GW - 2

MONITORING REPORTS

DATE: 1989-1986

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ATKEARNEY

March 29, 1989

Mr. Thomas D. Clark
Regional Project Officer
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202-2733

Reference: EPA Contract No. 68-01-7374; Work Assignment No. R26-06-04; Phillips Petroleum-Lee Natural Gas Plant; Buckeye, New Mexico; EPA I.D. No. NMD000709659; Comprehensive Ground-Water Monitoring Evaluation (CME); CME Report

Dear Mr. Clark:

As you requested, we have enclosed one copy of the draft report and one copy of the cover letter for the above-referenced project. We are sending the original report and two copies of the report to Julie Wanslow at the New Mexico Environmental Improvement Division.

Because of the unusual length of time required for analysis of samples by the EID laboratory and the fact that the current contract terminates on March 31, 1989, we will be unable to respond to any comments you may have concerning this report. However, we would like to offer you a copy of the report (excluding Appendices C, D and E) on a floppy disk in "Word Perfect 5.0" format. This would allow you to make revisions to the report as you require.

As a result of this evaluation, we found several technical deficiencies which may constitute violations of 40 CFR Parts 264 and 270. Detailed lists of deficiencies and potential regulatory violations are provided in our report.

Please contact me or Steve Muse, the Work Assignment Manager, at (703) 548-4700, if you have any questions.

Sincerely,

Arthur Glazer
Technical Director

Enclosure

cc: J. Wanslow, EID (original and two copies)
J. Levin
D. Bean
S. Muse
A. Schaffer (w/o enclosure)
S. Strum, SAIC

COMPREHENSIVE GROUND-WATER MONITORING EVALUATION

REPORT

Phillips Petroleum-Lee Natural Gas Plant
Buckeye, New Mexico
EPA I.D. Number NMD000709659

Prepared for:

U.S. Environmental Protection Agency
Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

Prepared by:

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Contract No. 68-01-7374
Work Assignment No. R26-06-04

March 1989

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1.0 INTRODUCTION

1.1 Description, Objective and Scope

A Comprehensive Ground-Water Monitoring Evaluation (CME) is a detailed evaluation of the design and operation of the ground-water monitoring systems at RCRA-regulated facilities. The objective of the CME is to determine if a facility has, in place, a ground-water monitoring system which is adequately designed, constructed, and operated so as to yield representative samples of in-situ ground-water and to detect releases of hazardous constituents, or to define the rate and extent of migration of contaminants to ground water from the waste management area. This is a requirement under 40 CFR 265, Subpart F.

The purpose of this CME report is to present the findings of the CME conducted at the Phillips Petroleum - Lee Natural Gas Plant (Lee) and to identify the technical deficiencies which may constitute violations of regulations under 40 CFR Parts 265 and the applicable sections of 40 CFR 270.

1.2 Documents and Other References Used

The references used to prepare this report include the facility's RCRA Part A permit application; correspondence between the facility and EPA Region VI and the New Mexico Environmental Improvement Division (NMEID); previously conducted facility inspection reports; the facility's contractor reports; regional geologic and hydrogeologic reports; the facility's sampling and analysis plan; communications with NMEID and Phillips personnel; and interviews with Phillips personnel during the field evaluation.

1.3 Components of the Comprehensive Ground-Water Monitoring Evaluation

A CME is a two-phased process consisting of both office and field evaluation components. The office evaluation is the first phase of the CME and is intended to determine the adequacy of the design of the facility's ground-water monitoring system (GWMS). The field evaluation is the second phase of the process, and involves a field evaluation of the operation of the system, as well as verification (where possible) of the findings of the office evaluation.

