.001
89058	OCD - 2	14	1.8	36	17.80	17.70	0.28	< 0.5	0.009	0.02	< 0.001
89059	S - 1	11	0.9	20	11.18	11.00	0.81	< 0.5	0.009	< 0.02	< 0.001
89060	S - 5	22	1.6	27	10.69	10.41	1.33	< 0.5	0.070	< 0.02	< 0.001
89060	S-5 DUP	21	1.6	26	10.55	10.43	0.57	< 0.5	0.010	< 0.02	< 0.001
89061	KWBA - 1	33	1.8	55	23.12	23.07	0.11	< 0.5	0.010	0.02	< 0.001
89062	KWBA - 2	0.6	0	0	0.10	0.09	5.26	< 0.5	0.005	< 0.02	< 0.001

PNAs
(Water)

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG 1
Laboratory Number: C89052
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-2A
Laboratory Number: C89053
Analysis Requested: 8100
Sample Matrix: Water
Preservative: Cool
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/31/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed By Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-2A
Laboratory Number: C89053DUP
Analysis Requested: 8100
Sample Matrix: Water
Preservative: Cool
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/31/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-2B
Laboratory Number: C89054
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-3
Laboratory Number: C89055
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-3 SPIKE
Laboratory Number: C89055
Analysis Requested: 8100
Sample Matrix: Soil
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/28/89

Parameter	Add	Found	Percent Recovery	Det. Limit	Units
Naphthalene	200	107	54%	0.0018	mg/l
Acenaphthalene				0.0023	mg/l
Acenaphthene	200	106	53%	0.0018	mg/l
Fluorene				0.0010	mg/l
Phenanthrene				0.0010	mg/l
Anthracene	200	113	57%	0.0010	mg/l
Fluoranthene				0.0010	mg/l
Pyrene	20	17	85%	0.0010	mg/l
Benzo(a)Anthracene				0.0010	mg/l
Chrysene	20	19	95%	0.0010	mg/l
Benzo(b)fluoranthene	10	7	70	0.0010	mg/l
Benzo(k)fluoranthene				0.0010	mg/l
Benzo(a)pyrene				0.0010	mg/l
Dibenzo(a,h)anthracene				0.0010	mg/l
Indeno(1,2,3-cd)pyrene	20	5	25%	0.0010	mg/l
Benzo(ghi)perylene				0.0010	mg/l
Benzo(j)fluoranthene				0.0010	mg/l
Dibenz(a,h)acridine				0.0010	mg/l
Dibenz(a,j)acridine				0.0010	mg/l
Dibenz(a,e)pyrene				0.0010	mg/l
Dibenz(a,h)pyrene				0.0010	mg/l
Dibenz(a,i)pyrene				0.0010	mg/l
3-Methylcholanthrene				0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-4
Laboratory Number: C89056
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-4
Laboratory Number: C89056DUP
Analysis Requested: 8100
Sample Matrix: Water
Preservative: Cool
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/23/89
Date Analyzed: 07/31/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	0.002	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	0.006	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: OCD-1
Laboratory Number: C89057
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: OCD-2
Laboratory Number: C89058
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: S-1
Laboratory Number: C89059
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/28/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: S-1	SPIKE	Date Sampled:	06/16/89
Laboratory Number:	C89059	Date Received:	06/20/89
Analysis Requested:	8100	Date Extracted:	06/22/89
Sample Matrix:	Water	Date Analyzed:	07/28/89
Preservative:	None		
Condition:	Cool		

Parameter	Add	Found	Percent Recovery	Det. Limit	Units
Naphthalene				0.0018	mg/l
Acenaphthalene	179	135	75%	0.0023	mg/l
Acenaphthene				0.0018	mg/l
Fluorene				0.0010	mg/l
Phenanthrene	179	132	74%	0.0010	mg/l
Anthracene				0.0010	mg/l
Fluoranthene	18	13	72%	0.0010	mg/l
Pyrene				0.0010	mg/l
Benzo(a)Anthracene	18	10	56%	0.0010	mg/l
Chrysene				0.0010	mg/l
Benzo(b)fluoranthene	18	13	72%	0.0010	mg/l
Benzo(k)fluoranthene				0.0010	mg/l
Benzo(a)pyrene	18	21	117%	0.0010	mg/l
Dibenzo(a,h)anthracene	18	5	28%	0.0010	mg/l
Indeno(1,2,3-cd)pyrene				0.0010	mg/l
Benzo(ghi)perylene				0.0010	mg/l
Benzo(j)fluoranthene				0.0010	mg/l
Dibenz(a,h)acridine	18	16	89%	0.0010	mg/l
Dibenz(a,j)acridine				0.0010	mg/l
Dibenz(a,e)pyrene				0.0010	mg/l
Dibenz(a,h)pyrene				0.0010	mg/l
Dibenz(a,i)pyrene				0.0010	mg/l
3-Methylcholanthrene				0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: S-5
Laboratory Number: C89060
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/14/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: S-5 DUPLICATE
Laboratory Number: C89060
Analysis Requested: 8100
Sample Matrix: Water
Preservative: Cool
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/23/89
Date Analyzed: 0714/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: KWBA-1
Laboratory Number: C89061
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/17/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: KWBA-2		Date Sampled:	06/17/89
Laboratory Number:	C89062	Date Received:	06/20/89
Analysis Requested:	8100	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/23/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: BLANK
Laboratory Number: BLANK
Analysis Requested: 8100
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/22/89
Date Received: 06/22/89
Date Extracted: 06/22/89
Date Analyzed: 06/23/89

Parameter	Concentration	Det. Limit	Units
Naphthalene	ND	0.0018	mg/l
Acenaphthalene	ND	0.0023	mg/l
Acenaphthene	ND	0.0018	mg/l
Fluorene	ND	0.0010	mg/l
Phenanthrene	ND	0.0010	mg/l
Anthracene	ND	0.0010	mg/l
Fluoranthene	ND	0.0010	mg/l
Pyrene	ND	0.0010	mg/l
Benzo(a)Anthracene	ND	0.0010	mg/l
Chrysene	ND	0.0010	mg/l
Benzo(b)fluoranthene	ND	0.0010	mg/l
Benzo(k)fluoranthene	ND	0.0010	mg/l
Benzo(a)pyrene	ND	0.0010	mg/l
Dibenzo(a,h)anthracene	ND	0.0010	mg/l
Indeno(1,2,3-cd)pyrene	ND	0.0010	mg/l
Benzo(ghi)perylene	ND	0.0010	mg/l
Benzo(j)fluoranthene	ND	0.0010	mg/l
Dibenz(a,h)acridine	ND	0.0010	mg/l
Dibenz(a,j)acridine	ND	0.0010	mg/l
Dibenz(a,e)pyrene	ND	0.0010	mg/l
Dibenz(a,h)pyrene	ND	0.0010	mg/l
Dibenz(a,i)pyrene	ND	0.0010	mg/l
3-Methylcholanthrene	ND	0.0010	mg/l

Method: Method 8100, Polynuclear Aromatic Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield for Jack Morgan
Reviewed by Jack Morgan, Organic Chemist

GLYCOLS
(Water)

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	EPNG-1	Date Sampled:	06/17/89
Laboratory Number:	C89052	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: EPNG-2A
Laboratory Number: C89053
Analysis Requested: Glycols
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	EPNG-2B	Date Sampled:	06/17/89
Laboratory Number:	C89054	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	EPNG-3	Date Sampled:	06/17/89
Laboratory Number:	C89055	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	EPNG-4	Date Sampled:	06/16/89
Laboratory Number:	C89056	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: OCD-1
Laboratory Number: C89057
Analysis Requested: Glycols
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	OCD-2	Date Sampled:	06/16/89
Laboratory Number:	C89058	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	S1	Date Sampled:	06/16/89
Laboratory Number:	C89059	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: S5
Laboratory Number: C89060
Analysis Requested: Glycols
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	KWBA-1	Date Sampled:	06/16/89
Laboratory Number:	C89061	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID:	KWBA-2	Date Sampled:	06/16/89
Laboratory Number:	C89062	Date Received:	06/20/89
Analysis Requested:	Glycols	Date Extracted:	06/21/89
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
MATRIX DUPLICATE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: EPNG-4
Laboratory Number: C89056
Analysis Requested: Glycols
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

** QUALITY ASSURANCE REPORT
MATRIX DUPLICATE

Report Date: 07/19/89

Client: KW Brown and Associates

Sample ID: S5
Laboratory Number: C89060
Analysis Requested: Glycols
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Ethylene Glycol	ND	5.0	mg/kg
Diethylene Glycol	ND	5.0	mg/kg

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

CHLORINATED HYDROCARBONS
(Water)

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-1
Laboratory Number: C89052
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.003	mg/l
1,4-Dichlorobenzene	ND	0.003	mg/l
1,2-Dichlorobenzene	ND	0.001	mg/l
Hexachlorobutadiene	ND	0.0007	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.0007	mg/l
2-Chloronapthalene	ND	0.0009	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-2A
Laboratory Number: C89053
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.003	mg/l
1,4-Dichlorobenzene	ND	0.003	mg/l
1,2-Dichlorobenzene	ND	0.001	mg/l
Hexachlorobutadiene	ND	0.0007	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.0007	mg/l
2-Chloronapthalene	ND	0.0009	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-2B
Laboratory Number: C89054
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.003	mg/l
1,4-Dichlorobenzene	ND	0.003	mg/l
1,2-Dichlorobenzene	ND	0.001	mg/l
Hexachlorobutadiene	ND	0.0007	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.0007	mg/l
2-Chloronapthalene	ND	0.0009	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

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Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-3
Laboratory Number: C89055
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

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Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-3 DUPLICATE
Laboratory Number: C89055
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-4
Laboratory Number: C89056
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: EPNG-4 DUPLICATE
Laboratory Number: C89056
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: OCD-1
Laboratory Number: C89057
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.003	mg/l
1,4-Dichlorobenzene	ND	0.003	mg/l
1,2-Dichlorobenzene	ND	0.001	mg/l
Hexachlorobutadiene	ND	0.0007	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.0007	mg/l
2-Chloronapthalene	ND	0.0009	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

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Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: OCD-2
Laboratory Number: C89058
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.003	mg/l
1,4-Dichlorobenzene	ND	0.003	mg/l
1,2-Dichlorobenzene	ND	0.001	mg/l
Hexachlorobutadiene	ND	0.0007	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.0007	mg/l
2-Chloronapthalene	ND	0.0009	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

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Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: S-1
Laboratory Number: C89059
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

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Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: S-5
Laboratory Number: C89060
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield
Reviewed by Lisa Mayfield

Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: S-5 DUPLICATE
Laboratory Number: C89060
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: KWBA-1
Laboratory Number: C89061
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/21/89
Date Analyzed: 07/27/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.003	mg/l
1,4-Dichlorobenzene	ND	0.003	mg/l
1,2-Dichlorobenzene	ND	0.001	mg/l
Hexachlorobutadiene	ND	0.0007	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.0007	mg/l
2-Chloronapthalene	ND	0.0009	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

iml
Inter-Mountain
Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Sample ID: KWBA-2
Laboratory Number: C89062
Analysis Requested: 8120
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: 06/22/89
Date Analyzed: 07/25/89

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.003	mg/l
1,4-Dichlorobenzene	ND	0.003	mg/l
1,2-Dichlorobenzene	ND	0.001	mg/l
Hexachlorobutadiene	ND	0.0007	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.0007	mg/l
2-Chloronapthalene	ND	0.0009	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

Inter-Mountain Laboratories, Inc.

Route 3, Box 256
College Station, Texas 77840
Tel. (409) 776-8945

Report Date: 08/02/89

Client: K.W.BROWN AND ASSOCIATES

Sample ID: BLANK		Date Sampled:	06/16/89
Laboratory Number:	BLANK	Date Received:	06/20/89
Analysis Requested:	8120	Date Extracted:	06/22/89
Sample Matrix:	Water	Date Analyzed:	07/27/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
1,3-Dichlorobenzene	ND	0.005	mg/l
1,4-Dichlorobenzene	ND	0.005	mg/l
1,2-Dichlorobenzene	ND	0.002	mg/l
Hexachlorobutadiene	ND	0.001	mg/l
1,2,4-Trichlorobenzene	ND	0.0001	mg/l
Hexachlorocyclopentadiene	ND	0.001	mg/l
2-Chloronapthalene	ND	0.002	mg/l
Hexachlorobenzene	ND	0.0001	mg/l

Method: Method 8120, Chlorinated Hydrocarbons, SW-846, USEPA, (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Lisa Mayfield

Reviewed by Lisa Mayfield

VOLATILES
(Water)

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	S-5	Date Sampled:	06/16/89
Laboratory Number:	C89060	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	1.2	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Client: KW Brown and Associates

Report Date: 07/07/89

Sample ID: S-5
Laboratory Number: C89060
Analysis Requested: 8020
Sample Matrix: Water
Preservative: Cool

Date Sampled: 06/16/89
Date Received: 06/20/89
Date Extracted: NA
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Benzene	0.24	0.20	ug/l
Toluene	0.32	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	EPNG-1	Date Sampled:	06/17/89
Laboratory Number:	C89052	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	2.1	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	EPNG-1	Date Sampled:	06/17/89
Laboratory Number:	C89052	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	0.34	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	EPNG-2A	Date Sampled:	06/17/89
Laboratory Number:	C89053	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	EPNG-2A	Date Sampled:	06/17/89
Laboratory Number:	C89053	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	8.1	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	37.4	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	162	0.20	ug/l
o-Xylene	30.4	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	EPNG-2B	Date Sampled:	06/17/89
Laboratory Number:	C89054	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	EPNG-2B	Date Sampled:	06/17/89
Laboratory Number:	C89054	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	1.6	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	1.2	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	10.8	0.20	ug/l
o-Xylene	1.3	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	EPNG-3	Date Sampled:	06/16/89
Laboratory Number:	C89055	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/29/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	EPNG-3	Date Sampled:	06/16/89
Laboratory Number:	C89055	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/29/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	0.4	0.20	ug/l
Toluene	0.33	0.20	ug/l
Ethylbenzene	4.3	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	13.1	0.20	ug/l
o-Xylene	0.44	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	EPNG-4	Date Sampled:	06/16/89
Laboratory Number:	C89056	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	EPNG-4	Date Sampled:	06/16/89
Laboratory Number:	C89056	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	0.95	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	OCD-1	Date Sampled:	06/16/89
Laboratory Number:	C89057	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	1.3	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	OCD-1	Date Sampled:	06/16/89
Laboratory Number:	C89057	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	OCD-2	Date Sampled:	06/16/89
Laboratory Number:	C89058	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	OCD-2	Date Sampled:	06/16/89
Laboratory Number:	C89058	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates   Report Date: 07/07/89

Sample ID: S-1   Date Sampled: 06/16/89
Laboratory Number: C89059   Date Received: 06/20/89
Analysis Requested: Volatile Halocarbons   Date Extracted: NA
Sample Matrix: Water   Date Analyzed: 06/30/89
Preservative: None
Condition: Cool

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	1.6	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).
ND - Parameter not detected at the stated detection limit.
Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	S-1	Date Sampled:	06/16/89
Laboratory Number:	C89059	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	S-5	Date Sampled:	06/16/89
Laboratory Number:	C89060	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	S-5	Date Sampled:	06/16/89
Laboratory Number:	C89060	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	0.26	0.20	ug/l
Toluene	0.32	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	KWBA-1	Date Sampled:	06/17/89
Laboratory Number:	C89061	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

EPNG-2A (Dup)

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID: KWBA-1
Laboratory Number: C89061
Analysis Requested: 8020
Sample Matrix: Water
Preservative: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: NA
Date Analyzed: 06/30/89

Parameter	Concentration	Det. Limit	Units
Benzene	4.4	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	22.2	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	115	0.20	ug/l
o-Xylene	15.7	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Client: KW Brown and Associates | Report Date: 07/07/89

Sample ID: KWBA-2 | Date Sampled: 06/17/89
Laboratory Number: C89062 | Date Received: 06/20/89
Analysis Requested: Volatile Halocarbons | Date Extracted: NA
Sample Matrix: Water | Date Analyzed: 07/01/89
Preservative: None
Condition: Cool

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	1.2	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

Report Date: 07/07/89

Client: KW Brown and Associates

Sample ID:	KWBA-2	Date Sampled:	06/17/89
Laboratory Number:	C89062	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
TRAVEL BLANK

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/29/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	1.2	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
TRAVEL BLANK

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/29/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
TRAVEL BLANK

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	1.1	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
TRAVEL BLANK

Client: KW Brown and Associates | Report Date: 07/07/89

Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
TRAVEL BLANK

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	1.2	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
TRAVEL BLANK

Client: KW Brown and Associates — Report Date: 07/07/89

Sample ID:	NA	Date Sampled:	NA
Laboratory Number:	NA	Date Received:	06/20/89
Analysis Requested:	8020	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	07/01/89
Preservative:	Cool		

Parameter	Concentration	Det. Limit	Units
Benzene	ND	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Client: KW Brown and Associates | Report Date: 07/07/89

Sample ID:	OCD-1	Date Sampled:	06/17/89
Laboratory Number:	C89057	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Spike Added	Sample Result	Spiked Sample	Percent Recovery
1,1,2-Trichloroethane	20.0	ND	18.7	93.3
1,2-Dichloroethane	20.0	ND	17.2	84.9
Tetrachloroethene	20.0	ND	21.1	105
1,1,2,2-Tetrachloroethane	20.0	ND	17.1	85.4

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/l.

Reviewed by

JMM

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Client: KW Brown and Associates   Report Date: 07/03/89

Sample ID: OCD-1   Date Sampled: 06/16/89
Laboratory Number: C89057   Date Received: 06/20/89
Analysis Requested: 8020   Date Extracted: NA
Sample Matrix: Water   Date Analyzed: 06/30/89
Preservative: Cool

Parameter	Spike Added	Sample Result	Spiked Sample Result	Percent Recovery
Benzene	20.0	ND	20.8	104
Toluene	20.0	ND	23.2	116
Ethylbenzene	20.0	ND	21.6	108
Chlorobenzene	20.0	ND	20.9	105

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/l.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Client: KW Brown and Associates Report Date: 07/07/89

Sample ID: EPNG-2B
Laboratory Number: C89054
Analysis Requested: Volatile Halocarbons
Sample Matrix: Water
Preservative: None
Condition: Cool

Date Sampled: 06/17/89
Date Received: 06/20/89
Date Extracted: NA
Date Analyzed: 07/03/89

Parameter	Spike Added	Sample Result	Spiked Sample	Percent Recovery
1,1,1-Trichloroethane	20.0	ND	20.3	102
1,1-Dichloroethene	20.0	ND	20.1	101
Tetrachloroethene	20.0	ND	19.8	99
Trichloroethene	20.0	ND	16.7	83.5
Dibromochloromethane	20.0	ND	17.2	86
Chloroform	20.0	ND	19.3	96.5

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).
ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/l.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
MATRIX SPIKE

Client: KW Brown and Associates   Report Date: 07/03/89

Sample ID: EPNG-2B   Date Sampled: 06/17/89
Laboratory Number: C89054   Date Received: 06/20/89
Analysis Requested: 8020   Date Extracted: NA
Sample Matrix: Water   Date Analyzed: 07/01/89
Preservative: Cool

Parameter	Spike Added	Sample Result	Spiked Sample Result	Percent Recovery
Benzene	20.0	1.6	21.5	99.3
Toluene	20.0	ND	20.1	101
Ethylbenzene	20.0	1.2	21.2	100
Chlorobenzene	20.0	ND	20.1	100

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments: All concentrations in ug/l.