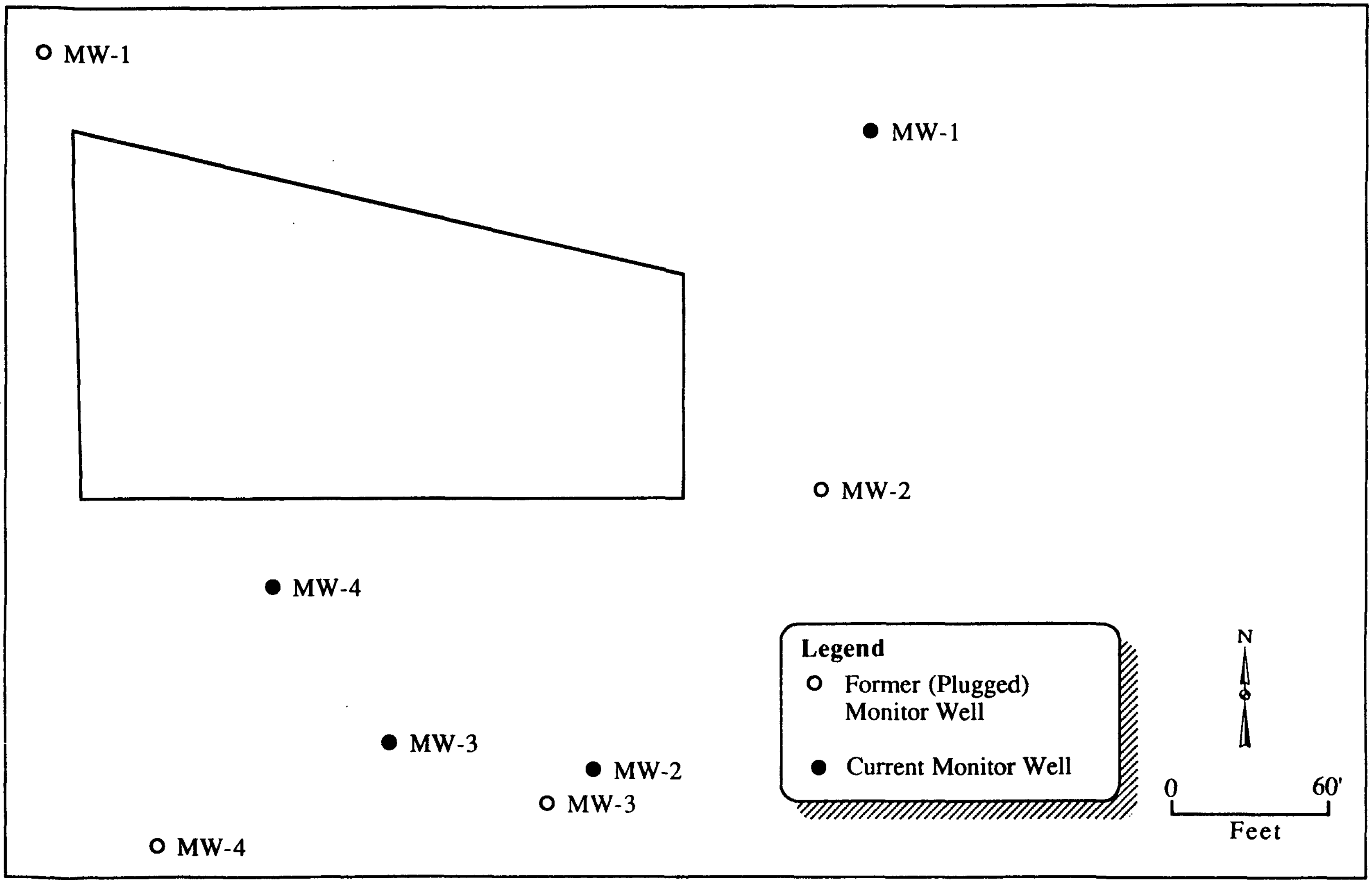
To assist the evaluator in the CME process, office and field evaluation checklists (Appendices A and B, respectively) were developed using the RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD) as a guide. These checklists are completed by the evaluator for each facility at which a CME is performed.

1.4 Facility Description and Operation

The Lee facility (EPA ID No. NMD000709659) is located near Buckeye, New Mexico in the southeastern part of the state (Section 30, T17S,R35E). At the Lee facility, raw natural gas is processed for recovery of natural gas liquids and sulfur. The facility operated a surface impoundment for the treatment of cooling tower blowdown water from approximately 1953 until 1984. The impoundment may also have received process wastewater (7). A skimmer may also have been present for oil removal (33, 37). The blowdown water contained chromium which was used as a corrosion inhibitor until October 1983, when the facility began using a non-hazardous phosphate-type corrosion inhibitor (8). In 1984, the facility discontinued use of the surface impoundment and filled it in with caliche. In June of 1984, NMEID issued a Notice of Violation (NOV) citing improper operation of the Lee surface impoundment. Phillips subsequently submitted closure and post-closure plans for the Lee surface impoundment. In October 1984, Phillips submitted certification of closure for the Lee surface impoundment. A map depicting the surface impoundment, the former GWMS and the new GWMS is included as Figure 1-1.

Figure 1-1

Site Map Showing Former and Current Monitoring Wells
Lee Gas Plant



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1.5 History of the Regulatory Status of the Phillips Petroleum-Lee Natural Gas Plant

1.5.1 Status of the Permit Process for the Lee Facility

The Lee facility notified EPA of its hazardous waste management activities in August 1980 and submitted its Part A permit application in November 1980. In June 1982, Phillips withdrew the notification and the Part A application based on a Phillips' review of the facility process which determined that Phillips had incorrectly applied for a RCRA permit. Phillips filed an amended Part A application in March 1983, and notified EPA that the surface impoundment may, from time to time during its use, have received chromium in excess of the levels for EP Toxicity. EPA issued a Compliance Order to the Lee facility in September 1983 for operating without interim status and for failure to determine whether the cooling tower blowdown water was a hazardous waste. In July 1984, the facility submitted a closure/post-closure plan for the surface impoundment. Closure certification approval by the New Mexico Environmental Improvement Division (EID) is pending.

1.5.2 Ground-Water Monitoring Status of the Lee Facility

The Lee facility operated a surface impoundment for the disposal/treatment of cooling tower blowdown water from approximately 1953 until 1984. The facility installed four interim status monitoring wells to monitor the uppermost aquifer beneath the surface impoundment in 1984. These wells were judged to be inadequate by EID and EPA Region VI. In April 1988, Phillips plugged the original wells and installed four new monitoring wells to fulfill requirements of an EID compliance order concerning post-closure ground-water monitoring. The facility began sampling these wells in May 1988. EID considers the Lee facility to be in the detection phase of monitoring[11,19].

2.0 KEY FINDINGS

This section presents the findings of the CME in terms of the ground-water performance standards which have not been met by the Lee facility, the technical deficiencies which were discovered during the office, and field evaluations and the regulations under 40 CFR Parts 265 and 270 which may have been violated. Table 2-1 summarizes the findings. Subsequent sections provide the basis for these findings and present further details about the facility and its operations.

Table 2-1

Ground-Water Performance Standard Requirements Which Were Not Met	Technical Deficiencies Which May Constitute Violations Under 40 CFR Parts 265 and 270	Regulatory Citations
Uppermost aquifer must be correctly identified	o Failure to clearly define the extent of the uppermost aquifer in the area of the facility	§265.90(a) §265.91(a)(1) (a)(2) *§270.14(c)(2)
	o Failure to adequately consider aquifers which may be hydraulically interconnected to the uppermost aquifer	§265.90(a) §265.91(a)(1) (a)(2) *§270.14(c)(2)
Ground-water flow directions and rates must be properly defined	o Failure to collect data sufficient to establish ground-water flow directions and rate (relying too heavily on regional data)	§265.90(a) §265.91(a)(1) (a)(2) *§270.14(c)(2)
Geologic and hydrogeologic formations underlying the site must be fully characterized	o Failure to assess significance of vertical gradients when evaluating flow rates and directions	§265.90(a) §265.91(a)(1) (a)(2) §270.14(c)(2)
	o Failure to prepare flow nets	§270.14(c)(2)
	o Failure to document the procedure for establishing the potentiometric surface	§265.90(a) §265.91(a)(1) (a)(2) *§270.14(c)(2)
	o Failure to document the method(s) of obtaining samples during the 1984 boring program	§265.90(a) §265.91(a)(1)
	o Failure to consider temporal and seasonal variations in water levels when establishing flow directions	§265.90(a) §265.91(a)(1) (a)(2) §270.14(c)(2)

* Indicates potential Class I regulatory violation.

Table 2-1 (Cont.)

Ground-Water Performance Standard Requirements Which Were Not Met	Technical Deficiencies Which May Constitute Violations *Under 40 CFR Parts 265 and 270*	Regulatory Citations
Geologic and hydrogeologic formations underlying the site must be fully characterized (cont.)	o Failure to document the method(s) of obtaining samples during the 1984 boring program	§265.90(a) §265.91(a)(1)
	o Failure to consider temporal and seasonal variations in water levels when establishing flow directions	§265.90(a) §265.91(a)(1) (a)(2) §270.14(c)(2)
	o Failure to perform pump tests to determine hydraulic conductivity of uppermost aquifer	§270.14(c)(2)
	o Failure to collect sufficient hydrogeologic data to support selection of the geometric dimensions of the uppermost aquifer	§265.90(a) §265.91(a)(1) (a)(2) §270.14(c)(2)
	o Failure to document presence or absence of confining layer	§270.14(c)(2)
	o Failure to perform sufficient pump tests to prove a lack of interconnection between aquifers	§270.14(c)(2)
	o Failure to drill sufficient borings in the site investigative program to establish accurate correlation of geologic units between boreholes	§270.14(c)(2)
	o Failure to provide geologic and hydrogeologic cross-sections concerning subsurface conditions	§270.14(c)(2)
	o Failure to prepare boring logs and field notes	§270.24(c)(2)
	o Failure to prepare geologic cross-sections, and soil maps	§270.14(c)(2)
	o Failure to perform material tests and geochemical analyses on boring samples	§270.14(c)(2)

* Indicates potential Class I regulatory violation.

Table 2-1 (Cont.)

Ground-Water Performance Standard Requirements Which Were Not Met	Technical Deficiencies Which May Constitute Violations Under 40 CFR Parts 265 and 270	Regulatory Citations
Geologic and hydrogeologic formations underlying the site must be fully characterized (cont.)	o Failure to prepare structure maps of the water-bearing formations and confining layer	§270.14(c)(2)
	o Failure to adequately characterize site hydrogeology	§270.14(c)(2)
	o Failure to document qualifications of personnel supervising boring program in 1984	§270.14(c)(2)
	o Overreliance on regional geologic and hydrogeologic data in site investigation	§270.14(c)(2)
	o Failure to provide a topographic map prepared by a licensed surveyor	§270.14(c)(2)
	o Failure to prepare a contour map accurately depicting the potentiometric surface of the uppermost aquifer	§270.14(c)(2)
	o Failure to document methods or criteria used to correlate and analyze subsurface data	§270.14(c)(2)
	o Failure to provide documentation of criteria used to select boring locations	§270.14(c)(2)
	o Failure to have 1984 boring logs prepared by a qualified geologist	§270.14(c)(2)
	o Failure to prepare adequate borings logs	§270.14(c)(2)
Downgradient wells must be located so as to ensure the immediate detection of any contamination migrating from the facility	o Failure to locate downgradient monitoring wells at the edge of the hazardous waste management unit	§265.91(a)(2)

* Indicates potential Class I regulatory violation.

Table 2-1 (Cont.)