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Client:	KW Brown and Associates	Report Date:	07/07/89
Sample ID:	EPNG-4	Date Sampled:	06/16/89
Laboratory Number:	C89056	Date Received:	06/20/89
Analysis Requested:	Volatile Halocarbons	Date Extracted:	NA
Sample Matrix:	Water	Date Analyzed:	06/30/89
Preservative:	None		
Condition:	Cool		

Parameter	Concentration	Det. Limit	Units
Chloromethane	ND	1.0	ug/l
Bromomethane	ND	1.0	ug/l
Dichlorodifluoromethane	ND	1.0	ug/l
Vinyl Chloride	ND	1.0	ug/l
Chloroethane	ND	1.0	ug/l
Methylene Chloride	ND	1.0	ug/l
1,1-Dichloroethene	ND	1.0	ug/l
Trichlorofluoromethane	ND	1.0	ug/l
1,1-Dichloroethane	ND	1.0	ug/l
trans-1,2-Dichloroethene	ND	1.0	ug/l
Chloroform	ND	1.0	ug/l
1,2-Dichloroethane	ND	1.0	ug/l
1,1,1-Trichloroethane	ND	1.0	ug/l
Carbon Tetrachloride	ND	1.0	ug/l
Bromodichloromethane	ND	1.0	ug/l
1,2-Dichloropropane	ND	1.0	ug/l
cis-1,3-Dichloropropene	ND	1.0	ug/l
trans-1,3-Dichloropropene	ND	1.0	ug/l
Trichloroethene (TCE)	ND	1.0	ug/l
Dibromochloromethane	ND	1.0	ug/l
1,1,2-Trichloroethane	ND	1.0	ug/l
2-Chloroethylvinyl ether	ND	1.0	ug/l
Bromoform	ND	1.0	ug/l
1,1,2,2-Tetrachloroethane	ND	1.0	ug/l
Tetrachloroethene (PCE)	ND	1.0	ug/l
Chlorobenzene	ND	1.0	ug/l
1,3-Dichlorobenzene	ND	1.0	ug/l
1,2-Dichlorobenzene	ND	1.0	ug/l
1,4-Dichlorobenzene	ND	1.0	ug/l

Method: Method 8010, Halogenated Volatile Organics, SW-846, USEPA (Sept. 1986).
ND - Parameter not detected at the stated detection limit.
Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

** QUALITY ASSURANCE REPORT
FIELD DUPLICATE

Client: KW Brown and Associates Report Date: 07/07/89

Sample ID: EPNG-4 Date Sampled: 06/16/89
Laboratory Number: C89056 Date Received: 06/20/89
Analysis Requested: 8020 Date Extracted: NA
Sample Matrix: Water Date Analyzed: 06/30/89
Preservative: Cool

Parameter	Concentration	Det. Limit	Units
Benzene	0.76	0.20	ug/l
Toluene	ND	0.20	ug/l
Ethylbenzene	ND	0.20	ug/l
Chlorobenzene	ND	0.20	ug/l
p,m-Xylene	ND	0.20	ug/l
o-Xylene	ND	0.20	ug/l
1,4 Dichlorobenzene	ND	0.40	ug/l
1,3 Dichlorobenzene	ND	0.30	ug/l
1,2 Dichlorobenzene	ND	0.40	ug/l

Method: Method 8020, Aromatic Volatile Organics, SW-846, USEPA (Sept. 1986).

ND - Parameter not detected at the stated detection limit.

Comments:

Reviewed by

Jack M. Morgan
Organic Analyst

APPENDIX I
Boring Logs/Well Construction Diagrams

Sym	Samp % Rec	Depth (MSL)	Depth (Feet)
	Continuous Auger Cuttings		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

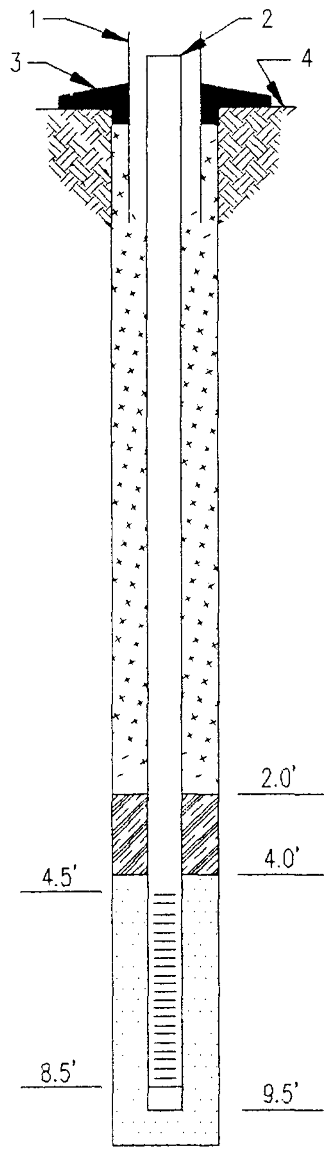
Geologic Description

0'-1' Sandy Loam Top Soil
1'-10' Sand/Gravel/Cobbles; Very Poorly Sorted; Cobbles Up To 12" In Diameter.

TD = 10'

ST=Shelby Tube | SS=Split Spoon | ☒ C=Cuttings

Monitoring Well	☒
Piezometer	
Protective Casing	No / ☒ YES



Depths in Feet from Ground Surface (Not to Scale)

Design Specifications

Elevations: 1 5486.97 2 5487.03
3 5483.88 4 5483.81

Coordinates: N 10254.10 E 10214.39

Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐

Casing Diameter: ☒ 2" ☐ 3" ☐ 4" ☐ 6" ☐

Type of Screen: ☐ 0.008 ☒ 0.010 ☐

Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐

Sand Pack: #10 Colorado Silica Sand

Bentonite Seal: ☐ 1/2" Pellets ☐ Hole Plug ☐ Slurry ☒ 1/4" Pellets ☐

Grout Type: Portland I & II Weight:

Bore Hole Diameter: 6 1/4"

Drill Rig: ☐ Hollow Stem ☒ Rotary ☐

Drilled By: MO-TE, Farmington, NM

Logged By: S. Johnson

Completion Date: 6-14-89

Date	D-T-W	MSL	Date	Field pH	Field EC
6-15-89	8.03	5479.00	6-16-89	7.45	1600 u
6-15-89	8.47	5478.56	6-16-89	7.45	2000 u
6-16-89	8.39	5478.64	6-17-89	NA	2000 u

Comments: Purged 50 gallons from well during development.

EL PASO NATURAL GAS CO.

MONITORING WELL EPNG-1

Project: EPNG Flora Vista 63712
Location: Flora Vista, NM

K.W. BROWN & ASSOCIATES, INC.

Sym	Samp % Rec	Depth (MSL)	Depth (Feet)
	Continuous Auger Cuttings.		1–25

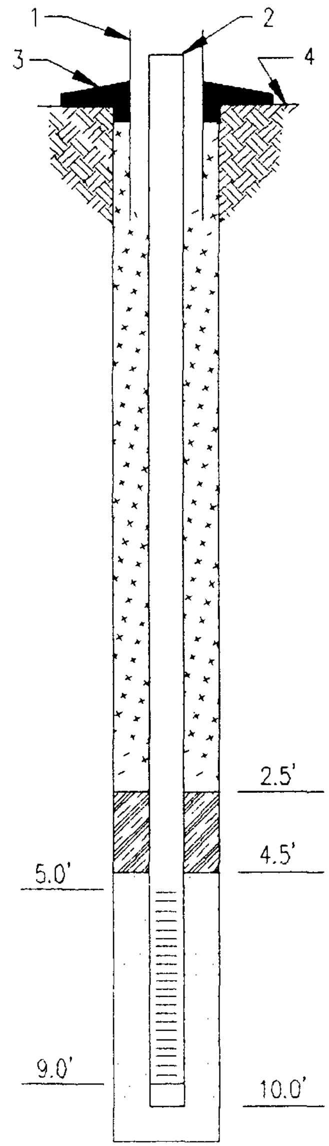
Geologic Description

0'-1' Sandy Loam Top Soil
1'-10' Sand/Gravel/Cobbles; Very Poorly Sorted; Cobbles Up to 12" In Diameter. Black Staining Noted At A Depth Of Approximately 5'.

TD = 10'

☐ ST=Shelby Tube ☐ SS=Split Spoon ☒ C=Cuttings

Monitoring Well	☒
Piezometer	
Protective Casing	No ☐ ~~YES~~ ☒



Depths in Feet from Ground Surface (Not to Scale)

Design Specifications

Elevations: 1 5486.48 2 5486.54
3 5483.04 4 5482.94
Coordinates: N 10085.04 E 10109.17
Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐
Casing Diameter: ☒ 2" ☐ 3" ☐ 4" ☐ 6" ☐
Type of Screen: ☐ 0.008 ☒ 0.010 ☐
Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐
Sand Pack: #10 Colorado Silica Sand
Bentonite Seal: ☐ 1/2" Pellets ☐ Hole Plug ☐ Slurry ☒ 1/4" Pellets ☐
Grout Type: Portland I & II Weight:
Bore Hole Diameter: 5 5/8"
Drill Rig: ☐ Hollow Stem ☒ Rotary ☐
Drilled By: MO-TE, Farmington, NM
Logged By: S. Johnson
Completion Date: 6-14-89

Date	D-T-W	MSL	Date	Field pH	Field EC
6-15-89	8.19	5478.35	6-17-89	7.52	1610 μ
6-15-89	8.50	5478.04	6-17-89	7.55	1650 μ
6-16-89	7.96	5478.58			

Comments: Purged 40 Gallons From Well During Well Development.

El PASO NATURAL GAS CO.

MONITORING WELL EPNG-2A

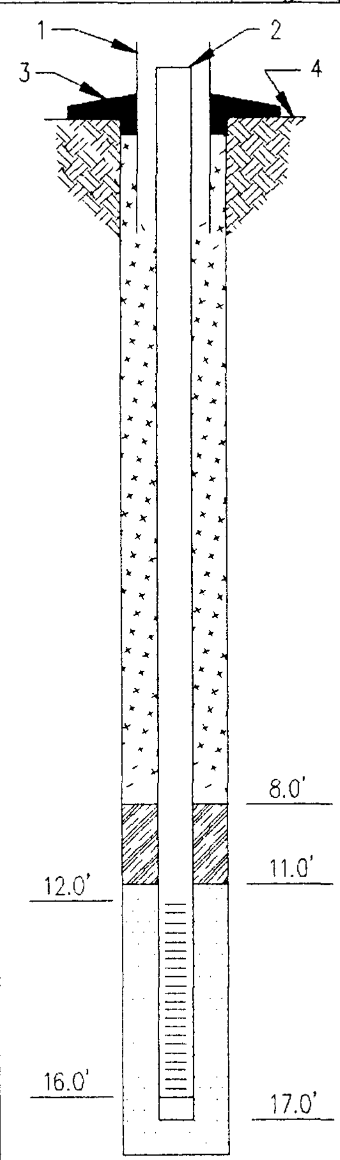
Project: EPNG Flora Vista 63712
Location: Flora Vista, NM

K.W. BROWN & ASSOCIATES, INC.

Sym	Samp % Rec	Depth (MSL)	Depth (Feet)	Geologic Description
	Continuous Auger Cuttings.		1–25	0'-20' Sand/Gravel/Cobbles; Very Poorly Sorted; Cobbles Up To 12" In Diameter. Black Staining Noted At A Depth Of Approximately 5'.
				TD = 20'

ST=Shelby Tube | SS=Split Spoon | ☒ C=Cuttings

Monitoring Well	☒
Piezometer	
Protective Casing	No / ☒ Yes



Depths in Feet from Ground Surface (Not to Scale)

Design Specifications

Elevations: 1 5485.67 2 5485.68
3 5482.89 4 5482.92

Coordinates: N 10080.56 E 10106.37

Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐

Casing Diameter: ☒ 2" ☐ 3" ☐ 4" ☐ 6" ☐

Type of Screen: ☐ 0.008 ☒ 0.010 ☐

Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐

Sand Pack: #10 Colorado Silica Sand

Bentonite Seal: ☐ 1/2" Pellets ☐ Hole Plug ☐ Slurry ☒ 1/4" Pellets ☐

Grout Type: Portland I & II Weight:

Bore Hole Diameter: 5 5/8"

Drill Rig: ☐ Hollow Stem ☒ Rotary ☐

Drilled By: MO-TE, Farmington, NM

Logged By: S. Johnson

Completion Date: 6-14-89

Date	D-T-W	MSL	Date	Field pH	Field EC
6-15-89	7.16	5478.52	6-17-89	7.55	1600 u
6-15-89	7.19	5478.49	6-17-89	7.52	1500 u
6-16-89	7.10	5478.58	6-17-89	7.44	1600 u

Comments: Purged 45 Gallons During Well Development.

El PASO NATURAL GAS CO.

MONITORING WELL EPNG-2B

Project: EPNG Flora Vista 63712

Location: Flora Vista, NM

K.W. BROWN & ASSOCIATES, INC.

Sym	Samp % Rec	Depth (MSL)	Depth (Feet)
			1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
			16
			17
			18
			19
			20
			21
			22
			23
			24
			25

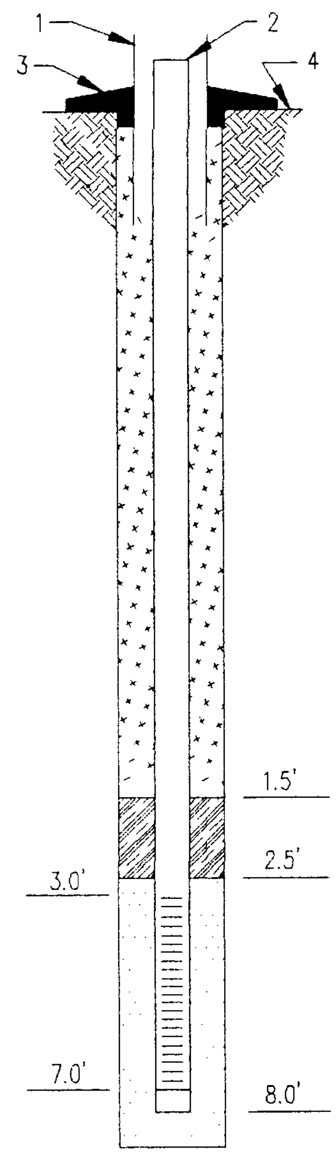
Geologic Description

0'-2' Sand/Gravel/Cobbles
2'-4.5' Sandy Clay?
Reserv Pit Cuttings?
4.5'-8' Sand/Gravel/Cobbles
Black Staining Noted At 5'

TD = 8.0'

ST=Shelby Tube | SS=Split Spoon | ☒ C=Cuttings

Monitoring Well	☒
Piezometer	
Protective Casing	No / ☒ Yes



Depths in Feet from Ground Surface (Not to Scale)

Design Specifications

Elevations: 1 5484.87 2 5484.90
3 5481.49 4 5481.85

Coordinates: N 10006.18 E 10104.09

Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐

Casing Diameter: ☒ 2" ☐ 3" ☐ 4" ☐ 6" ☐

Type of Screen: ☐ 0.008 ☒ 0.010 ☐

Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐

Sand Pack: #10 Colorado Silica Sand

Bentonite Seal: ☐ 1/2" Pellets ☐ Hole Plug ☐ Slurry ☒ 1/4" Pellets ☐

Grout Type: Portland I & II Weight:

Bore Hole Diameter: 5 5/8"

Drill Rig: ☐ Hollow Stem ☒ Rotary ☐ Solid Auger

Drilled By: MO-TE, Farmington, NM

Logged By: S. Johnson

Completion Date: 6-14-89

Date	D-T-W	MSL	Date	Field pH	Field EC
6-15-89	6.97	5477.93	6-16-89	7.40	1800 μ
6-15-89	7.03	5477.87	6-16-89	7.46	1800 μ
6-16-89	6.93	5477.97	6-16-89	7.47	1800 μ

Comments: Purged 80 Gallons From Well During Development.

El PASO NATURAL GAS CO.

MONITORING WELL EPNG-3

Project: EPNG Flora Vista 63712
Location: Flora Vista, NM

K.W. BROWN & ASSOCIATES, INC.

Sym	Samp % Rec	Depth (MSL)	Depth (Feet)
		Continuous Auger Cuttings.	1–25

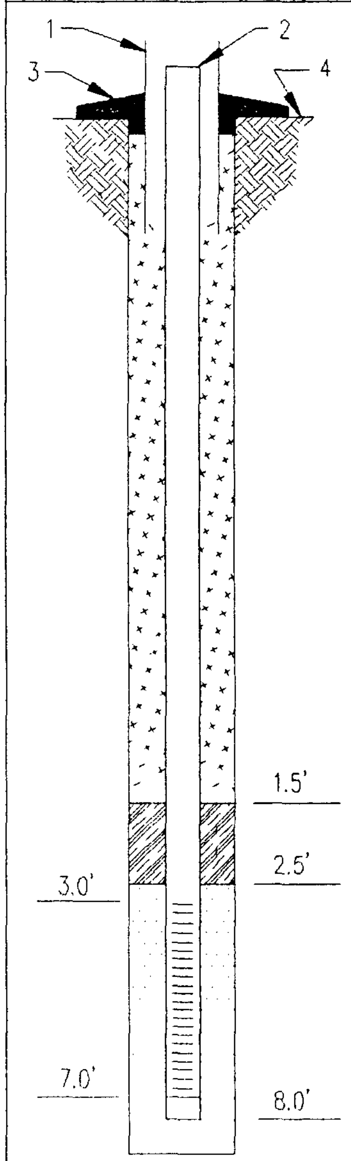
Geologic Description

0'–8 1/2' Sand/Gravel/Cobbles;
Coarse Grained Sand; Very Poorly Sorted; Cobbles Up To 12" Diameter.