Ground-Water Performance Standard Requirements Which Were Not Met	Technical Deficiencies Which May Constitute Violations Under 40 CFR Parts 265 and 270	Regulatory Citations
Samples from background and down-gradient wells must be properly collected and analyzed	o Failure to transfer samples directly to containers from bailer	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	o Failure to make proper use of sample blanks	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	o Failure to document in the sampling and analysis plan the cleaning procedures for sample containers for inorganics	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	o Failure to use sampling methods which can detect immiscible layers	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	o Improper handling of samples for volatiles analysis; samples agitated as placed in containers	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	o Chain-of-custody form does not request time or date of collection	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)

* Indicates potential Class I regulatory violation.

3.0 DISCUSSION OF THE OFFICE EVALUATION AND FIELD EVALUATION AT PHILLIPS LEE NATURAL GAS PLANT

The office evaluation and field evaluation phases of a CME involve review of the available file material concerning the facility's ground-water monitoring program and GWMS design, and a site visit for the purpose of evaluating the operation of the GWMS. Checklists for both the office and field evaluation have been developed to aid the technical reviewer in the evaluation. These checklists have been completed for this CME and are attached as Appendices A and B. Findings and conclusions of the office and field evaluations are presented in Sections 5.1 and 5.2, respectively.

EPA Region VI and the New Mexico Environmental Improvement Division (EID) requested that the Kearney Team obtain replicate ground-water samples from the new monitoring wells MW-1, MW-2, MW-3, and MW-4 at the Lee facility during the facility's routine sampling event. Samples were to be analyzed for volatile organics, semi-volatile organics, turbidity and Priority Pollutant Metals. The samples for volatile and semi-volatile organics were submitted to C-E Environmental, Inc., for analysis. The samples for metals and turbidity analyses were submitted to the New Mexico Health and Environmental Department, Scientific Laboratory Division (SLD) in Albuquerque. At the request of SLD, samples submitted for metals analyses were preserved with nitric acid in the field. The Kearney Team provided sample containers and preservatives necessary for the replicate samples.

The field evaluation at the Lee facility was conducted on October 31 and November 1, 1988. The Kearney Team included Phebe Davol and Marianne Smith (Kearney/Centaur). The team arrived at the facility at 9:20 a.m. Mountain Standard Time (MST) on October 31. The team met briefly with Mike Ford who is the Staff Environmental Analyst for the Phillips Petroleum facilities in the area. The team explained to Mr. Ford that they would observe his techniques and procedures for well evacuation, sample collection and handling, and record-keeping. Ambient air temperatures ranged from 65°F to 75°F, winds were from the south at 5 to 10 mph and skies were mostly sunny during the two-day field evaluation.

All samples were stored on ice in coolers from time of collection until they were delivered to the analytical laboratories by Federal Express on November 2, 1988.

4.0 ANALYTICAL RESULTS

The samples collected by the Kearney Team for analysis of volatiles, semivolatiles, turbidity and inorganics were shipped on the day of collection via overnight air service to the designated laboratories. The chain-of-custody and analytical request forms were completed and included with each shipment. A custody seal was affixed to each cooler prior to shipment. The laboratories were notified to expect delivery of the samples the following day.

The samples collected for analysis of organic parameters were submitted to the C-E Environmental, Inc., lab in Camarillo, CA. C-E Environmental analyzed for all CLP target compounds (volatile and semivolatile organics). In addition to the CLP target list, the samples were analyzed for 2-butanone; 1-methyl-naphthalene; (o,m,p-)cresol; and 7,12-dimethylanthracene. The lab provided the standard CLP data package summarizing the results of the analyses and related QC data. A summary of the analytical results provided by CE Environmental is presented in Table 4-1. The complete data package is attached as Appendix E to this report.

The samples collected for the analysis of inorganic parameters were shipped to the EID Scientific Laboratory Division (SLD) in Albuquerque. Prior to delivery to the lab, the field team had completed all necessary analytical forms as required by SLD. The SLD lab analyzed the samples for Total Metals and for turbidity, and provided a data package summarizing the results of the analyses. A summary of the analytical results provided by SLD is included in Table 4-1. The complete data packages are included as Appendix E to this report.

High levels of volatile organic constituents were detected in MW-4. Cadmium was detected in the upgradient well, but was not detected in any of the downgradient wells. Arsenic was detected in MW-3 and MW-4 at higher levels than in the upgradient well. Lead was detected in the upgradient well at higher levels than in the downgradient well MW-3. Lead was not detected in downgradient wells MW-2 or MW-4. Turbidity results were high for all four wells. This may indicate inadequate well development, and may cause interferences which affect the analytical results.

Table 4-1

Analytical Results Summary
Phillips-Lee CME

Sample Id#	Organics (ppb)	Inorganics(ppm)		Turbidity (NTU)
MW-1	None detected	Aluminum	21.0	77.0
		Arsenic	0.024	
		Barium	1.9	
		Cadmium	0.053	
		Calcium	610.0	
		Chromium	0.043	
		Iron	23.0	
		Lead	0.030	
		Magnesium	13.0	
		Manganese	0.91	
		Silicon	22.0	
		Silver	0.001	
		Strontium	1.1	
		Tin	0.2	
		Zinc	0.1	
MW-2	None detected	Aluminum	5.0	55.0
		Arsenic	0.021	
		Barium	0.9	
		Boron	0.2	
		Calcium	430.0	
		Iron	2.6	
		Magnesium	35.0	
		Manganese	1.1	
		Silicon	18.0	
		Strontium	2.2	
		Tin	0.1	
		Zinc	0.2	
MW-3	None detected	Aluminum	4.8	81.0
		Arsenic	0.29	
		Barium	0.3	
		Boron	0.1	
		Calcium	46.0	
		Iron	2.4	
		Lead	0.006	
		Magnesium	3.1	
		Manganese	0.09	
		Silicon	14.0	
		Strontium	0.1	
		Tin	0.1	

Table 4-1 (Cont.)

Analytical Results Summary
Phillips-Lee CME

Sample Id#	Organics (ppb)		Inorganics(ppm)		Turbidity (NTU)
MW-4	Acetone	10	Aluminum	1.7	102.0
	Benzene	6700	Arsenic	0.18	
	Ethyl benzene	160	Barium	0.6	
	Xylenes	220	Boron	0.2	
	Phenol	49	Calcium	160.0	
	Naphthalene	4	Chromium	0.008	
	2-Methyl naphthalene	2	Iron	3.3	
	bis(2-ethylhexyl) phthalate	3	Magnesium	18.0	
			Manganese	0.78	
			Silicon	15.0	
			Strontium	0.9	
			Tin	0.1	
MW-5 (Equipment Blank)	None detected		None detected		0.2
MW-6 (field Blank)	Acetone	29	None detected		0.05
	1,1,1-trichloro-ethane	18			
	Phenol	67			
	Naphthalene	4			
	2-Methylnap-thalene	2			

5.0 SUMMARY AND CONCLUSIONS

5.1 Office Evaluation

The following sections are conclusions drawn from the CME office evaluation of the Phillips Petroleum Lee facility: Section 5.1.1 addresses the facility's evaluation of site subsurface geology; Section 5.1.2 addresses the facility's site hydrogeologic assessment; and Section 5.1.3 addresses the adequacy of the design and construction of the facility's GWMS.

5.1.1 Adequacy of the Characterization of Subsurface Geology and Related Data Gaps

Data from two subsurface investigations performed at the Lee facility were reviewed. The first investigation was completed in 1984 and the second in 1988. Both studies were conducted in order to determine appropriate locations for monitoring wells associated with the facility's former surface impoundment. While data collected during the investigations is useful and necessary, the depth of termination of the borings completed during the studies is not sufficient to adequately characterize site subsurface geology.

Several deficiencies and data gaps, which the facility should address, were noted during review of the facility's geologic information. The following is a description of these deficiencies:

- Criteria used to select spacing or depth of termination of borings was not provided;
- Methods of drilling and sample collection used during the 1984 study were not provided;
- Boring samples from the 1984 study were not logged by a qualified geological professional;

- Lithologic descriptions of the different strata encountered during the 1984 study were not complete or detailed enough;

- Lithologic logs from both studies (especially the 1984 work) were incomplete, lacking information such as sampling intervals and depth and vertical extent of water-bearing units;

- No geochemical or petrographic analyses were performed on samples from either study;

- No geologic cross-sections were prepared; and

- A site topographic map with contours intervals of two feet was not prepared.

5.1.2 <u>Adequacy of the Characterization of the Uppermost Aquifer and Related Data Gaps</u>

The hydrogeologic assessment inducted at the Lee facility is incomplete and identification of the uppermost aquifer has not been accomplished. The following deficiencies and data gaps identified during the office evaluation should be addressed by the facility:

- No materials tests (e.g., sieve analysis) were performed on borings samples;

- No piezometers were installed for use in determining the vertical and horizontal gradients;

- No pump tests or slug tests were performed;

- Values for hydraulic conductivity were obtained from a text on hydrogeology;

- No hydrogeologic cross-sections were prepared;

- Presence or absence of the first confining layer beneath the uppermost aquifer has not been documented and lack of hydraulic communication between the uppermost aquifer and underlying aquifer has not been established;

- Narrative description and calculation of ground-water flow rate was not provided;

- The potentiometric surface map based on data collected in May 1988 does not include static water level data;

- A vertical component of flow through unsaturated and saturated zones was not considered; and

- Flow nets have not been prepared.