TD = 8.5'

ST=Shelby Tube | SS=Split Spoon | ☒ C=Cuttings

Monitoring Well ☒
Piezometer
Protective Casing No | Yes ☒



Depths in Feet from Ground Surface (Not to Scale)

Design Specifications

Elevations: 1 5483.83 2 5483.87
3 5480.50 4 5480.45
Coordinates: N 9954.27 E 10067.09
Type of Casing: ☒ PVC Sched. 40 Flush Thread ☐ Stainless Steel ☐
Casing Diameter: ☒ 2" ☐ 3" ☐ 4" ☐ 6" ☐
Type of Screen: ☐ 0.008 ☒ 0.010 ☐
Screen Style: ☒ Machine Slot ☐ Wire Wrap ☐
Sand Pack: #10 Colorado Silica Sand
Bentonite Seal: ☐ 1/2" Pellets ☐ Hole Plug ☐ Slurry ☒ 1/4" Pellets ☐
Grout Type: Portland I & II Weight:
Bore Hole Diameter: 6 1/2"
Drill Rig: ☐ Hollow Stem ☒ Rotary ☐
Drilled By: MO-TE, Farmington, NM
Logged By: S. Johnson
Completion Date: 6-14-89

Date	D-T-W	MSL	Date	Field pH	Field EC
6-15-89	6.22	5477.65	6-16-89	7.10	1700 μ
6-15-89	6.30	5477.57	6-16-89	NA	1800 μ
6-16-89	6.19	5477.68			

Comments: Total Of 70 Gallons Purged From Well During Development.

El PASO NATURAL GAS CO.

MONITORING WELL EPNG-4

Project: EPNG Flora Vista 63712
Location: Flora Vista, NM

K.W. BROWN & ASSOCIATES, INC.

El Paso
Natural Gas Company

P. O. BOX 4990
FARMINGTON, NEW MEXICO 87499
PHONE: 505-325-2841

June 30, 1989

RECEIVED

JUL 10 1989

OIL CONSERVATION DIV.
SANTA FE

Mr. Dave Englert
New Mexico Oil Conservation Division
310 Old Santa Fe Trail
Santa Fe, New Mexico 87504

Re: Flora Vista Groundwater Investigation

Dear Mr. Englert:

Enclosed is a copy of the field notes that K. W. Brown gathered during their investigation at the Flora Vista Site.

K. W. Brown is currently working on organizing the material they collected in the field. Laboratory results from Intermountain Laboratory should be available by mid-July.

If you have any questions concerning the project, please call me at 599-2176.

Sincerely,

Anu N. Pundari

Anu N. Pundari
Compliance Engineer

anp

Enclosure

cc: K. E. Beasley, III

EL PASO NATURAL GAS
FLORA VISTA SITE INVESTIGATION

A. PUNDARI (EPNG)
B. SPEAKE (KWB&A)
S. JOHNSON (KWB&A)

6/12/89 SAFETY MEETING, 7:00 AM @ THE AZTEC FIELD OFFICE

ON-SITE @ 9:00 AM.

WEATHER: PARTLY CLOUDY, BREEZY, 75°F

TRENCHES LAID OUT FIRST.

D-T-W MEASUREMENTS MADE.

(10:30 AM) DATE	WELL I.D.	D-T-W (FEET)	T.O.C. (FT, MSL)	GW. EL (FT, MSL)
6-12-89	OCD-1	6.32	100.61	94.29
	OCD-2	(WELL SILTED IN)		N/A
	OCD-3	6.33	101.90	95.57
	OCD-4	(WELL SILTED IN)		N/A
	OCD-5	4.85	100.18	95.33
	S-1	5.35	100.48	95.13
	SX-1	4.77	99.74	94.97
	SX-2	(CASING WELDED SHUT)		
	S-~~3~~2	(ACTIVELY PUMPING - WELLHEAD SEALED)		
	S-~~4~~3			
	S-~~5~~4			
	S-5	6.92	99.45	92.53
S-6 →	SURVEY PT. 20	(ACTIVELY PUMPING - WELLHEAD SEALED)		
	SURVEY PT. 19	(INACTIVE - WELLHEAD BOLTED BUT LOOSE)		
S-7 →	SURVEY PT. 21	(ACTIVELY PUMPING - WELLHEAD SEALED)		

BROKE FOR LUNCH @ 12:00 PM

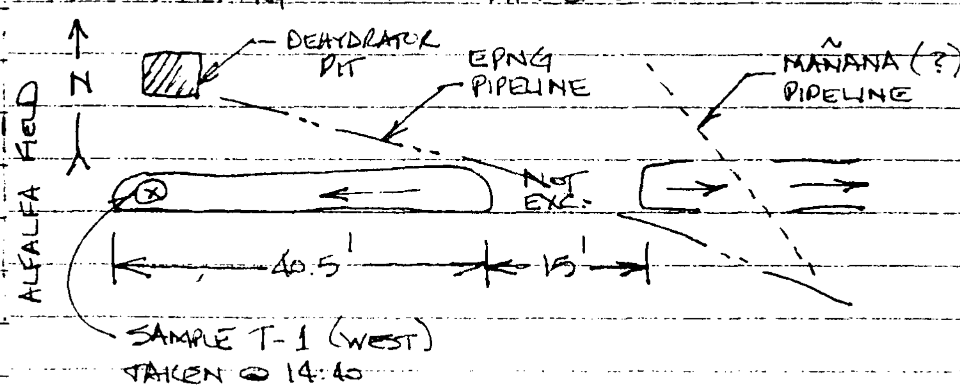
BACK ON-SITE @ 1:00 PM

BACKHOE ON-SITE @ 1:20 PM

6-12-89
1:26 PM

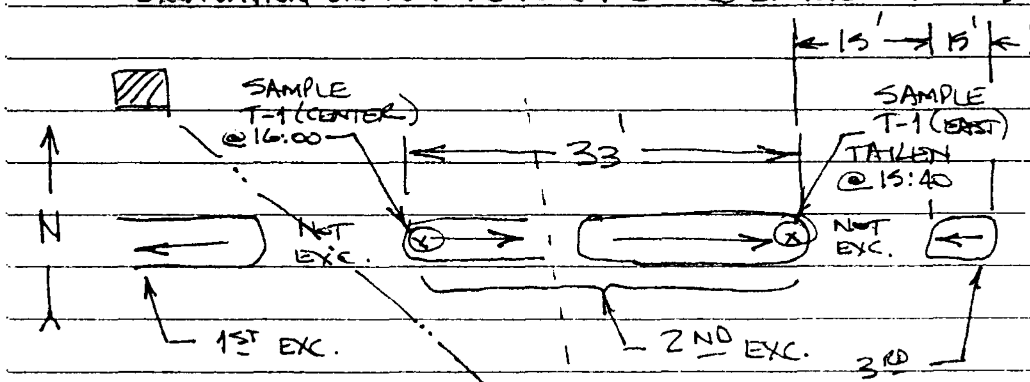
TRENCH #1 (T-1)

OIL FIRST ENCOUNTERED @ 4 FEET.
TRENCH SIDES SLOPED BY BACKHOE OPERATOR.
EXCAVATED MATERIAL IS COARSE SAND W/LARGE WELL-ROUNDED COBBLES (UP TO 12 IN ϕ).
SOIL & COBBLES STAINED BLUE/BLACK.
FOUL PETROLEUM ODOR EMANATING FROM EXCAVATION.
GROUNDWATER FIRST ENCOUNTERED @ 5 FEET.
GROUNDWATER HAS FILM OF HYDROCARBON SEEN AS DROPLETS OF OIL; NO RAINBOW PATTERNS EVIDENT.
AFTER GROUNDWATER WAS ALLOWED TO SETTLE, CLEAR COLOR W/OIL DROPLETS DEVELOPED.
EXCAVATION WAS INITIATED FROM EAST TO WEST.
EXCAVATION TERMINATED AFTER 40.5 FEET FOR FEAR OF DAMAGING ADJACENT FARMER'S ALFALFA CROP.



EXCAVATION RESUMED ON EASTERN SIDE OF PIPELINE.
2-INCH ϕ PIPELINE DISCOVERED BY BACKHOE OPERATOR APPROX. 15 FEET EAST OF EPNG PIPELINE; POSSIBLY

SOME TYPE OF VENT LINE. (PROBABLY OWNED BY MAÑANA)
BACKHOE OPERATOR STRESSED PIPELINE.
VERTICAL EXTENT OF OIL IS VERY DIFFICULT TO ASSESS DUE TO CONSTANT INFLUX OF GROUNDWATER.
BACKHOE OPERATOR ATTEMPTED TO REMOVE AS MUCH SOIL FROM AROUND PIPELINE AS POSSIBLE W/O INDUCING FURTHER DISTURBANCE OF THE LINE.
DAVE ENGLERT (OCD) ON-SITE @ ≈ 3:00 PM.
2^{ND} EXCAVATION PROCEEDED FROM WEST TO EAST.
2^{ND} EXCAVATION TERMINATED AFTER 33 FEET; EVIDENCE OF HYDROCARBON STILL PRESENT, ALTHOUGH MINOR.
3^{RD} EXCAVATION INITIATED FROM EAST TO WEST STARTING 30 FEET EAST OF TERMINUS OF 2^{ND} EXCAVATION.
3^{RD} EXCAVATION DID NOT REVEAL PRESENCE OF HYDROCARBONS.



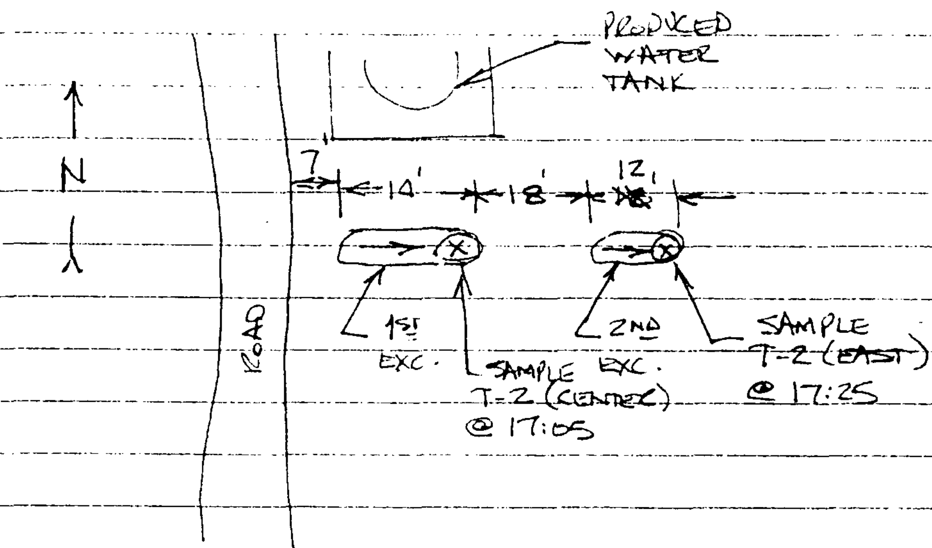
* ARROWS INDICATE DIRECTION OF EXCAVATING

ALL SAMPLES WERE TAKEN W/BACKHOE, AND VOA VIALS WERE FILLED IMMEDIATELY.
TRENCH BACK-FILLING & COMPACTION COMPLETE @ 14:45.

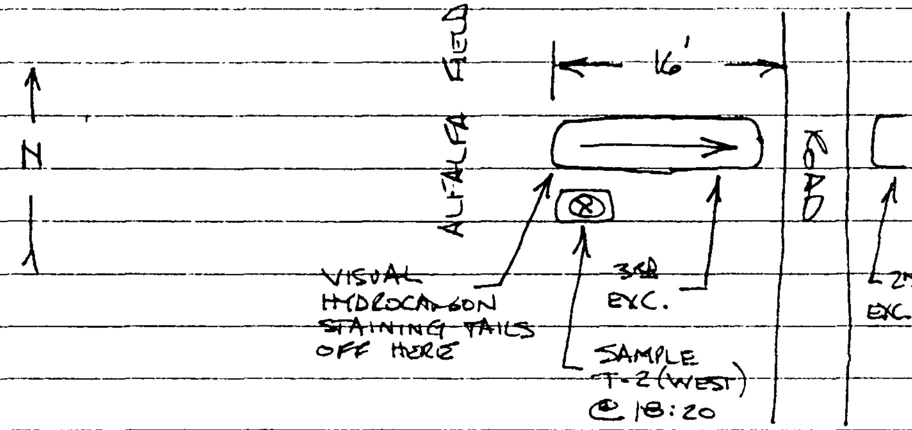
TRENCH #2 (T-2)

6-12-93
5:00 PM

1^{ST} EXCAVATION MADE FROM WEST TO EAST.
OIL FIRST ENCOUNTERED @ ≈ 4 FEET.
FEWER COBBLES NOTED THAN AT T-1.
DIFFICULT TO DISCERN A ZONE OF HYDROCARBON STAINING.
IT APPEARS THAT GROUNDWATER & FIRST APPEARANCE OF HYDROCARBONS ARE COINCIDENT (i.e., @ ≈ 4 FEET).
POSSIBLE THAT GROUNDWATER IS ABOUT 6 TO 8 IN. BELOW FIRST APPEARANCE OF HYDROCARBON.



LITTLE, IF ANY, HYDROCARBON STAINING IN THE 2^{ND} EXCAVATION.
2^{ND} EXCAVATION MADE FROM WEST TO EAST.
3^{RD} EXCAVATION STARTED ABOUT 12 FEET WEST OF ROAD & PROCEEDED FROM WEST TO EAST.



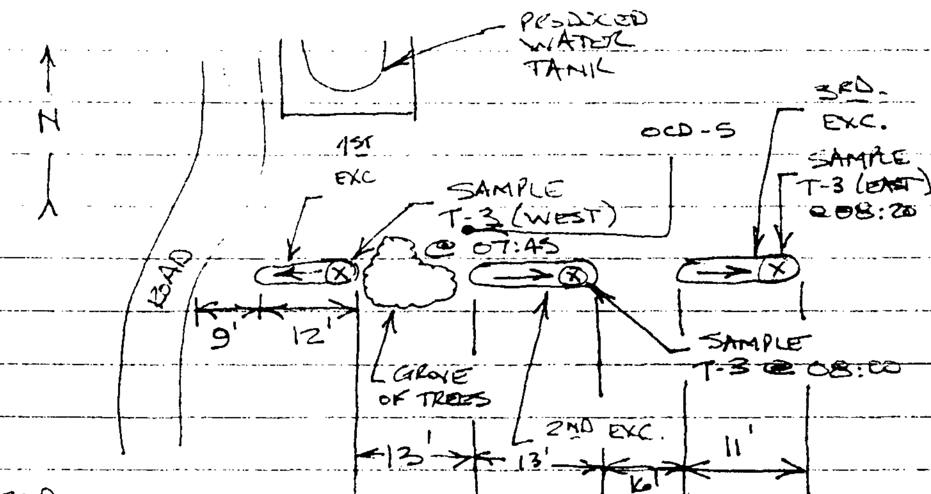
COBBLES MORE FREQUENT (AND LARGER) IN 3RD EXCAVATION THAN IN 2ND.
HYDROCARBONS FIRST DETECTED @ ≈ ~~4~~ 5 FEET.
GROUNDWATER FIRST APPEARED @ ≈ 6 FEET.
RAINBOW SHEEN ON WATER SURFACE.
PHOTOGRAPHS OF TRENCHES T-1 & T-2 WERE MADE; HOWEVER, DUE TO THE SHARP ANGLE BETWEEN THE CAMERA AND THE EXPOSED TRENCH FACE, AND TO POOR LIGHTING CONDITIONS, IT IS LIKELY THAT NO CONTRAST BETWEEN THE STAINED & THE UNSTAINED SOIL WILL BE SEEN.
TRENCH BACK-FILLING & COMPACTION COMPLETE @ 18:40.

WEATHER: MOSTLY SUNNY, CALM WINDS, 60°F

6/13/89 ON SITE @ 7:30 AM

TRENCH #3 (T-3) 7:30 AM

1ST EXCAVATION PROCEEDED FROM EAST TO WEST.
EXCAVATED MATERIAL IS A LOAMY SAND W/LARGE WELL-ROUNDED COBBLES (UP TO 12 IN. ϕ).
GROUNDWATER FIRST NOTED @ 6 FEET.
NO VISUAL EVIDENCE OF HYDROCARBONS.



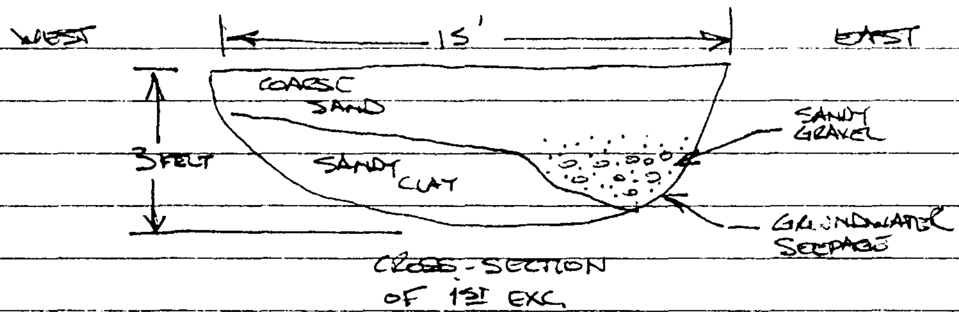
2ND EXCAVATION PROCEEDED FROM WEST TO EAST.
2ND EXCAVATION NOTED HEAVY HYDROCARBON STAINING @ 4 FEET. MATERIAL SIMILAR TO 1ST EXCAVATION.
GROUNDWATER FIRST SEEN @ ABOUT 4.5 FEET.
3RD EXCAVATION NOTED MOSTLY SAND W/LESSER AMOUNTS OF COBBLES.
NO VISUAL EVIDENCE OF STAINING IN 3RD EXCAVATION.
3RD EXCAVATION PROCEEDED FROM WEST TO EAST.
GROUNDWATER FIRST NOTED @ ABOUT 4 FEET.
TRENCH BACK-FILLING & COMPACTION COMPLETE @ 08:40.

TRENCH #4 (T-4) 9:05 AM

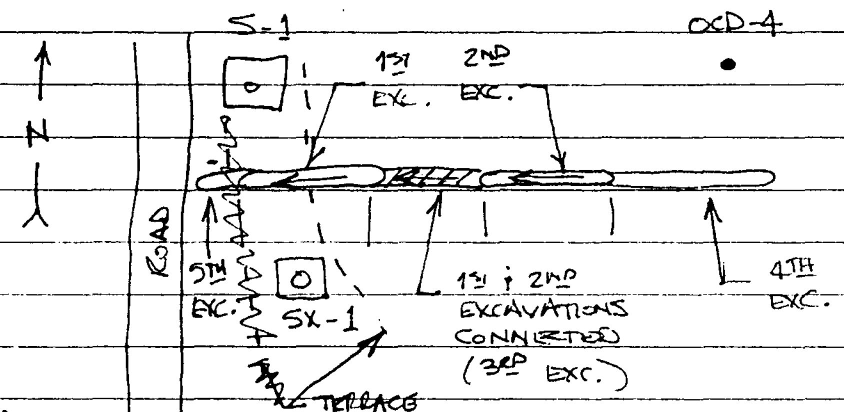
1ST EXCAVATION: MATERIAL IS MOIST COARSE SAND W/SMALL PERCENTAGE OF COBBLES.