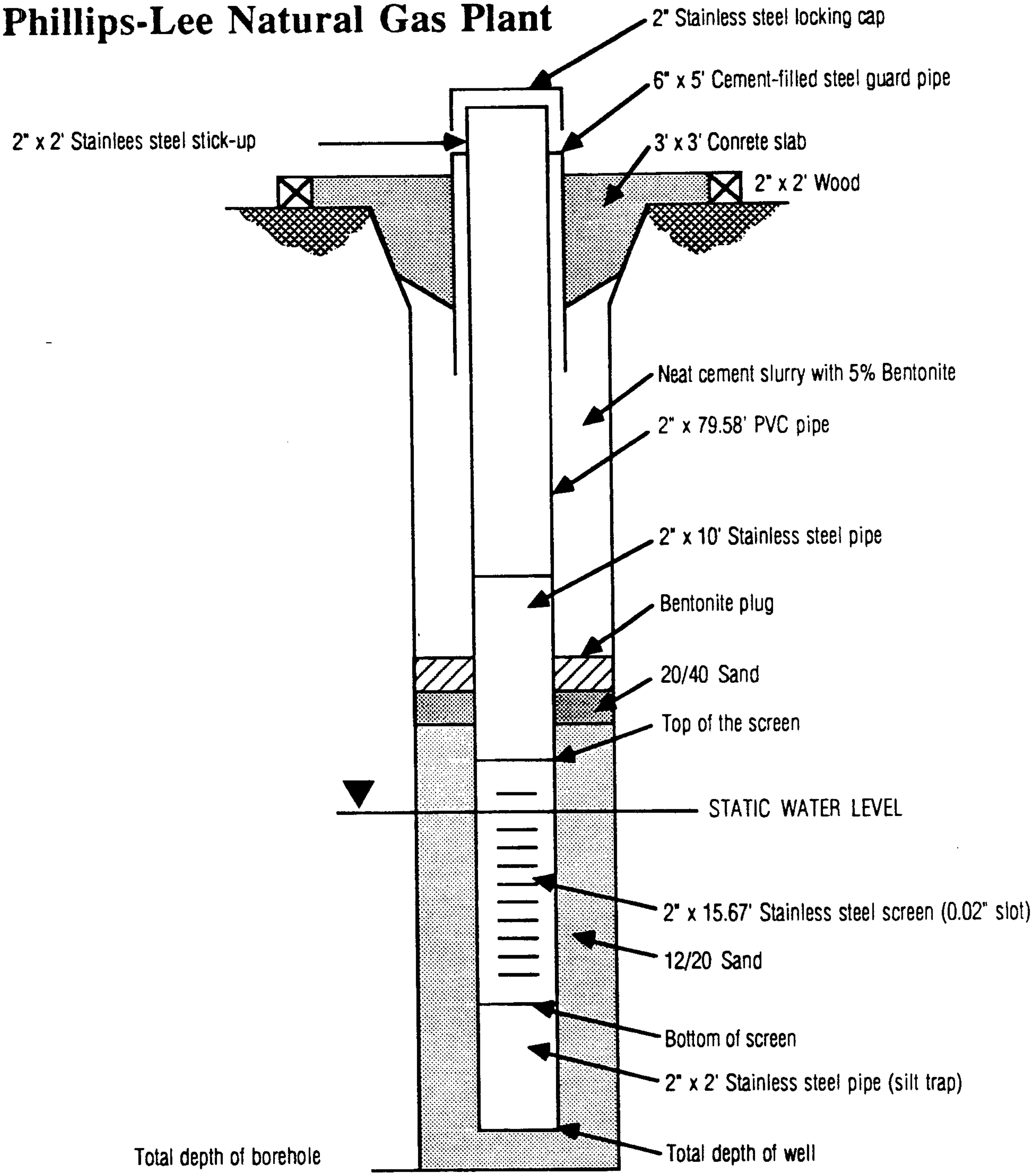
5.1.3 Adequacy of the Design and Construction of the Ground Water Monitoring Wells and Related Data Gaps

The Lee facility has closed the surface impoundment which the GWMS monitors and is awaiting approval of its closure certification by EPA and EID. This evaluation of the design and construction of the GWMS is based on requirements for detection monitoring under 40 CFR Parts 265.90 and 265.91. Except for the deficiencies noted below, the design and construction of the monitoring wells at the Lee facility meet the performance standards for such systems as discussed in the RCRA TEGD. Figure 5-1 shows the typical monitor well design for the Phillips Lee facility.

- The upgradient well may be influenced by the facility, based on sampling results indicating the presence of Barium, Lead and Cadmium at levels higher than was detected in the downgradient wells.

Typical Monitor Well Design

Phillips-Lee Natural Gas Plant



2.602bh

- o Downgradient wells MW-2 and MW-3 are not located at the edge of the hazardous waste management area. Downgradient monitoring wells must be located so as to immediately detect any contamination migrating from the regulated unit.

5.1.4 Adequacy of the Facility's Data Evaluation and Reporting

The following deficiency was noted in the office evaluation of Phillips-Lee's data evaluation and reporting procedures:

- o The facility has not recorded and reported the ground-water monitoring data as required by 40 CFR 265.94(a)(2).

5.2 Field Evaluation

The field evaluation at the Lee facility was conducted October 31 and November 1, to verify (where possible) the findings of the office evaluation and to collect ground-water samples. This section summarizes the findings of the field evaluation as follows: Section 5.2.1, ground-water monitoring system design and construction, Section 5.2.2, sample preservation and handling procedures; Section 5.2.4, chain-of-custody procedures; Section 5.2.5, implementation of quality assurance/quality control program; and Section 5.2.6, surficial well inspection. Table 5-2 is a summary of water level data collected during this CME.

5.2.1 Adequacy of the Design and Construction of the Ground-Water Monitoring System

The following deficiencies were noted pertaining to the design and construction of the Phillips-Lee monitoring wells:

- o Samples from all wells were very turbid, indicating inadequate well development techniques; and

Table 5-2

Summary of Water Level Data

	MW-1	MW-2	MW-3	MW-4
Elevation of Reference Point(1)	3978.77	3979.98	3979.86	3979.87
Depth of Static Water Level(2)	94.84	97.02	96.81	96.72
Elevation of Static Water Level(3)	3883.93	3882.96	3883.05	3883.15

(1) Feet above mean sea level; data provided by facility.