GROUNDWATER BEGAN SEEPING INTO EXCAVATION @ ABOUT 2.5 FEET.

SANDY CLAY @ ABOUT 2 FEET.



NO VISUAL EVIDENCE OF HYDROCARBON STAINING IN 1ST EXC.



2ND EXCAVATION:

SOIL IS VERY MOIST; CLAYEY SAND TO 2 FEET, GRAVELLY SAND STARTING @ 2 FEET (GROUNDWATER @ THIS LEVEL).

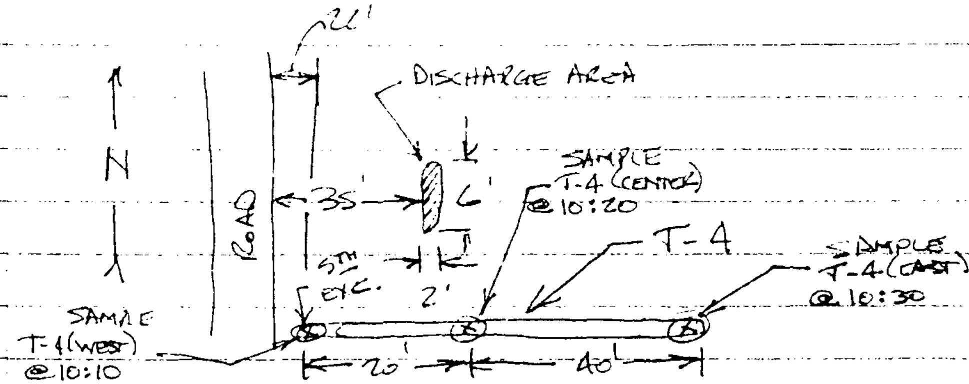
GRAVELLY SAND IS OLIVE W/ABUNDANT BLACK ORGANIC

NO HYDROCARBON ODOR PRESENT.

RIVER COBBLES ABUNDANT IN GRAVELLY SAND.

UPPER 2 FEET PROBABLY REPRESENTS OVERBANK DEPOSITS.

SMALL GROUNDWATER DISCHARGE AREA NOTED TO THE NORTH (APPROX. 50') OF T-4; 6 FEET x 2 FEET; APPROX. 35 FEET EAST OF ROAD:



NO HYDROCARBON ODOR APPARENT IN SEEP; WATER IS CLEAR.

3RD EXCAVATION:
DECIDED TO CONNECT EXCAVATIONS 1 & 2; NO STAINING APPARENT; STRATIGRAPHIC CONDITIONS SIMILAR.

4TH EXCAVATION SHOWED COARSE SAND W/COBBLES TO SURFACE.

DEPTH TO GROUNDWATER APPROX. 3 FEET.

IRON STAINING BEGINS APPROX. 6-8 IN. ABOVE GROUNDWATER LEVEL.

NO EVIDENCE OF HYDROCARBONS PRESENT.

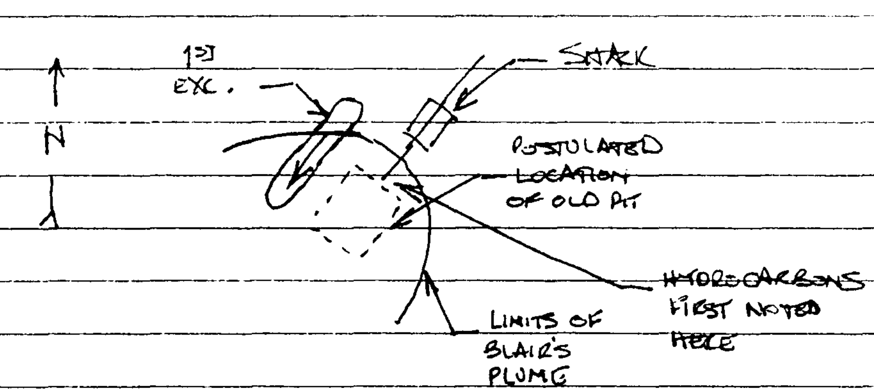
NO SHEEN ON WATER SURFACE.

5TH EXCAVATION SHOWED SIMILAR GEOLOGIC CONDITIONS TO THE 1ST EXCAVATION.

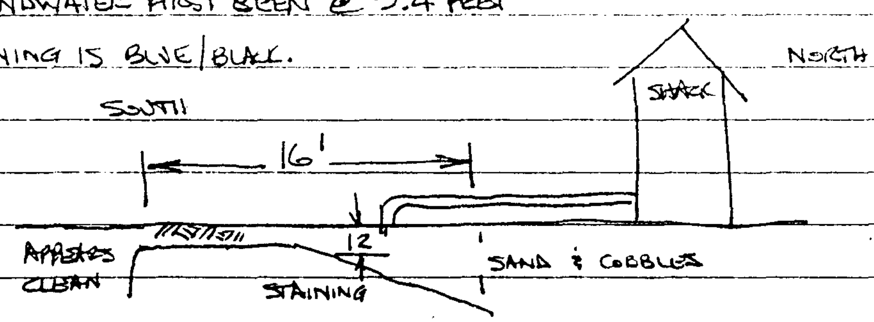
TRENCH BACK-FILLING & COMPACTION COMPLETE @ 11:15.
(BACKHOE OPERATOR BROKE FOR LUNCH @ 11:15)

SECURED CENTRIFUGAL PUMP FOR PUMPING S-5.
WAS NOT SUCCESSFUL IN GETTING PUMP TO WORK.
BROKE FOR LUNCH @ 12:20 PM.
BACK ON-SITE @ 1:10 PM.

EXCAVATION OF OLD DEHYDRATOR PIT 13:15



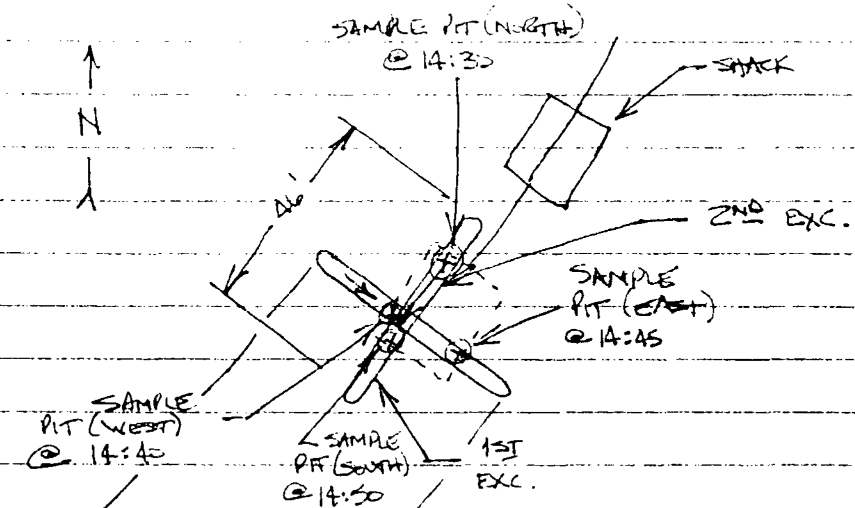
COARSE SAND W/LARGE COBBLES.
HEAVY HYDROCARBON STAINING @ ~~FEET~~ 12 IN.
FOUL ODOR EMANATING FROM EXCAVATION.
GROUNDWATER FIRST SEEN @ 5.4 FEET
STAINING IS BLUE/BLACK.



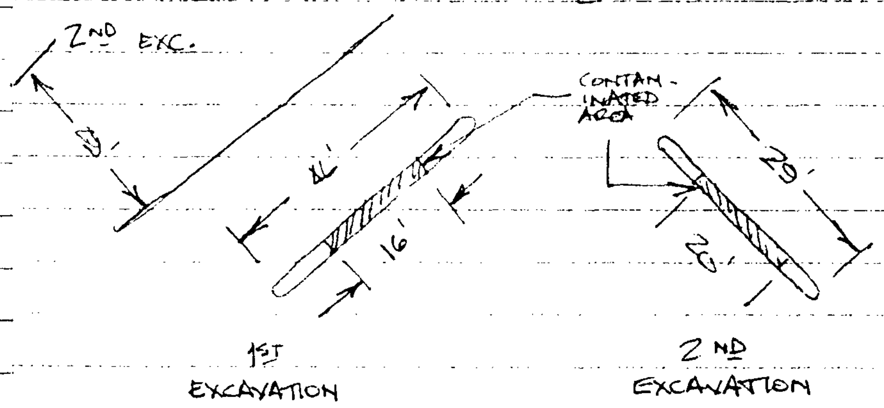
CROSS-SECTION OF TRENCH

AS EXCAVATION PROCEEDED FROM NORTH TO SOUTH, IT APPEARED THAT THE BOTTOM OF THE PIT HAD BEEN EXPOSED BY THE BACKHOE.

2ND EXCAVATION PROCEEDED FROM WEST TO EAST AND WAS DONE TRANSVERSE TO THE 1ST EXC.:

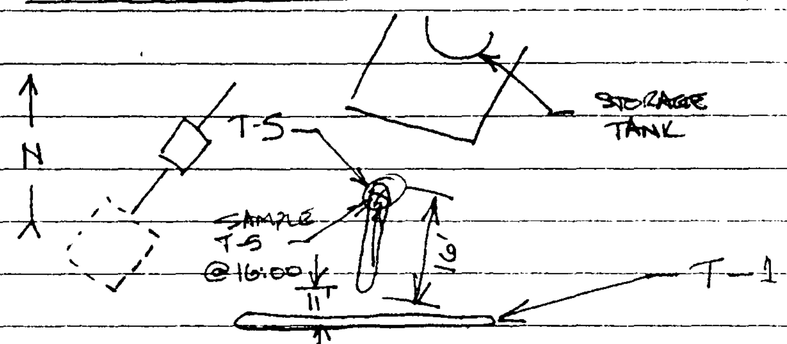


1-IN. PIPELINE WAS INADVERTANTLY EXCAVATED DURING THE 2ND EXC.



TRENCH BACK-FILLING & COMPACTION COMPLETE @ 15:45

TRENCH #5 (E/SE OF DEHYDRATOR PIT) (T-5) @ 15:45



EXCAVATION PROCEEDED FROM SOUTH TO NORTH.
MOIST BROWN LOAMY SAND W/SMALL PERCENTAGE OF COBBLES.
LARGE COBBLES STARTING @ ABOUT 3 FEET (GROUNDWATER FOUND @ THIS LEVEL ALSO).
BLUE/BLACK STAINING ~~STARTING~~ @ 3FEET.
HYDROCARBON ODOR IS PRESENT, BUT AT LOW LEVELS.
BACK-FILLING & COMPACTION COMPLETE @ 16:15.

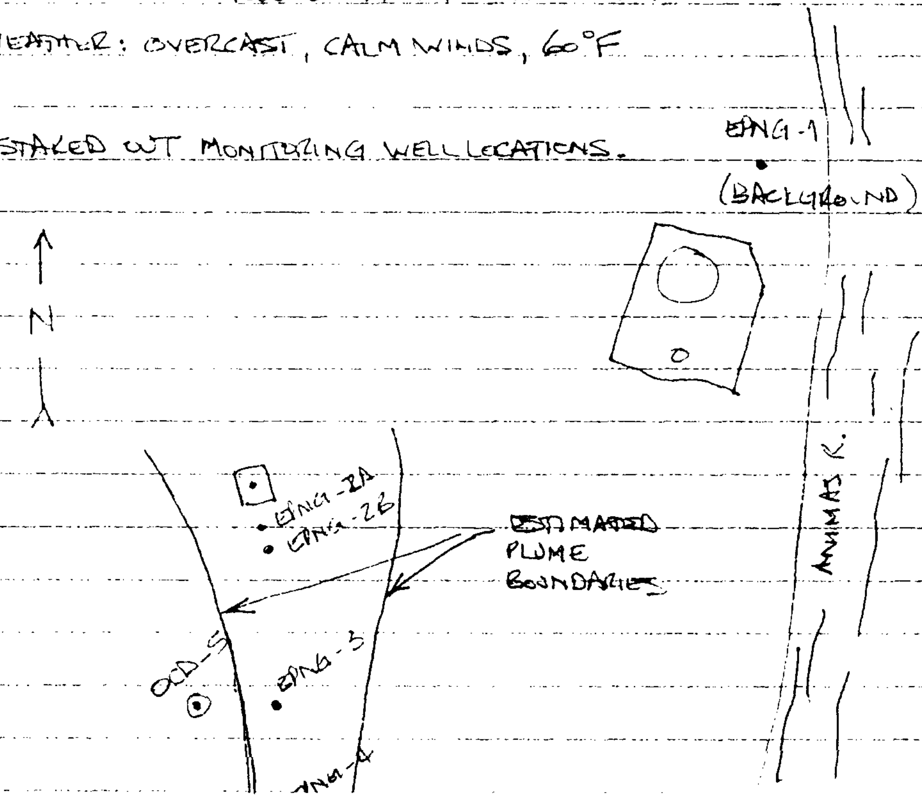
ABANDONED PUMPING OF S-5 DUE TO FAULTY EQUIPMENT.
OFF-SITE @ 5:00 PM

MISCELLANEOUS NOTES:

1. BACKHOE BUCKET WAS INSPECTED PRIOR TO ANY EXCAVATION AND WAS FOUND TO BE FREE OF SOIL FROM PREVIOUS SITE WORK; NO STEAM-CLEANING WAS DONE.
2. IT WAS DECIDED THAT BACK-FILLING OF EACH TRENCH SUFFICIENTLY CLEANED THE BACKHOE BUCKET TO WARRANT NOT STEAM-CLEANING BETWEEN TRENCHES.
3. SOIL SAMPLES WERE PLACED INTO THE FOLLOWING CONTAINERS:
   - 250 ml AMBER JAR (GLASS)
   - ZIP-LOC BAG
   - 40 ml CLEAR GLASS VIAL W/ TEFLON SEPTUM
4. NO OILS OR HYDRAULIC FLUIDS WERE FOUND TO BE LEAKING FROM THE BACKHOE.

6/14/99 ON-SITE @ 7:30 AM
DRILLERS ON-SITE @ 7:45 AM
WEATHER: OVERCAST, CALM WINDS, 60°F

STAKED OUT MONITORING WELL LOCATIONS.



6-14-89

EPNG WORKER ON-SITE TO CHECK PROPOSED DRILLING LOCATIONS FOR BURIED ~~PIPELINES~~. (8:20).

MONITORING WELL #1: EPNG-1 (BACKGROUND)

Started drilling @ 8:40 am.
Filled the pit ½ way w/ bentonite slurry.
Drilled with a 5⅝" bit. Circulated cutting out of borehole. Sand and gravel/cobbles to depth of 10'. Set well a ~~10'~~ ≈ 9.5'
Reamed hole w/ 6¼" bit. Set 4" PCV Casing and backwashed bore hole to remove bentonite mud. Set 2" monitoring well casing inside of 4" casing. ~~Completed well inside~~ Set sand pack inside of 4". Sand pack was #30 sand, but was too fine grained for 0.010 screen. Blew sand out and used a #10 sand pack.

2' - ¼" pellets (½ bucket)
2+ bags of #10 sand
Type I & II Portland cement.

Finished @ 11:50

Set square steel protective collar in 2'

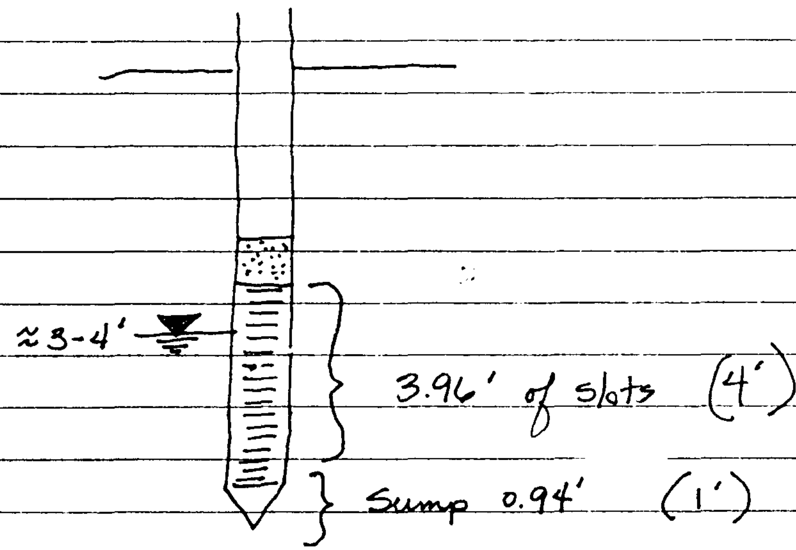
6/14/89 Wed

Flora Vista Well S-5
Set up 85 gal/min trash pump @ 10:45. First ~~search~~ surge of water from well was black. No hydrocarbon odor was noted; appeared to be decaying organic matter.
10:48 Within 2 minute water was clear.
12.97' Well casing was open; no cover for the well was seen.

Approx. pumping rate = 70 gal/min.

Pump ran out of gas; pumping time was unknown. ~~Amount~~ of water removed can not be determined. Estimated amount >1,000 gallons.

6-14-89
WED.



EPNG #4 Monitoring Well

Set rig @ 12:55
Drilled w/ bentonite slurry and a 6¼" bit. Sand / Gravel / Cobbles.
At 4' started to circulate "oily" black gel out of the hole. 4" PVC casing was not used. Back washed borehole and set casing to 8'. Drilled to 8½'; 8-8½ cuttings that couldn't be washed from hole.

2½ bags of #10 sand.
1/4 bucket of pellets.
Type 1&2 portland cement

~~2~~ Protective Collar and
2ft² pad.

Finished @ 1:55.

Constructed pad w/ a slope away from the protective collar.

6-14-89
WED.

EPNG #3 Monitoring Well

Set rig @ 2:10
Switched to a 5 5/8" bit.
Oily stained soil was encounted at a depth of 5-6'.

0-2'	Sand / Gravel / Cobbles
2-4½	No rock
4½-8	Sand / Gravel rock

TD=8'
Set bottom of sump at 8'

7-8 Sump
3-7 Screen
2½-3 Sand
1½-2 Pellets

Flushed borehole w/ clean water to remove bentonite mud. Added sand upto 1½'; had to jet 1' of sand out of borehole. Final sand height at 2½'. Added bentonite pellets and hydrated them. Mixed thick grout and add to top of borehole.
Set protective collar and 2 ft² pad.
Finished @ 3:00

6-14-89
WED

EPNG #2A Monitoring Well

Set rig at 3:15
Used a 5 5/8" Bit. Black staining encounted at approx 5'.
Sand / Gravel / Cobbles to TD.
Circulated mud out of hole w/ fresh water. Set sand and pellets.
Moved to EPNG 2B. ~~Did not set~~ grout. Pumped ≈ 50% of mud to grassy area east of produced water tank. Remainder of the mud was released on the road. Will have backhoe clean it up.

Reference Point for GW ▼ Trench L 5'.
Set top of screen at 5'.
Sump 9-10
Screen 5-9
Sand 4½-9
Pellets 2½-4½

Finished at 4:00. Set Protective collar and Pad at 6:30.

6-14-89
WED

EPNG 2B Monitoring Well

Start at 4:15
Mixed a heavy bentonite mud slurry and augered to 20'. Cuttings filled the hole to 17'. Had a difficult time cleaning the hole out. Cobbles kept sluffing into the annulus.

Sump 16-17
Screen 12-16
Sand 11-12
Pellets 8 - 11

Completed well w/ ≈ ½ of the cement needed; will top off the hole in the morning.

Finished @ 7:00

6-15-89
Thur

Arrived at 7:35; started by finishing pad at 2B. Blewout monitoring wells w/ aircompressor.

EPNG1	8.03'	7:50
3	6.97'	9:37
4	6.22'	9:05
2a	8.11	10:00
2b	7.16	10:15

6-15-89
Thur

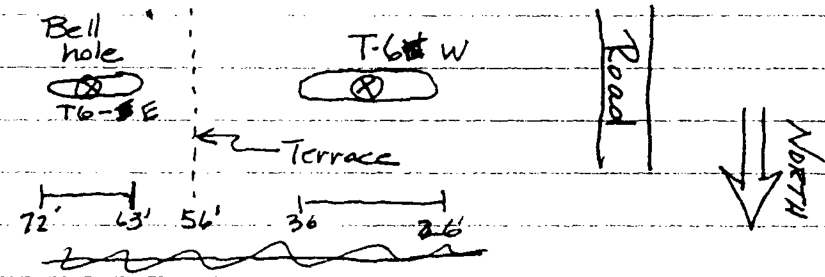
Dave took Rocky and dug hole ~~west~~ south of Trench 4.

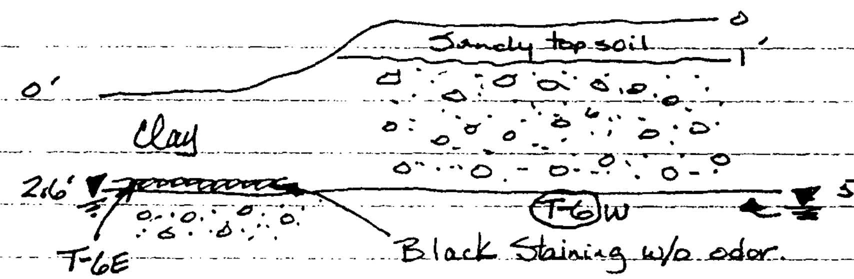
Clean in monitoring wells by inserting 1" PVC hose into well and connecting the hose to the air compressor on the drill rig. The air compressor had a dry element connected to prevent oil and water from blowing past compressor.

6-15-89
Thur

Trench #6 T-6 (South of Trench #4)

Location selected by Dave.
Only 2 excavations and ~~one~~ two sample collected. Bell hole located south of trench where sample was collected.





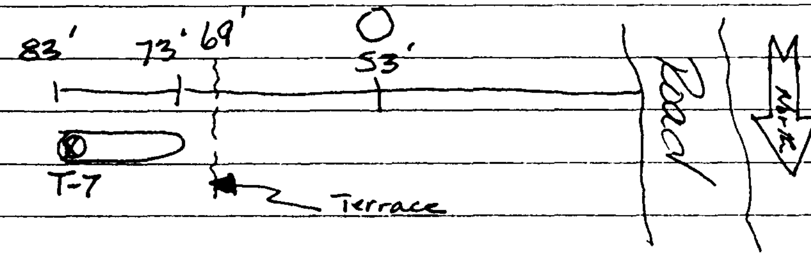
T6-E The overburden was clay: very plastic; gray to dark brown; near contact w/ sand and gravel the clay is black (appears to be reduced organic matter; no hydrocarbon odor)

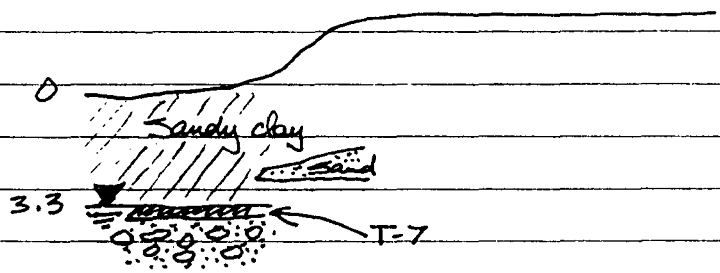
6-15-89
Thur

Trench #7

South of of trench #6.

only one excavation (bell hole) just east of terrace.

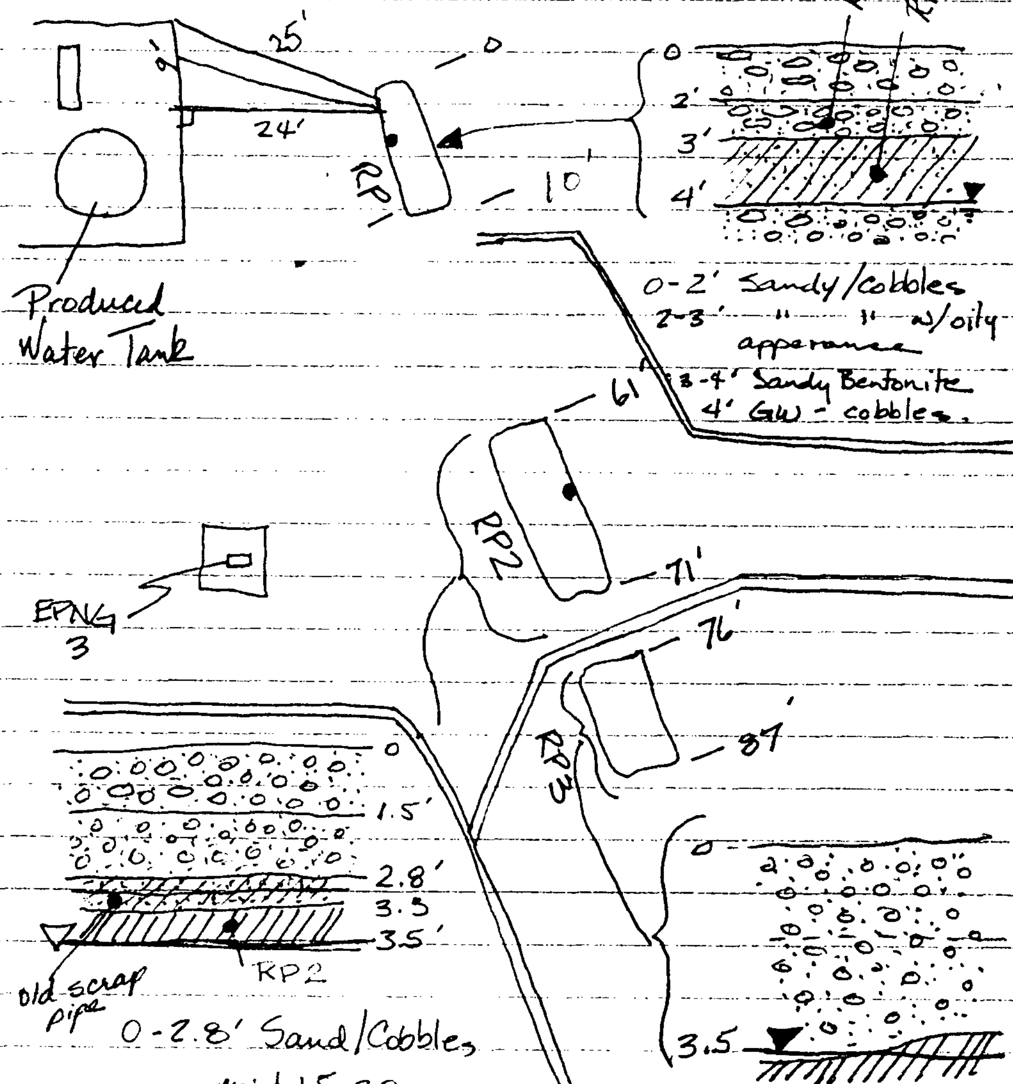




Sandy clay; brown; very plastic; black stained clay just above sand and gravel; concurrent w/ groundwater elevation.

6-15-89
Thur

Reserve Pit



0-2' Sandy/cobbles
2-3' " " w/oily appearance
3-4' Sandy Bentonite
4' GW - cobbles.

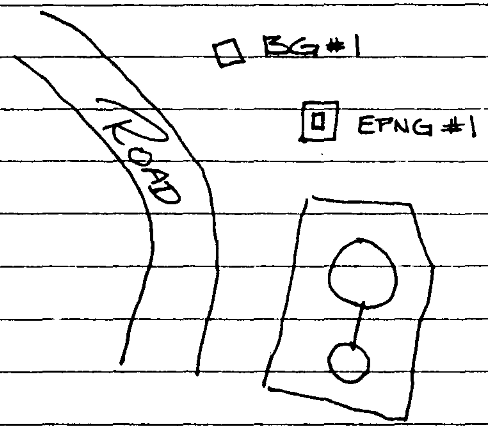
0-2.8' Sand/Cobbles
Moist 1.5-2.8.
2.8-3.3 Sandy clay fill
3.3-3.5 Massive gray clay w/ black staining along
Sta... l...

0-3.5 Sand/gravel
3.5 Massive gray clay w/ trace of bentonite; scrap
.... 3.5

6-15-89
thur

Background Soil Sample BG #1

Sandy "top soil"
collected at a depth of 2 feet



Samples from Reserve Pit Area

* 2 Samples from RP1
  1 from oily zone 2-3'
  1 from bentonite zone 3-4'

* 1 Sample from RP2
  from massive clay zone 3.3'

6-15-89
Thur

~~Ht~~ Had Rocky grade the road and bring in some sand to top dress the road. He finished at 1:00

Went to Aztec field office and prepared soil samples for Fed Ex. Replaced the ice, repacked the samples, filled out the chain of custody, and took the ice chests (2) to Pearls Express for Fed Ex. pickup.

Started pumping S-5 at 3:10 w/ trash pump.

6-15-89
Thur

Well #	DIA	DTW	TIME	TD	Water Column ×6"	Gallons
EPNG 1	2"	8.47	4:00	12.47	4.50'	0.77 2.3
2A	2"	8.50	~~3~~:55	13.19	5.19	0.88 2.6
2B	2"	7.19	3:52	19.58	12.89	2.19 6.57
3	2"	7.03	3:49	11.57	5.04	0.86 2.6
4	2"	6.30	3:44	10.96	5.16	0.88 2.6
~~5~~	~~2"~~	~~4.84~~				
* OCD 1	2"	6.50	3:25	8.18	2.18	0.37 1.1
2	2"	7.10	3:22	10.12	3.52	0.60 1.8
3	2"	6.28	3:32	6.81	1.03	0.18 0.54
4	2"	4.50	3:40	6.38	2.38	0.40 1.2
5	2"	4.84	3:46	7.60	3.26	0.55 1.7
S-1	10"	5.42	3:34	20.29	14.87	~~2.53 7.8~~ 60.67/182
S-2						
S-3						
S-4						
S-5	10"					78.37/235
SX-1	10"	4.87	3:28	23.58	19.21	~~3.27~~

* OCD well measurements from well (steel) casing.

$V = \pi r^2 h$ (2" well)

$\pi r^2 = 0.2182\ ft^2 \times 1\ ft = 0.2182\ ft^3$

$1\ ft^3 = 7.48\ gal$

$0.2182\ ft^3 * 7.48\ gal/ft^3 = 0.16319\ gal./ft$

6-15-89
Thur

"Recovery Test"

S-5 after 45 min of pumping

0	t_0 = 13.44	
	10 sec	10.40
	20 sec	9.54
	30 sec	8.76
	40 sec	8.35
	50	8.15
1 min	60	8.03
	70	7.93
	80	7.84
	90	7.83
	100	7.80
	110	7.79
2 min	120	7.78
3 min	180	7.71
4	240	7.67
5	300	7.64
6	360	7.63
7	420	7.60
8	480	7.59
9	540	7.58
10	600	7.57

6-15-89
thur

Started Pumping S1 @ 4:30
w/ Trash pump. Pumping rate ≈ 70gpm

Initial DTW = 5.42' (5:20), (5:25) (5:30)
Pumping Level = 10.12' - 10.18' - 10.21
Initially water was orange; rust stain, no odors were noted. Within 5 min water was flowing clean.

Recovery test of S1

	t_0	= 10.22
	10	8.60
	20	7.80
	30	7.14
	40	6.75
	50	6.54
1min	60	6.41
	70	6.34
	80	6.28
	90	6.25
	100	6.21
	110	6.18
2min	120	6.16
3min	180	6.06
4min	240	6.00
5 min	300	5.97
6 min	360	5.94
7 min	420	5.9[illegible]
8min	480	5.90
9min	540	5.87
10min	600	5.86

6-15-89
Thur

Talked w/ Ely the land owner about repairing the road.
Left the site at 6:50.

6-16-89
Fri

6-16-89
FRI.

Arrived at the fieldoffice at 7:00. Prepared the GW sample containers and filled ice pillows. Arrived at the site at 8:00 and pumped S-1.

Calibrated pH meter w/ #4 & #7 standards. Calibrated w/ 720μ & 20000μ.

Talk w/ Eli about fixing road again came to an agreement and made the necessary arrangement. Will have road material brought in ≈ cost $200⁰⁰.

	D-T-W	Time
EPNG-1	~~5.23~~ 8.39	8:36
-2A	7.96	8:46
-2B	7.10	8:53
-3	6.93	9:00
-4	6.19	9:05
OCD-1	6.28	9:24
-2	6.79	9:34
-3	6.46	9:50
-4	~~5~~3.93	9:15
S-1	5.23	8:00
S-5	6.89	9:37
SX-1	5.16	9:42
OCD-5	4.81	9:53

6-15-89
thur

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w/ Trash pump. Pumping rate ≈ 70gpm

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Pumping Level = 10.12' - 10.18' - 10.21
Initially water was orange; rust stain, no odors were noted. Within 5 min water was flowing clean.

Recovery test of S1

	t_0 =	10.22
	10	8.60
	20	7.80
	30	7.14
	40	6.75
	50	6.54
1min	60	6.41
	70	6.34
	80	6.28
	90	6.25
	100	6.21
	110	6.18
2min	120	6.16
3min	180	6.06
4min	240	6.00
5min	300	5.97
6min	360	5.94
8min	480	5.90
9min	540	5.87
10min	600	5.86

6-15-89
Thur

Talked w/ Ely the land owner about repairing the road.
Left the site at 6:50.

6-16-89
Fri

6-16-89
FRI.

Arrived at the field office at 7:00. Prepared the GW sample containers and filled ice pillows. Arrived at the site at 8:00 and pumped S-1.

Calibrated pH meter w/ #4 & #7 standards. Calibrated w/ 720 μ & 20,000 μ.

Talk w/ Eli about fixing road again came to an agreement and made the necessary arrangement. Will have road material brought in ≈ cost $700.00.

	D-T-W	Time
EPNG-1	~~5.23~~ 8.39	8:36
-2A	7.96	8:46
-2B	7.10	8:53
-3	6.93	9:00
-4	6.19	9:05
OCD-1	6.28	9:24
-2	6.79	9:34
-3	6.46	9:50
-4	~~5~~3.93	9:15
S-1	5.23	8:00
S-5	6.89	9:37
SX-1	5.16	9:42
OCD-5	4.81	9:53

6-16-89
Fri

EPNG-1 Purged 25 gallons
Lost bailer in well. Retrieved with piece of aluminum ~~or~~ conduit.
Purged and additional 20 gallons
* Water was turbid

pH = 7.45 7.45 7.46 7.45
EC = 1600 1600 2100 2000
Temp = 16.8°C 16.3 16.3 16.1

Collected samples w/ bailer
12:00

EPNG-4 Moved to EPNG-4 Started bailing and then tried trash pump but could not maintain suction. Took pump out and rented an air compressor to run Isco pump. Removed a total of 70 gallons. First 30-40 gallons were black and had a slight oil sheen. Last amount pumped was crystal clear. No odor.

pH = 7.10 ; Meter out (Probe)
EC = 1800; 1600; 1800; 1700
Temp = 18.4; 16.3; 16.0; 15.8

6-16-89
Fri

OCD-5 Bailed 10 gallons. Black muddy w/ vegetable matter, moss like decaying in water. Bailer plugging up w/ mud & vegetable matter. ≈1" black sediment bottom of bucket. Took no measurements. No Samples!

EPNG-3 Problems with Isco. Had to manually turn on/off switch back & forth to pump. Removed total of 80 gallons. Relatively clear with slight amount of sediment. Slight H_2S odor from beginning. Water wasn't turbid but stained light grey color.

pH = 7.40; ~~7.39~~ 7.45; ~~7.39~~ 7.46; 7.46; 7.47, 7.45
EC = 1800; ~~1800~~ 1800; 1800; 1900; 1900; 1800
TEMP = 16.6; ~~17.5~~ 15.7; ~~18.0~~ 16.2; 16.9; 15.7, 17.9, 17.9

~~4:40 16.6, 17.5~~ 5:00 5:30

S1 Pumped for 1 hour yesterday and 1 hour today. Sample collected w/ Bailer. There was a protrusion on the inside of the well below the water,

6-16-89
Fri

no odors were notes

S-1 (contin) pH = 7.54; 7.51; 7.58
EC = 900; 900; 900
TEMP = 16.1; 15.7; 14.5

~~6:00 PM~~ 6:30 PM

S-5 Pumped for 3 hours during the course of the last two days. Collected sample with bailer. Water from well smelled septic.

EC = 860; 860; 850
PH = 7.73; 7.73; 7.74
Temp = 14.8; 14.8; 14.7

Placed all samples on ice as they were collected. Filtered all metal samples w/ 0.45 micron filter paper. Used appropriated preservatives.

Left site @ 7:10

Wells sampled: EPNG-1, 4, 3
51, 55

6-17-89
Sat

Arrived at the site @ 7:20. Deconned the pump and setup the lab. Began by re-developing EPNG-1 w/ the Isco pump. The sample collected yesterday was turbid. So we decided to re-do EPNG-1.

EPNG-1 ~~PH~~ pH meter probe wiring is broken.
pH: NA
EC = 1800; 2000;
Temp. = 15.1; 15.1;

Removed at total of 25 gal this morning.
25 yesterday = 50 total gallons.
The first 51 sample was discarded.

8:00am Finised

Worked on pH probe and got the ~~meter~~ meter to stabilize w/ #7 standard.

6-17-89
Sat

EPNG 2B

Purge 45 gallons w/ Isco pump and then collected samples. Initially water was muddy but cleared after 15 gallons. No black coloration.

pH = 7.55 7.54 7.52 7.44
EC = 1600 1600 1500 1600
Temp = 14.2 15.0 13.9 14.2

No odors or oil were noted
finished at 9:30

9:00 Ed (Mañana) stopped by and asked what we were upto. I told him we were private consultants working for EPNG. Didn't tell him anything specific about what we were doing. He check Mananas equipment. He left at 9:15.