(2) Feet below TOC of steel outer casing; measured on 10/31/88.

(3) Elevation of static water level on 10/31/88.

- Based on sampling results, the upgradient well may be influenced by the facility (see Section 5.1.3).

During the field evaluation the following information presented in the facility's hydrogeologic assessment was verified:

- Numbers and locations of monitoring wells;

- A concrete pad measuring 3 feet by 3 feet and approximately six inches thick was installed at the surface around the casing stick-up for all wells;

- Two-inch diameter stainless steel casing inside a six-inch protective casing inside an 8-inch surface casing was visible at the surface for all wells;

- All wells were structurally stable at the surface; and

- All wells were fitted with locking caps.

5.2.2 Adequacy of Sample Collection Procedures

The following deficiencies in sample collection procedures identified during the field evaluation:

- The owner/operator does not employ techniques capable of detecting immiscible layers prior to well evacuation;

- Except for the samples for volatiles, samples were not transferred directly from the bailer to the sample container; samples were transferred from the bailer to a polypropylene beaker which had been rinsed with well water. The polypropylene beaker was then used to fill the sample containers. This practice increases the potential for cross-contamination between wells, and increases the potential for loss of organics from the samples. After sampling the first well, the field team pointed out the potential problems which may be introduced by this procedure. Sampling at subsequent wells was conducted properly;

- No equipment blanks are collected at the time of equipment decontamination; and

- The owner/operator uses polypropylene rope instead of fluorocarbon coated wire or single-strand stainless steel wire to lower and retrieve bailers.

5.2.3 Adequacy of Sample Preservation and Handling Procedures

The owner/operator's sampling and analysis plan was reviewed prior to the field evaluation. During the field evaluation, the owner/operator was observed while collecting, handling and preserving samples to ascertain if the procedure documented in the plan were followed. The following deficiencies in the plan or in the owner/operator's implementation of the plan were identified:

- The owner/operator's sampling and analysis plan states that equipment blanks will be collected only when equipment is decontaminated by steam cleaning. Equipment blanks should be collected whenever sampling equipment is decontaminated in the field;

- The owner/operator's sampling and analysis plan states that equipment blanks will be analyzed for benzene, toluene, ethyl benzene and xylene (BTEX). Equipment blanks are intended to ensure that cross-contamination has not occurred and, therefore, should be analyzed in the laboratory for the same parameters as the environmental samples;

- The owner/operator's sampling and analysis plan states that trip blanks will be provided and analyzed only for BTEX. Trip blanks are intended to verify the effectiveness of the laboratory's sample container decontamination and, therefore, should be analyzed for the same parameters as the environmental samples; and

- The owner/operator's sampling and analysis plan includes procedures to be used by the analytical laboratory for cleansing sample containers for organics, but the cleaning procedure for sample containers for inorganics analysis is not specified.

5.2.4 Adequacy of Chain-of-Custody Procedures

Chain-of-custody procedures documented in the owner/operator's sampling and analysis plan are adequate and are implemented in the field. Only one comment is offered relative to this subject. The field logbook maintained by the owner/operator is a looseleaf notebook. Some of the information entered in the logbook is required under 40 CFR 265.92 and 265.94 and, as such, should be recorded in a bound notebook with pre-numbered pages. A bound notebook provides a more defensible record for documenting field data.

5.2.5 Adequacy of Field Implementation of the Quality Assurance/Quality Control Program

Most of the data generated through sampling and analysis of ground-water samples at the Lee facility should be considered valid and reliable. However, the deficiencies noted in Section 5.2.2, 5.2.3 and 5.2.4 of this report should be addressed by the facility immediately to ensure that all data can be relied upon to determine what impact the facility's operations have had on the quality of the ground-water.

5.3 Conclusions Concerning the Adequacy of the Ground-Water Monitoring Program

The Lee facility is in the detection phase of monitoring under 40 CFR Part 265, Subpart F. The detection monitoring program is not adequate due to the technical deficiencies noted in Sections 5.1 and 5.2 of this report. Table 2-1 summarizes the technical deficiencies which may constitute violations of the ground-water performance standards under regulations in 40 CFR 265, Subpart F. Based on the results of this evaluation, the ground-water monitoring system at the Phillips Lee facility is inadequate due to technical deficiencies in the following major areas:

- o The geologic and hydrogeologic investigations have not resulted in adequate or complete characterization of the uppermost aquifer (see Section 5.1.2);

- o Ground-water flow directions and rates have not been properly defined (see Section 5.1.2);

- o Geologic and hydrogeologic formations underlying the site have not been fully characterized (see Section 5.1.1); and

- o The downgradient monitoring wells are not located so as to ensure the immediate detection of any contamination migrating from the hazardous waste management unit.

- o Samples from background and downgradient wells have not been properly collected and analyzed (See Section 5.2.2 and 5.2.3).

- o The upgradient well may be influenced by the unit.

- o All wells yield excessively turbid samples indicating that they should be redeveloped or replaced.

6.0 REFERENCES

1. Letter to B.F. Ballard Phillips Petroleum Company from Dick Whittington Regional Administrator re: compliance Order and Notice of Opportunity for Hearing, undated.