6-17-89
Sat

EPNG 2A

Purged 40 gallons w/ Isco pump prior to collecting samples. Initially water was slightly muddy and turbid. Slight gray tint w/ very faint hydrocarbon odor.

pH = 7.52 7.55 7.55
EC = 1610 1630 1650
Temp = 16.8 16.9 ~~16.9~~ 16.9

Finished @ 10:30

KWBA-1 (Duplicate from EPNG 2A)

Purged ∅ gallons. Collected immediatly following EPNG-2A.

Finished 11:15

6-17-89
Sat

Called IML in Farmington and arranged to have samples dropped off this afternoon. (Signed custody over to Ricky @ 4:30).

OCD-1

Bailed well; removed 15 gallons. Initially the water was very rusty. There was also alot of gravel and sand in the well. Ants, live ants were in the well. Very light film on sample surface. No odors noted. Water remained turbid

Temp =	17.3	15.8	16.0
pH =	7.41.	7.41	7.44
EC =	1220	1220	1220

Finished @ 1:30

OCD-2

Tried to sample but could not retrieve any water at first. Roots had grown into the well. Water was turbid throughout. Removed 15 gallons.

6-17-89
Sat

Lost bailer in well; the steel casing cut the line used the fishing tool to retrieve it. Bailed 5 more gallons.

TEMP =	16.5	16.1	16.0
pH =	7.50	7.48	7.52
EC =	1300	1300	1300

2:45 finish time.

OCD-4 3:00

The casing on the well was bent and the bailer would not enter to the bottom of the well. No samples were collected.

OCD-3

Since all of the OCD wells were contaminated w/ oil in the past, and since the well is clearly outside of the plume, no samples were collected.

6-17-89
Sat

Finished at the site @ 4:00. Prepared all samples for shipment and put new ice in all of the ice chests. Filled out the chain-of-custody and loaded the coolers in the van. Cleaned up the van and repacked all of the equipment. Told Mrs. Valasquez we were finished with our work and left.

We placed a trip blank in each ice chest.

List of Wells Sampled

	Purge Vol (gal)	(Date)	Sample Time
EPNG-1	25	6-16	12:20 pm
-2A	40	6-17	10:30 am
-2B	45	6-17	9:30 am
-3	80	6-16	5:30 pm
-4	70	6-16	4:40 pm
(Resampled) -1*	50	6-17	8:00 am
OCD-1	15	6-17	1:30 pm
-2	15 ~~not sampled~~	6-17	2:45 pm
-3	not sampled		
-4	not sampled		
-5	Not Sampled		
S-1	8,400	~~6-30~~ 6-16	6:30 pm
S-5	12,600	~~7:00~~ 6-16	7:00 pm
(EPNG-2A) Duplicate = KWBA1	∅	6-17	~~10:30~~ 11:15 am
(DI water) Blank = KWBA2	∅	6-17	4:00 pm

70 gal/min x 60 min = 4,200 x 2 = 8,400
4,200 x 3 12,600

P. 60 Skimming for oil released during removal

$$v = \frac{Ki}{\theta} = \frac{T}{b}\frac{i}{\theta}$$

0.5/80 = 0.0063
0.5/60 = 0.0083
Well Sed 0.5/40 = 0.0125
1/140 = 0.0071
Avg = 0.0072

$$= \left(\frac{14{,}000\ gal}{day\ ft} \times \frac{ft^3}{7.48\ g},\ 20\ ft\right)$$

93.6 ft/day

$$\frac{0.0072}{0.25} = 2.7\ ft/day$$

w/θ = 0.2: v = 3.4 ft/day
w/θ = 0.4: v = 1.7 ft/day

Skimming to S'ly removed

~~P. 61~~ - Restate + ~~odors~~ To be removed

~~P. 61~~ - How to gather sample since ~~gw~~ bottom of soil excavation in gw? using backhoe?

~~P 62~~ - Location of down-grad wells

~~P63~~ - Acetone sampling in 51
~~P 63~~ - Monitoring well removal?
- At time of O & G well Aband.
~~P64~~ - Time schedule

$\boxed{\text{Work notes}}$

Conclusions (Remediation)

GW Soil

VOA 4.3 μg/g Vinyl Chloride [could this be new PVC well materials degassing?]

Groundwater Flow Direction probably varies according to 3 things: 1. seasonal fluctuation of river 2. Pumping rates of relative high capacity well field. 3 Divergence due to variations of permeability (ie. buried channel at ∠ to less permeable subsurface

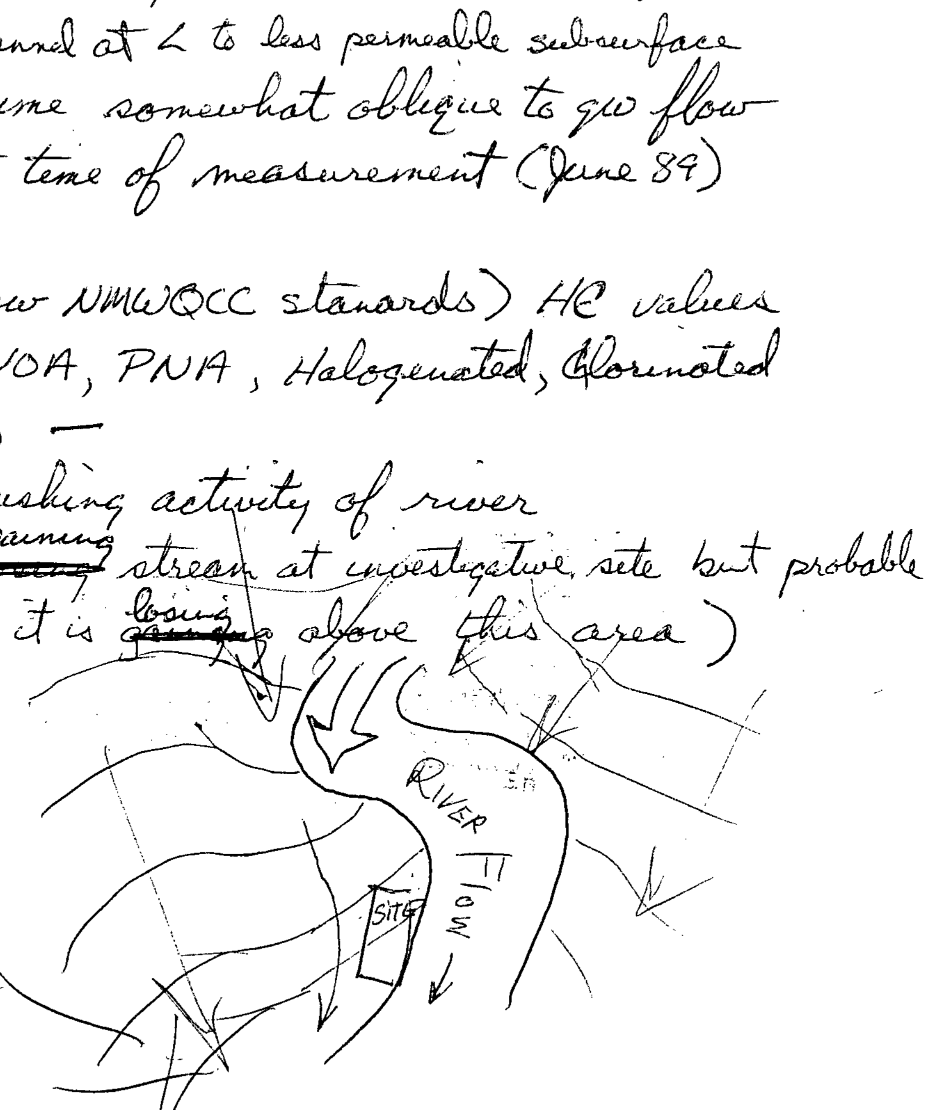
A* — ~~at~~ the plume somewhat oblique to gw flow direction at time of measurement (June 89)

Not in report

B — low (below NMWQCC standards) HC values including VOA, PNA, Halogenated, Chlorinated constituents —

1 — flushing activity of river

a. (~~losing~~ gaining stream at investigative site but probable that it is ~~gaining~~ losing above this area)



since HC (no longer?) above NMWQCC standards but a source exists that still impacts g.w., source is to be removed. EPNG expresses willingness to remove HC stained soil from dehydrator pit and residue in reserve pit. [Does this include plume of visible staining?] yes

*? To determine area to be excavated

? 1. results of site investigation

— does that mean area delineated as ["approximate limit of HC staining" on platts]?

2. Visual evidence — to extend beyond delineated staining area

3. Lab results

levels of cont that ~~go~~ will be removed?

a. on-site portable GC, to quantify contam.

4. What about Oil and Grease slug adjacent to S-6

Clean Up.

ok 1. Uncontaminated overburden stockpiled

a. to be replaced into excavation when program complete

?? — ~~replacement fill & creation of lateral barrier & its effects?~~ use sd & gravel for fill at water table.

2. Contaminated Soil Disposition

Expand: What levels deterministic; periods of time; containment;

a. stockpiled on site & tested on site before removal to designated treatment/disposal site

b. contaminated soil placed directly into trucks for delivery ~~of waste~~ to treatment/disposal site

c. location of treatment/disposal site will be selected and approved of by OCD before xcavation

Excavation

- soil exhibiting visual evidence of contam to be completely stripped. [visual evidence below water table difficult to determine]
- samples taken at bottom of xcavation to determine continued excavation [explain analysis protocol for soils w/ portable GC

To Comply? ? What WQCC standards for soil; EP Tox tests or direct correlation to water standards

Analytical Parameters during Xcavation for soils

8020 1. BTEX

ND 846 Protocol 2. Total ~~HC~~ Petroleum Hydrocarbons (TPH)

3. pH & EC

GW Sampling Freq.

1. All MW & S-1 & S-5 Before } Xcavation
In plume, downgradient. 2. Replacement MW & S1, S5 & remaining MW's After }
* 3. Quarterly sampling - if for 2 consec quarters ~~(what parameters)~~ remain below WQCC - ~~#~~ sampling will discontinue

* No groundwater treatment

Chromium at very high levels (161mg/l stand .05mg/l) at reserve pit site

T-1 West Flouranthene .165 mg/Kg ~~ppb~~ ppm $^{-3}$ (standard ?)
T-2 East Napthalene + ~~others~~ Acenapthene above water standard ≤ .03 ppm
3.9 ppm 3.584 ppm

North Pit Flouranthene .178 Chrysene .118

~~T-3 West~~ See spiked analyst for Glycols T-3W (54% recovery)
(soil samples) Chlorinated Detection limits above water standards T-7 (81% ") & low recovery (30-47%)

1. Strip & stockpile overburden during season of year when water table normaly at its lowest (winter?)
2. Excavate ~~so~~ stained soil - (including additional debth ~~below~~ to ensure total removal of contaminated soil
3. Skim floating product w/ skimmers or HC absorbants
4. Monitor clean up as suggested by KW Brown
5. Continued quarterly monitoring
(Vinyl Chloride)

Skimmers wouldn't work unless 1/8" thick product present

are we talking about pumping & treating to remove HC from water?
& use of infiltration pit or galleries

Check T-1 East p,m xylene .98 µg/g
T-1 C Toluene .16 µg/g
T-1 W p.m xylene .73 µg/g
T-2E Benzene .22 Toluene .35
T-2C Toluene .26 pmxylene .94

BG-1 Dichloropropane .61
T-5 High recovery rates for Halogenated HC
" " BTEX (89-94%) (78-102%)5
T3 C Chlorobenzene .19
P-N Toluene 1.2 pmxylene 15.6 oX 2.2
P-S Chlorobenzene .37 pmX .76
P-E p,m X 1.6 oX .5
P-W B 2.6 T 34.3 pm X 152 oX 25.2 ?? could be 1.52
RP1-B Chloroethane 4.3

Water

S-5 B .24 ug/l

T .32

EPNG-1 pmX .34

EPNG 2A B 8.1 µg/l Ethylbenzene 37.4 pmX 162 oX 30.4

EPNG 2B B 1.6 E " 1.2 " 10.8 " 1.3

EPNG 3 B .4 T .33 E " 4.3 " 13.1 " .44

EPNG 4 B .95

S-5 B .26 T .32

~~Fuel Blanks~~ ? ~~Spoke~~

?? KWBA-1 B 4.4 E 22.2 pmX 115 oX 15.7

* Comments

Summary

EPNG has expressed willingness to excavate HC stained soil from dehydrator pit, ~~plume~~ of soils stained by migrating HC's which have been approximately delineated, and residue in reserve pit.

Three criteria established to determine necessary excavated soils

1. Site investigation – area delineated as "approximate limit of HC staining and approximate locations of dehydrator pit & reserve pit.
2. Visual evidence –
3. Lab Results (portable GC)

*

No action regarding ground water is stated since WQCC standards not exceeded.

Monitoring of clean up will be via samples at bottom of xcavation pit, and ~~groun~~ MW's (S1 & S5) ~~and after~~ before Xcavation begins. Constituents measured will be BTEX, TPH & pH & EC. Analytical protocol will be consistent w/ SW-846.

After Xcavation completed, water samples from remaining MW's, replacement MW's and S-1 and S-5 will be sampled quarterly until constituent concentrations remain below WQCC standards for 2 consecutive quarters.

Excavation procedure to include: 1. stripping and stockpiling overburden, 2. stripping, stockpiling on site and removing contaminated soil.

Excavation of contaminated soils will be determined visually and thru sampling & analyzing the bottom of excavation. ~~Soils~~ Contaminated soils will be stockpiled on site for additional analysis & then removed to ~~site~~ selected site approved by OCD.

Additional Criteria for contaminated soil clean up

1. State more clearly protocol for analyzing soils and standards deemed necessary so as to not impact groundwater quality. WQCC or USEPA water standards not adequate.
2. Visual evidence may be difficult during excavation due to heavy equipment operations. Visibility also restricted below water table.
   a. Operations could begin during season of year when water ~~level~~ table normally at its lowest? lowest?
   b. additional depth below stained area removed for assurance contaminated soil removed in addition to stated monitoring
3. Provide for skimming/removal of migrant product (free floating HC) in excavation.
4. Expand on disposition of contaminated soil, i.e.
   a. what & analytical levels ~~detern~~ determine removal,
   b. time frame for ~~pit~~ excavation to be left open and

also include safety plan i.e. fencing, security (while excavation open after working hrs)

   contaminated soil stockpiled on site/~~Safety precautions~~
   c. containment of stripped contaminated soils on site to prevent seepage
5. Criteria for selection of MW #'s replacement?
6. Pumping of S-6 ~~not ad~~ after excavation not addressed.
7. Oil and Grease "slug" ~~adjacent~~ between to SX-2 & ~~SX~~ S-1 ~~S-6~~, and ~~not addressed~~ area at T-6E not addressed.

4.1 mg/l O&G in OCD 2 highest level

8. Platt with surveyed elevations & groundwater levels
9. Volumetric estimates of stripped overburden & stripped contaminated soil

10. Escalation procedures –

Mike Morris
Dames
Env. Assessment 6

WORK NOTES

Describe routine well site management (Section 2.0 ?)
S-1 originally impacted 2/83 (See
S-2, S-7 & S-6 only producing (active wells)
Vapor line from still column, glycol storage vent line, and the
liquid phase dump line routed to unlined pit
gas well drilled 1/80 / F/WUA began operating 1981
83" EPNG rerouted vapor line & liquid phase dump line
9/85 OCD developed wells (possibly contaminating wells) compare to later
analysis & composites
85 OCD report indicates no verifiable cont in MW or unused production
wells - what reported contam?
10/86 OCD reported HC contam adjacent to S1
3/87 Martin Ass conducted investigation (inconclusive) but see
info on boring at S-4 for possible background info
8/87 Blair - initiated trenching exercise, 6 of 13 trenches
contained HC staining of soil.
contradicts p12 — Previous work efforts had delineated impacted areas & source
Table 2-2 (original) Brewers water quality (after complaints made)

Check depths/diameters of wells to determine purge volumes.
S-5 had septic odor
S1-S5 VOA's
EPNG 2A & 3 Highest BTEX values
Background well (EPNG 1) .34 μg/l p.m-xylene NMWQCC (62)
* No VOA detected downgradient from T-3 [T-4 had .95 μg/l Benzene & S-5 had trace B.T.]
Additional info about referred slug of O&G at S-6 (Consult)

CDS LABORATORIES
A DIVISION OF CASA DEL SOL, INC.
75 SUTTLE STREET
POST OFFICE BOX 2605
DURANGO, COLORADO 81302
(303) 247-4220

WATER SAMPLES SUBMITTED 12/28/89

CDS #	El Paso ID	TIME	Sample Name
1952	F89506	1230 HOURS	FV-6
1953	F59505	1300	FV-5
1954	F89504	1200	FV-2
1955	F89503	1500	FV-6
1956	F89502	1500	FV-5
1957	F89501	1500	FV-2

SOIL SAMPLES SUBMITTED 12/28/89

1958	A89253	0743	East side UST-2---
1959	A89254	0756	West side UST-2---
1960	A89255	----	North end UST-2---
1961	A89256	----	South end UST-2---

CDS Labs
AET Project No.: 8193

Parameter	Analytical Result ppm	Date	Time	Analyst	Method Number
** Client ID: 1958 12/19					
Benzene	<0.050	12/31/89	6:30pm	CMB	8240
Ethyl Benzene	0.050	12/31/89	6:30pm	CMB	8240
Toluene	0.196	12/31/89	6:30pm	CMB	8240
Xylenes, T.	0.992	12/31/89	6:30pm	CMB	8240
TPH	<10.0	01/05/90	10:00am	MDB	503D/E
** Client ID: 1959 12/19					
Benzene	<0.050	12/31/89	6:30pm	CMB	8240
Ethyl Benzene	0.152	12/31/89	6:30pm	CMB	8240
Toluene	0.889	12/31/89	6:30pm	CMB	8240
Xylenes, T.	4.43	12/31/89	6:30pm	CMB	8240
TPH	<10.0	01/05/90	10:00am	MDB	503D/E
** Client ID: 1960 12/19					
Benzene	<0.050	12/31/89	6:30pm	CMB	8240
Ethyl Benzene	0.088	12/31/89	6:30pm	CMB	8240
Toluene	0.412	12/31/89	6:30pm	CMB	8240
Xylenes, T.	1.986	12/31/89	6:30pm	CMB	8240
TPH	<10.0	01/05/90	10:00am	MDB	503D/E
** Client ID: 1961 12/19					
Benzene	<0.050	12/31/89	6:30pm	CMB	8240
Ethyl Benzene	0.109	12/31/89	6:30pm	CMB	8240
Toluene	0.483	12/31/89	6:30pm	CMB	8240
Xylenes, T.	2.31	12/31/89	6:30pm	CMB	8240
TPH	<10.0	01/05/90	10:00am	MDB	503D/E

All of the above tests were performed as outlined in the U.S. E.P.A. "Methods for Chemical Analysis of Water and Wastes," 1983, "Standard Methods for the Examination of Water and Wastewater," 1985, and U.S. E.P.A. "Test Methods for the Evaluation of Solid Waste--SW846," 1986. Other methods as approved by the client are utilized. See specific method reference.

Certification:

H. Nathan Levy III
President

EL PASO NATURAL GAS COMPANY

ENVIRONMENTAL SAMPLING DATA 819317 1958

Facility No. [ ] Sample Matrix SOIL Sample No. 489253 Time 0743 24 Hr. Clk.

Sample Location LINCOLN STATION, NEW MEXICO Charge ____

Sampling Site Description EAST SIDE UST - 2'

Date of Collection (MMDDYY) 121989 Collection Method [X] Grab [ ] Comp. ____ hrs.

Sample Collected By DAVE HALL Phone 505-831-7759

Laboratory Conducting Analysis CDS LABS, DURANGO

ANALYSIS REQUESTED (check appropriate blocks)

GROUP A	Hardness	Residue, Nonfilterable	GROUP T
Ammonia	Iron	Residue, Settleable	Benzene
Chemical Oxygen Demand	Lead	Residue, Volatile	Benzo-a-pyrene
Kjeldahl Nitrogen	Magnesium	Silica	Bromoform
Nitrate	Manganese	Sulfate	Bromodichloromethane
Nitrite	Mercury	Sulfite	Carbon Tetrachloride
Oil & Grease	Molybdenum	Surfactants-MBAS	Chloroform
Organic Carbon	Nickel		Chloromethane
Orthophosphate	Potassium	GROUP H	Dibromochloromethane
Phosphorus, Total	Selenium	BHC Isomers	1,1-Dichloroethane (DCE)
	Silver	Chlordane	1,2-Dichloroethane (EDC)
GROUP D	Sodium	DDT Isomers	1,1-Dichloroethylene (1,1-DCE
Cyanide, Total	Thallium	Dieldrin	Ethylbenzene
	Zinc	Endrin	Ethylene Dibromide
GROUP E		Heptachlor	Methylene Chloride
Phenols	GROUP G	Heptachlor Epoxide	Monomethylnapthalenes
	Acidity, Total	Lindane	Naphthalene, Total
GROUP F	Alkalinity, Total	Methoxychlor	PAH
Aluminum	Alkalinity, Bicarbonate	Toxaphene	PCBs
Arsenic	Bromide	2,4-D	1,1,2,2Tetrachloroethane(PCE)
Barium	Carbon Dioxide	2,4,5-TP	1,1,1-Trichloroethane
Beryllium	Chloride	2,4,5-T	1,1,2 Trichloroethane
Boron	Color		1,1,2 Trichloroethylene (TCE)
Cadmium	Fluoride	GROUP	Trihalomethanes
Calcium	Iodide	Sulfides	TOX
Chromium, Total	Odor		Toluene
Cobalt	Residue, Total	Asbestos	Vinyl Chloride
Copper	Residue, Filterable (TDS)	Ignitability	Xylenes, Total

COMMENTS/SPECIAL INSTRUCTIONS SEND RESULTS AND INVOICE TO JOHN LAMBDIN

PLEASE ANALYZE FOR TOTAL PETROLEUM HYDROCARBONS

AND BTEX. RUSH

RELINQUISHED BY 1.	RELINQUISHED BY 2.	RELINQUISHED BY 3.	ON SITE ANALYSES
(Signature) 15:30 (Time)	(Signature) 6:00 (Time)	(Signature) (Time)	Turbidity NT
(Print Name) 12/28/89 (Date)	(Print Name) 12/28/89 (Date)	(Print Name) (Date)	Flow mg
EPNG CO (Company)	(Company)	(Company)	Chlorine, Total mg/
RECEIVED BY 1.	RECEIVED BY 2.	RECEIVED BY 3.	Dissolved, Oxygen mg/
(Signature) 3/30 (Time)	(Signature) 1145 (Time)	(Signature) (Time)	pH uni
(Print Name) 12/28/89 (Date)	(Print Name) 12/29 (Date)	(Print Name) (Date)	Temperature
(Company)	A&E TESTING, INC. 1717 Seaboard Drive Baton Rouge, La. 70808 Phone: (504) 769-1930 (Company)	(Company)	EC umhos/c

SP2983

EL PASO NATURAL GAS COMPANY

ENVIRONMENTAL SAMPLING DATA 819318 1959

Facility No. ☐☐☐☐☐ Sample Matrix SOIL Sample No. 1892254 Time 0756 24 Hr. Clk.

Sample Location LINCOLN STATION, NM MEXICO Charge

Sampling Site Description WEST SIDE UST - 2

Date of Collection (MMDDYY) 122789 Collection Method X Grab ☐ Comp. ____ hrs.

Sample Collected By DAVE HALL Phone 505-831-1759

Laboratory Conducting Analysis CDS Labs, DURANGO

ANALYSIS REQUESTED *(check appropriate blocks)*

GROUP A	Hardness	Residue, Nonfilterable	GROUP T
Ammonia	Iron	Residue, Settleable	Benzene
Chemical Oxygen Demand	Lead	Residue, Volatile	Benzo-a-pyrene
Kjeldahl Nitrogen	Magnesium	Silica	Bromoform
Nitrate	Manganese	Sulfate	Bromodichloromethane
Nitrite	Mercury	Sulfite	Carbon Tetrachloride
Oil & Grease	Molybdenum	Surfactants-MBAS	Chloroform
Organic Carbon	Nickel		Chloromethane
Orthophosphate	Potassium	GROUP H	Dibromochloromethane
Phosphorus, Total	Selenium	BHC Isomers	1,1-Dichloroethene (DCE)
	Silver	Chlordane	1,2-Dichloroethane (EDC)
GROUP D	Sodium	DDT Isomers	1,1-Dichloroethylene (1,1-DCE
Cyanide, Total	Thallium	Dieldrin	Ethylbenzene
	Zinc	Endrin	Ethylene Dibromide
GROUP E		Heptachlor	Methylene Chloride
Phenols	GROUP G	Heptachlor Epoxide	Monomethylnapthalenes
	Acidity, Total	Lindane	Naphthalene, Total
GROUP F	Alkalinity, Total	Methoxychlor	PAH
Aluminum	Alkalinity, Bicarbonate	Toxaphene	PCBs
Arsenic	Bromide	2,4-D	1,1,2,2Tetrachloroethane(PCE)
Barium	Carbon Dioxide	2,4,5-TP-Silvex	1,1,1-Trichloroethane
Beryllium	Chloride	2,4,5-T	1,1,2 Trichloroethane
Boron	Color		1,1,2 Trichloroethylene (TCE)
Cadmium	Fluoride	GROUP J	Trihalomethanes
Calcium	Iodide	Sulfides	TOX
Chromium, Total	Odor		Toluene
Cobalt	Residue, Total	Asbestos	Vinyl Chloride
Copper	Residue, Filterable (TDS)	Ignitability	Xylenes, Total

COMMENTS/SPECIAL INSTRUCTIONS SEND RESULTS AND INVOICE TO John Lambdin PLEASE ANALYZE FOR TOTAL PETROLEUM HYDROCARBONS AND BTEX. RUSH

RELINQUISHED BY 1.	RELINQUISHED BY 2.	RELINQUISHED BY 3.	ON SITE ANALYSES
[signature] 15:30	6:00		Turbidity NTU
(Signature) (Time)	(Signature) (Time)	(Signature) (Time)	
[signature] 12/28/89	DR. JOE A. FOWDEN 12/28/89		Flow m
(Print Name) (Date)	(Print Name) (Date)	(Print Name) (Date)	
EPNG CO	P.O. BOX		
(Company)	(Company)	(Company)	Chlorine, Total mg
RECEIVED BY 1.	RECEIVED BY 2.	RECEIVED BY 3.	Dissolved, Oxygen mg
[signature] 3:30	[signature] 1145		
(Signature) (Time)	(Signature) (Time)	(Signature) (Time)	pH un
12/28/89	TNT TESTING, INC. 12/29		
(Print Name) (Date)	(Print Name) (Date)	(Print Name) (Date)	Temperature
DR. JOE A. FOWDEN	1717 Seaboard Drive		umhos
(Company)	(Company) Baton Rouge, La. 70808	(Company)	EC

Phone: (504) 769-1930

SP2983

EL PASO NATURAL GAS COMPANY

ENVIRONMENTAL SAMPLING DATA

8193 1960

Facility No. ☐☐☐☐☐ Sample Matrix SOIL Sample No. 187255 Time ☐☐☐☐ 24 Hr. Clk.

Sample Location LINCOLN STATION, NEW MEXICO Charge

Sampling Site Description NORTH END UST - 2' BELOW

Date of Collection (MMDDYY) 121989 Collection Method X Grab ☐ Comp. ____ hrs.

Sample Collected By DAVE HALL Phone 505-831-7759

Laboratory Conducting Analysis CDS LABS, DURANGO

ANALYSIS REQUESTED *(check appropriate blocks)*

	GROUP A		Hardness		Residue, Nonfilterable		GROUP T
	Ammonia		Iron		Residue, Settleable		Benzene
	Chemical Oxygen Demand		Lead		Residue, Volatile		Benzo-a-pyrene
	Kjeldahl Nitrogen		Magnesium		Silica		Bromoform
	Nitrate		Manganese		Sulfate		Bromodichloromethane
	Nitrite		Mercury		Sulfite		Carbon Tetrachloride
	Oil & Grease		Molybdenum		Surfactants-MBAS		Chloroform
	Organic Carbon		Nickel				Chloromethane
	Orthophosphate		Potassium		GROUP H		Dibromochloromethane
	Phosphorus, Total		Selenium		BHC Isomers		1,1-Dichloroethene (DCE)
			Silver		Chlor[illegible]ne		1,2-Dichloroethane (EDC)
	GROUP D		Sodium		DDT Isomers		1,1-Dichloroethylene (1,1-DCE
	Cyanide, Total		Thallium		Dieldrin		Ethylbenzene
			Zinc		Endrin		Ethylene Dibromide
	GROUP E				Heptachlor		Methylene Chloride
	Phenols		GROUP G		Heptachlor Epoxide		Monomethylnapthalenes
			Acidity, Total		Lindane		Naphthalene, Total
	GROUP F		Alkalinity, Total		Methoxychlor		PAH
	Aluminum		Alkalinity, Bicarbonate		Toxaphene		PCBs
	Arsenic		Bromide		2,4-D		1,1,2,2Tetrachloroethane(PCE)
	Barium		Carbon Dioxide		[illegible],5-TP-Silvex		1,1,1-Trichloroethane
	Beryllium		Chloride		[illegible],5-T		1,1,2 Trichloroethane
	Boron		[illegible]lor				1,1,2 Trichloroethylene (TCE)
	Cadmium		[illegible]ride		GROUP J		Trihalomethanes
	Calcium		Iodide		[illegible]ides		TOX
	Chromium, Total		Odor				Toluene
	Cobalt		Residue, Total		Asbestos		Vinyl Chloride
	Copper		Residue, Filterable (TDS)		Ignitability		Xylenes, Total

COMMENTS/SPECIAL INSTRUCTIONS SEND RESULTS AND INVOICE TO JOHN LAMBDIN PLEASE ANALYZE FOR TOTAL PETROLEUM HYDROCARBONS AND BTEX. RUSH

RELINQUISHED BY 1.	RELINQUISHED BY 2.	RELINQUISHED BY 3.	ON SITE ANALYSES	
[signature] 15:30	6:00		Turbidity	NT
(Signature) (Time)	(Signature) (Time)	(Signature) (Time)		
Norman Norvelle 12/28/89	12/28/89		Flow	m
(Print Name) (Date)	(Print Name) (Date)	(Print Name) (Date)		
EPNG CO			Chlorine, Total	mg
(Company)	(Company)	(Company)		
RECEIVED BY 1.	RECEIVED BY 2.	RECEIVED BY 3.	Dissolved, Oxygen	mg
[signature] 3:30	[signature] 1145			
(Signature) (Time)	(Signature) (Time)	(Signature) (Time)	pH	uni
12/28/89	HW LEVY 12/29		Temperature	
(Print Name) (Date)	(Print Name) (Date)	(Print Name) (Date)		umhos
DR. JOE A. BOWDEN	[illegible]TESTING, INC. 1717 Seaboard Drive		EC	
(Company)	(Company) Baton Rouge, La. 70808	(Company)		

Phone: (504) 769-1930

SP2983

EL PASO NATURAL GAS COMPANY

ENVIRONMENTAL SAMPLING DATA

8193 | 70   1961

Facility No. ☐☐☐☐☐ Sample Matrix SOIL Sample No. 187256 Time ☐☐☐☐ 24 Hr. Clk.

Sample Location Lincoln Station New Mexico Charge ______

Sampling Site Description SOUTH END UST - 2' BELOW

Date of Collection (MMDDYY) 121989   Collection Method ☒ Grab ☐ Comp. ______ hrs.

Sample Collected By DALE HALL   Phone 505-831-7759

Laboratory Conducting Analysis CDS Labs, Durango

ANALYSIS REQUESTED *(check appropriate blocks)*

	GROUP A						GROUP T
	Ammonia		Hardness		Residue, Nonfilterable		Benzene
	Chemical Oxygen Demand		Iron		Residue, Settleable		Benzo-a-pyrene
	Kjeldahl Nitrogen		Lead		Residue, Volatile		Bromoform
	Nitrate		Magnesium		Silica		Bromodichloromethane
	Nitrite		Manganese		Sulfate		Carbon Tetrachloride
	Oil & Grease		Mercury		Sulfite		Chloroform
	Organic Carbon		Molybdenum		Surfactants-MBAS		Chloromethane
	Orthophosphate		Nickel				Dibromochloromethane
	Phosphorus, Total		Potassium		GROUP H		1,1-Dichloroethene (DCE)
			Selenium		BHC Isomers		1,2-Dichloroethane (EDC)
	GROUP D		Silver		Chlordane		1,1-Dichloroethylene (1,1-DCE
	Cyanide, Total		Sodium		DDT Isomers		Ethylbenzene
			Thallium		Dieldrin		Ethylene Dibromide
	GROUP E		Zinc		Endrin		Methylene Chloride
	Phenols				Heptachlor		Monomethylnapthalenes
			GROUP G		Heptachlor Epoxide		Naphthalene, Total
	GROUP F		Acidity, Total		Lindane		PAH
	Aluminum		Alkalinity, Total		Methoxychlor		PCBs
	Arsenic		Alkalinity, Bicarbonate		Toxaphene		1,1,2,2Tetrachloroethane(PCE)
	Barium		Bromide		2,4-D		1,1,1-Trichloroethane
	Beryllium		Carbon Dioxide		2,4,5-TP-Silvex		1,1,2 Trichloroethane
	Boron		Chloride		2,4,5-T		1,1,2 Trichloroethylene (TCE)
	Cadmium		Color				Trihalomethanes
	Calcium		Fluoride		GROUP J		TOX
	Chromium, Total		Iodide		Sulfides		Toluene
	Cobalt		Odor				Vinyl Chloride
	Copper		Residue, Total		Asbestos		Xylenes, Total
			Residue, Filterable (TDS)		Ignitability		

COMMENTS/SPECIAL INSTRUCTIONS Send results and invoice to John Lambdin. Please analyze for total petroleum hydrocarbons and BTEX. RUSH

RELINQUISHED BY 1.	RELINQUISHED BY 2.	RELINQUISHED BY 3.	ON SITE ANALYSES	
[illegible signature] 15:30	4:00		Turbidity	
(Signature) (Time)	(Signature) (Time)	(Signature) (Time)		
[illegible] 12/28/89	12/28/89		Flow	
(Print Name) (Date)	(Print Name) (Date)	(Print Name) (Date)		
EPNG CO			Chlorine, Total	
(Company)	(Company)	(Company)		
RECEIVED BY 1.	RECEIVED BY 2.	RECEIVED BY 3.	Dissolved, Oxygen	
[signature] 3:30	[signature] 1145			
(Signature) (Time)	(Signature) (Time)	(Signature) (Time)	pH	
12/28/89	[illegible] 12/29			
(Print Name) (Date)	(Print Name) (Date)	(Print Name) (Date)	Temperature	
[illegible]	A&E TESTING, INC.			umhos
(Company)	(Company) ...aboard Drive	(Company)	EC	

Baton Rouge, La. 70808

Phone: (504) 769-1930

SP2983

Flora Vista Remediation

update sampling program results
FV number of [illegible]
Crouch Paper.

Comments on Report.

1. Table 3-4 p. 41 WQCC standards not correct so TEX MethCl?

2. p. 45 Discuss O&G more prepare investigation to verify not O&G from sep/dehy

3. Copy of Crouch paper

4. p52 Table 4-2 - wrong conc

5. p57 - Reserve pit closure

Remedial Action plan

0. P.59 - visual evidence - how to [illegible]

1. P.60 - option one - how stored on plastic sheets or pad.

2. P.60 - Area around S → how inspected (resample)

3. P60 - Turbidity 2-3 ST/day
Must propose capture method

Soils

Inter-Mountain Laboratories, Inc.

Route 3, Box 256 College Station, TX 77840 Tel. (409) 776-8945 Fax. (409) 774-4705

Login # - 8907003
P.O. # - 25603

K.W. BROWN & ASSOCIATES, INC.
Project: EPNG FLORA VISTA - 63712

July 18, 1989

Lab #	Location	pH	EC, mmhos/cm	Calcium ppm	Magnesium ppm	Potassium ppm	Sodium ppm	HCO3 ppm	CO3 ppm	Chloride ppm	Sulfate ppm	Oil & Grease ppm	3050 Barium ppm	3050 Cadmium ppm	3050 Chromium ppm	3050 Selenium ppm
C89021	T-1 EAST	7.9	0.79	116	9	10	39	48	0	20	285	268	285	0.7	7	0.16
C89022	T-1 CENTER	8.0	0.95	124	13	16	48	59	0	20	331	356	479	0.8	6	0.09
C89023	T-1 WEST	8.0	0.95	128	11	10	43	37	0	21	270	1608	314	0.6	3	0.23
C89024	T-2 EAST	8.2	0.58	64	4	10	39	54	0	17	197	96	607	0.6	16	0.23
C89025	T-2 CENTER	8.0	0.95	95	9	11	79	59	0	13	285	492	560	1.0	6	0.29
C89026	T-2 WEST	8.0	0.90	66	6	9	103	47	0	9	283	92	498	1.5	9	0.29
C89027	T-3 EAST	8.1	0.79	88	7	11	55	55	0	13	279	204	225	0.8	10	0.12
C89028	T-3 CENTER	8.2	0.65	93	12	27	28	45	0	5	230	784	212	0.5	4	0.13
C89029	T-3 WEST	8.2	0.56	75	5	7	21	38	0	7	187	192	508	1.1	8	0.27
C89030	T-4 EAST	8.1	0.58	81	4	8	24	58	0	2	186	268	490	1.3	5	0.20
C89031	T-4 CENTER	8.3	0.30	33	1	7	12	55	0	6	47	236	592	1.5	3	0.09
C89032	T-4 WEST	8.4	0.28	36	1	7	13	46	0	6	72	256	371	0.6	2	0.20
C89033	T-5	8.0	1.03	148	12	17	44	59	0	7	404	2253	322	1.7	8	0.17
C89034	PIT NORTH	8.4	1.30	83	11	14	161	121	0	35	305	3000	221	1.8	8	0.22
C89035	PIT SOUTH	8.1	1.86	188	30	7	168	81	0	83	424	4484	395	3.8	9	0.62
C89036	PIT EAST	8.3	3.32	127	44	9	592	154	0	98	1027	3316	368	2.9	8	0.22
C89037	PIT WEST	8.4	1.93	52	9	8	361	102	0	38	498	2224	238	2.0	8	0.12
C89038	T-6 EAST	7.9	1.76	294	21	11	67	53	0	38	687	1624	361	3.8	15	0.49
C89039	T-6 WEST	7.9	0.72	115	6	8	28	40	0	15	298	176	669	1.7	3	0.29
C89040	T-7	7.8	1.23	204	14	11	44	75	0	9	360	984	270	1.4	7	0.19
C89041	RP1-A	8.5	2.84	34	9	40	549	82	0	251	909	1124	28	2.6	56	0.90
C89042	RP1-B	9.0	2.98	162	1	26	487	34	0	174	1271	692	227	1.1	78	0.19
C89043	RP2	8.1	1.01	121	14	11	60	66	0	23	410	2028	107	2.1	161	0.62
C89044	BG-1	8.0	1.36	199	17	9	83	68	0	11	618	68	315	1.7	10	0.16
C89045	T-6 EAST(DUP)	7.9	1.83	304	22	11	68	59	0	39	756	1728	336	3.6	11	0.41
C89046	T-6 WEST(DUP)	7.9	0.67	101	5	7	25	37	0	11	279	100	601	1.4	3	0.29
C89047	T-7(DUP)	7.8	1.19	199	14	11	42	74	0	11	557	684	268	1.6	6	0.13

Water

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Lab #	Location	pH, S.U.	EC, umhos/cm	TDS, 180c mg/l	TDS, Calc. mg/l	SAR	Total ALK mg/l	Oil & Grease, mg/l	Sulfite mg/l	Sulfide mg/l	HCO3 mg/l	CO3 mg/l	Chloride mg/l	Sulfate mg/l	Calcium mg/l
89052	EPNG - 1	7.7	2120	1780	1630	1.31	313	2.0	< 2	< 1	382	0	33	894	386
89053	EPNG - 2A	7.7	1770	1520	1460	0.74	295	1.5	< 2	< 1	360	0	44	775	376
89054	EPNG - 2B	7.6	1710	1440	1370	0.73	269	< 1.0	< 2	< 1	328	0	33	746	354
89055	EPNG - 3	7.7	2140	1890	1800	0.93	277	< 1.0	< 2	< 1	337	0	49	1030	440
89056	EPNG - 4	7.8	1970	1670	1610	1.10	281	< 1.0	< 2	< 1	342	0	27	914	365
89056	EPNG 4 DUP	7.9	1970	1670	1590	1.09	278	< 1.0	< 2	< 1	339	0	27	903	356
89057	OCD - 1	8.0	1360	1060	999	0.62	311	< 1.0	< 2	< 1	379	0	27	454	264
89058	OCD - 2	7.6	1430	1160	1090	0.55	296	4.1	< 2	< 1	361	0	16	544	302
89059	S - 1	7.8	943	674	658	0.38	231	< 1.0	< 2	< 1	281	0	27	270	189
89060	S - 5	7.8	927	600	608	0.54	252	< 1.0	< 2	< 1	308	0	22	228	153
89060	S-5 DUP	7.7	932	600	607	0.52	253	< 1.0	< 2	< 1	308	0	22	229	153
89061	KWBA - 1	7.7	1800	1490	1440	0.74	282	1.3	< 2	< 1	344	0	44	778	360
89062	KWBA - 2	6.2	4	1	4.5	0.00	1.9	< 1.0	< 2	< 1	2.3	0	0	2.5	1

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Lab #	Location	Magnesium mg/l	Potassium mg/l	Sodium mg/l	Cation Sum	Anion Sum	Difference %	Barium mg/l	Cadmium mg/l	Chromium mg/l	Selenium mg/l
89052	EPNG - 1	23	2	98	25.46	25.80	0.66	< 0.5	0.010	0.03	< 0.001
89053	EPNG - 2A	26	1.8	55	23.30	23.26	0.09	< 0.5	0.010	0.02	< 0.001
89054	EPNG - 2B	18	1.4	52	21.44	21.84	0.09	< 0.5	0.010	0.02	< 0.001
89055	EPNG - 3	35	1.9	75	28.10	28.29	0.34	< 0.5	0.010	0.02	< 0.001
89056	EPNG - 4	46	1.9	84	25.72	25.41	0.60	< 0.5	0.010	<0.03	< 0.001
89056	EPNG 4 DUP	49	1.8	83	25.48	25.12	0.71	< 0.5	0.010	0.02	< 0.001
89057	OCD - 1	23	1.8	39	16.83	16.43	1.20	< 0.5	0.010	0.02	< 0.001
89058	OCD - 2	14	1.8	36	17.80	17.70	0.28	< 0.5	0.009	0.02	< 0.001
89059	S - 1	11	0.9	20	11.18	11.00	0.81	< 0.5	0.009	< 0.02	< 0.001
89060	S - 5	22	1.6	27	10.69	10.41	1.33	< 0.5	0.070	< 0.02	< 0.001
89060	S-5 DUP	21	1.6	26	10.55	10.43	0.57	< 0.5	0.010	< 0.02	< 0.001
89061	KWBA - 1	33	1.8	55	23.12	23.07	0.11	< 0.5	0.010	0.02	< 0.001
89062	KWBA - 2	0.6	0	0	0.10	0.09	5.26	< 0.5	0.005	< 0.02	< 0.001

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89054	EPNG - 2B	18	1.4	52	21.44	21.84	0.09	< 0.5	0.010	0.02	< 0.001
89055	EPNG - 3	35	1.9	75	28.10	28.29	0.34	< 0.5	0.010	0.02	< 0.001
89056	EPNG - 4	46	1.9	84	25.72	25.41	0.60	< 0.5	0.010	0.03	< 0.001
89056	EPNG 4 DUP	49	1.8	83	25.48	25.12	0.71	< 0.5	0.010	0.02	< 0.001
89057	OCD - 1	23	1.8	39	16.83	16.43	1.20	< 0.5	0.010	0.02	< 0.001
89058	OCD - 2	14	1.8	36	17.80	17.70	0.28	< 0.5	0.009	0.02	< 0.001
89059	S - 1	11	0.9	20	11.18	11.00	0.81	< 0.5	0.009	< 0.02	< 0.001
89060	S - 5	22	1.6	27	10.69	10.41	1.33	< 0.5	0.070	< 0.02	< 0.001
89060	S-5 DUP	21	1.6	26	10.55	10.43	0.57	< 0.5	0.010	< 0.02	< 0.001
89061	KWBA - 1	33	1.8	55	23.12	23.07	0.11	< 0.5	0.010	0.02	< 0.001
89062	KWBA - 2	0.6	0	0	0.10	0.09	5.26	< 0.5	0.005	< 0.02	< 0.001

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
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SANTA FE, NEW MEXICO 87504
(505) 827-5800

March 30, 1989 1998

CERTIFIED MAIL
RETURN RECEIPT NO. P-918-402-154

Mr. Kenneth E. Beasley, Manager
North Region Compliance Engineering
EL PASO NATURAL GAS COMPANY
P. O. Box 1492
El Paso, Texas 79978

RE: Site Investigation Report/Remedial Action Plan for the Manana-Mary Wheeler #1E Gas Well Site, Flora Vista, New Mexico

Dear Mr. Beasley:

Attached are my comments on the above report. After review by you and your consultant, K.W. Brown and Associates, I would like to schedule a conference call or meeting in mid to late April to discuss my comments, your reply, and a schedule to commence work in late spring/early summer. The goal should be to accomplish physical removal of soils and complete cleanup by the end of the summer.

Two other issues, not mentioned previously in correspondence, but which I believe are critical to future protection of ground water, are the placement of proper well seals and locks on Flora Vista's water wells, and replacement of Manana's produced water tank. The issue of the unused but open, unsealed water wells has been mentioned numerous times, including as recommendations in my 1986 reports. Wells S-1, S-4, and S-5 and any other unused production wells should be sealed but with locking caps so that water level and sampling can be conducted as necessary. Exploratory wells SX-1 and SX-2 should have their caps examined and welded shut, if not already done so.

Secondly, Manana's fiber-glass tank sits partially below grade and has a buckled side. It should be replaced by an above ground metal stock tank, probably at the time of excavation. Without these additional precautions the cleanup could be undone in the event of vandalism or accident and charges could be made that EPNG was negligent in cleanup. OCD will contact Manana regarding the produced water tank, but EPNG may wish to assume responsibility for sealing unused wells to avoid any further future liability.

Along with my comments, I have also enclosed a copy of a map showing the Flora Vista numbering of water wells. Please send a copy of EPNG's December's Flora Vista analyses; I ended up with results of some other EPNG sampling.

On a personal note, with the rehiring of Bill Olson, we're finally digging ourselves out of the remedial action hole we were in (Pardon the expression!). We have at least a dozen projects needing attention similar to this one. My apologies for taking so long to get these comments out.

Sincerely,

Dave

David G. Boyer, Hydrogeologist
Environmental Bureau Chief

DGB/sl

Enclosures

cc: W. J. LeMay, Director OCD
OCD Aztec Office
J. Eichelmann, Burlington Northern
S. Johnson, KW Brown & Associates

COMMENTS ON SITE INVESTIGATION/REMEDIAL ACTION PLAN AT MANANA MARY WHEELER #1E GAS WELL FLORA VISTA, NEW MEXICO

Prepared by
David G. Boyer, Hydrogeologist
March, 1990

I. Comments on Site Investigation Report

1. p.41, Table 3-4. The values for Benzo(b) fluoranthene and Indeno (1, 2, 3-cd) pyrene should be shown as 2 and 6 ug/l (instead of 0.002 and 0.006 ug/l). The correct values for WQCC standards for Ethylbenzene, Toluene and Xylenes (total) are 750, 750 and 620 mg/l, respectively.

2. p.45. A discussion of oil and grease concentrations found in soil samples taken from trenches 6 and 7 is presented. Additional investigation is necessary to verify the actual presence of a "slug" of oil in this area, especially if analytical techniques may have contributed to false positive readings (ref. "A Comparison of Methods of Measuring Total Petroleum Hydrocarbons in Soil," 1989 NWWA/API Proceedings of the Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water) present a plan to perform the necessary verification.

3. p. 48. Please provide a copy of the referenced 1983 paper on risk assessment by Crouch ("The Risk of Drinking Water").

4. p.48, Comment on Section 4.0, Risk Assessment. As stated in this section, risk assessment techniques are used to estimate chronic toxic potential from contaminants dissolved in ground water. In addition to dissolved contaminants we have an oil phase that imparts visual and hydrocarbon odor characteristics to the water. The assessment technique would seem more appropriate if used after the cleanup to evaluate the risk of any remaining dissolved constituents.

5. p.52, Table 4.2. The contaminant concentrations listed in Table 4.2 are 1000 times greater than actually observed (eg. Benzene concentration in EPNG-2A is 8.1 ppb not 8,100 ppb). I suspect these are transcription errors. Please verify that the risk calculations shown are for the actual concentrations and not those shown in the table.

6. p. 57. In New Mexico, buried reserve pits commonly contain waste debris from drilling operations. It would not surprise me to find concrete fragments and scrap pipe in the pit.

II. Remedial Action Plan

A. Section 6.1.1. Contaminated Soil

1. p.59. Describe further the procedure for visual inspection verification of removal of contaminated soil, especially since contamination extends to sands and gravels beneath the water table. Is temporary dewatering proposed as part of the soil removal process?

2. p.59. Removal of hydrocarbon stained soil should extend to the vicinity of well S-1 since staining was noted in that location during the 1987 excavation (See the discussion on page 2 of Dr. Blair's 1987 report).

3. p.59. What procedures are proposed to determine the extent and the necessity for soil removal under lease structures (eg. oil/water separator, produced water tank, meter house).

4. p.59. Describe the type and source of the material that will be deposited in the excavation to replace the contaminated soil.

5. p.60. If the contaminated soil is stored on site prior to offsite removal, it must be stored such that oil and water drainage is intercepted prior to discharge to the bare ground. Likewise, saturated soil cannot be loaded directly into trucks such that oily water will discharge onsite or enroute to the disposal location.

B. Section 6.1.2. Contaminated Groundwater

1. p.60. Explain the impacts to the area adjacent to well S-5. Is the reference to the oil and grease analyses or the low levels of dissolved hydrocarbons found during the 1989 site investigation sampling?

2. p.60. Additional sampling of S-5 is necessary to verify if benzene and toluene are present at trace levels as shown in the 1989 site sampling. (1986 sampling also detected these at about the same levels).

3. p.60. During excavation, water will be made turbid with the disturbance and residual oil may be freed from the soil and float on top of the water. Equipment should be available on site during excavation to skim and remove floating oil.

C. Section 6.3. Monitoring Soil

1. p.61. Soil. Explain how representative samples are to be collected from the bottom of the excavation if the excavation is not dewatered.

2. p.61. Groundwater. The December, 1989 EID/OCD sampling of well S-1 detected acetone. Pre-cleanup sampling should verify the presence or absence of that contaminant.

3. p.62. In addition to replacement monitor wells, I would like to discuss digging a temporary trench just downgradient of the southwestern-most area of excavation to serve as an observation trench. It would provide visual verification (absence of product or sheens) that no floating hydrocarbons escaped excavation. More importantly, with ground water flow at 2 to 3 feet per day, it would allow natural volitization of any remaining dissolved hydrocarbons. With a minimum of agitation and circulation the trench could act as a final treatment "air stripper" and aeration system. It could be kept in use for a short period of time (90-120 days) after excavation and soil replacement has been completed to allow flushing of the replacement soil.

4. p.62. Suggest a schedule for short and long term pumping and testing of well S-1 after completion of the excavation.

5. p.62. Provide the number and location of the proposed monitoring wells.

6. p.62. Analytical Parameters. In addition to the proposed sampling constituents, analyses of water should include major cations and anions. Soil analyses should include chromium and those PAH's detected and shown in Table 3.5 (p. 43).

7. p.63. Sampling Frequency. Monitor wells shall be removed, or properly plugged and abandoned at the conclusion of their use. This will be no later than at the time of decommissioning of the gas well, or an earlier time as approved by OCD after consultation with other involved parties (i.e. Flora Vista Water Users, EID, EPNG, Manana).

D. Additional Comments

Provide a proposed timetable for the start and completion of the remedial action, including the time expected to be required for the excavation phase.

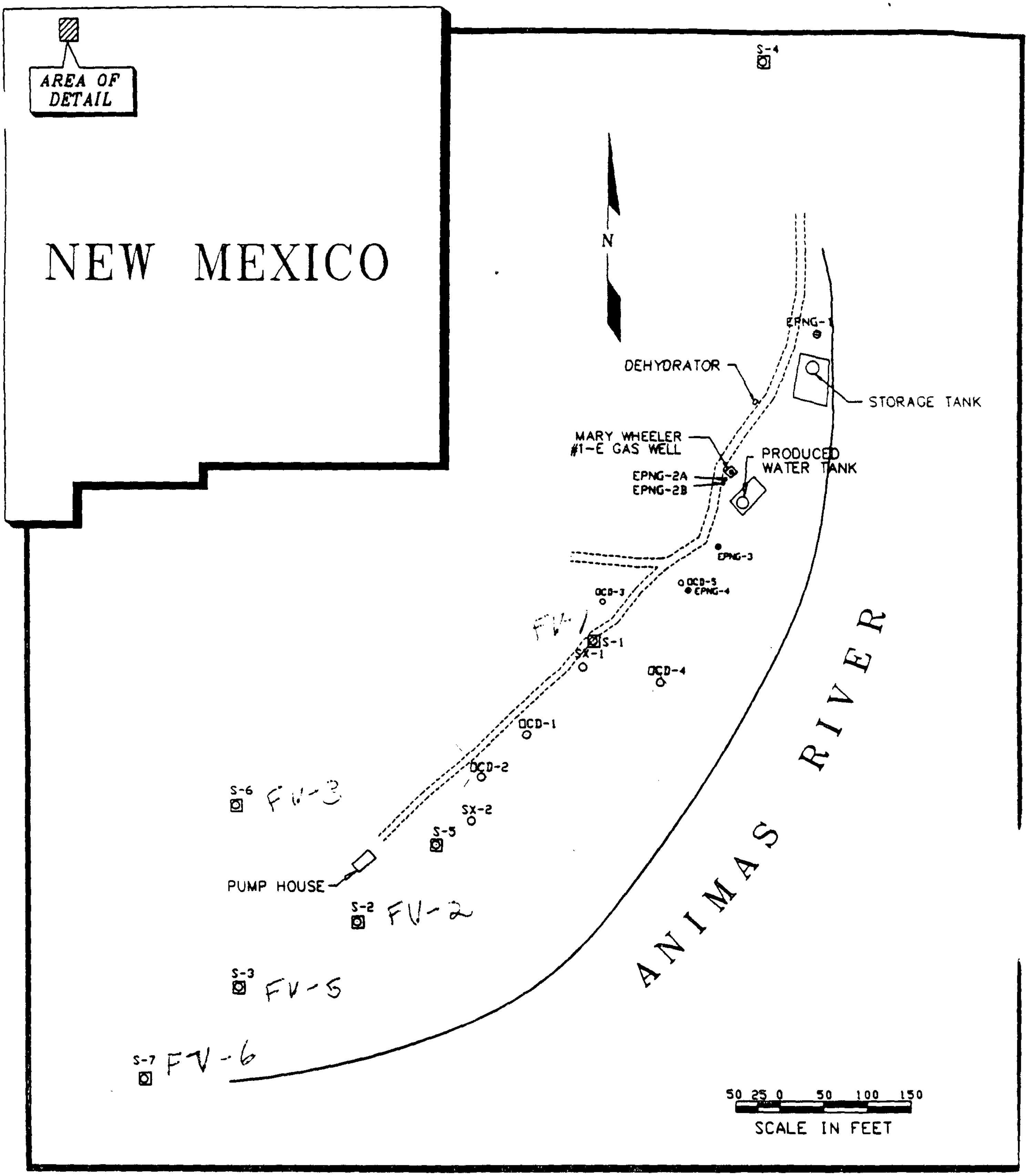

FIGURE 2-1. MAP SHOWING LOCATION OF THE MAÑANA - MARY WHEELER #1-E WELL SITE.