2. Waste Analysis plan Lee Plant Sampling and Analysis results, undated.

3. Waste Analysis Plan Lee Gasoline Plant, undated.

4. Closure and Post-Closure Compliance Review Checklist, undated.

6. Letter to Dianna Dutton U.S. EPA from B.F. Ballard, Phillips Petroleum, re: Lee Plant PSD Permit Application, November 26, 1979.

7. Potential Hazardous Waste Site Identification, March 2, 1981.

8. Potential Hazardous Waste Identification and Preliminary Assessment, March 3, 1981.

9. Letter to U.S. EPA Region VI from B.F. Ballard Phillips Petroleum, re: Removal of Facility from Active Status, June 16, 1982.

10. Letter to Lee Natural Gas Plant from Allyn Davis, U.S. EPA re: Part A Hazardous Waste Permit Application, August 6, 1982.

11. Penalty Calculation of Natural Gas Plant, February 18, 1983.

12. Hazardous Waste Permit Application, March 25, 1983.

13. Letter to Allyn Davis, U.S. EPA from B.F. Ballard, Phillips Petroleum re: RCRA Annual Report, March 31, 1983.

14. Letter to Allyn Davis, U.S. EPA from B.F. Ballard, Phillips, re: Closure of a surface impoundment, JUne 17, 1983.

15. Closure and Post Closure Plan for Hazardous Waste Facility, undated September 15, 1983.

16. Memorandum to Allyn Davis, Director, Air and Waste Management Division, from Dick Whittington Regional Administrator re: Delegation of Authority Pursuant to Section 3008 of the Solid Waste Disposal Act, September 28, 1983.d

17. Letter to R.W. Linsey, Lee Natural Gas Plant, from Bruce Galleher, State of New Mexico, re: Further Study for Possible Remedial Actions, December 8, 1983.

18. New Mexico Major Facilities Status Sheet for Lee Natural Gas Plant, January 1984.

19. Letter to J.W. Maharg Phillips from Joseph Reed, Ed L. Reed and Associates re: Lee Plant Ground Water Monitoring, April 3, 1984.

20. Inspection Review Worksheet, June 7, 1984.

21. Closure and Post Closure Plan for Hazardous Waste Facility, Updated June 14, 1984.

22. Closure and Post Closure Plan for Hazardous Waste Facility, July 27, 1984.

23. Letter to B.F. Ballard Phillips, from Steven Asher, Director, Environmental Improvement Division, re: Notice of Violation, June 15, 1984.

24. Geology Report, July 24, 1984.

25. Chemical and Physical Analyses for Water Samples, July 30, 1984.

26. Memorandum to J. David Duran, Program Manager Stationary Sources Section from Mike du Mond, Environmental Engineer, Enforcement Unit, re: Inspection of Phillips Petroleum, August 2, 1984.

27. Summary Approvability, Recommendations August 3, 1984.

28. Preliminary Statement August 27, 1984.

29. Letter to James Turner, U.S. EPA from Reese Copeland, Phillips re: RCRA Dockets, September 4, 1984.

30. Liquid Waste/Ground Water Surveillance, October 5, 1984.

31. Report of Samples Taken at Phillips-Lee, July 24, 1984.

32. Letter to Raymond Sisneros, Hazardous Waste Section, from B.F. Ballard, Phillips, re: Lee Plant RCRA Closure, October 29, 1984.

33. Site Inspection Report, May 20, 1985.

34. Letter to Jo Johnson-Ballard, U.S. EPA, from Richard Rawlings, Environmental Improvement Division, re: site inspection reports, August 2, 1985.

35. Hazardous Waste Inspection Data Sheet, August 17, 1985.

36. Hazardous Waste Inspection Data Sheet, August 27, 1985.

37. Letter to Robert Lindsey, Phillips, from Steven Cary, EID, re: Site Inspection Report, September 10, 1985.

38. Final Strategy Determination, September 10, 1985.

39. Letter to B.F. Ballard from C. Kelley Crossman, EID, re: Lee Natural Gas Plant groundwater samples, September 26, 1985.

40. Letter to William Rhea, Hazmat, U.S. EPA, from B.F. Ballard, re: Compliance with Section 3005(e)(2).

41. Letter to U.S. EPA from B.F. Ballard, Phillips, re: Request for Information, November 12, 1985.

42. Certification Checklist, November 14, 1985.

43. Summary Report Closure and Post Closure Plan Review Phillips, undated.

44. Letter to Steven Cary EID from Paul Sieminski, State Programs Section re: NMEID PA/SI Grant Commitments, December 10, 1985.

45. Letter to Phillips, from Allyn Davis, U.S. EPA re: Request for Information Pursuant to 30007 of the RCRA Act, February 28, 1986.

46. Facility Biennial Hazardous Waste Report for 1985.

47. Notice of Publication State of New Mexico Energy and Minerals Department Oil Conservation Division, March 27, 1986.

48. Letter to New Mexico Health and Environment Dept. from B.F. Ballard, Phillips, re: Change in Ownership Notification, May 2, 1986.

49. Summary Report Closure and Post Closure Plan Review Lee Natural Gas Plant, May 13, 1986.

50. Groundwater Monitoring Checklist, September 15, 1987.

51. Memorandum to Bill Taylor, Enforcement Section, from David Peters, Hazardous Waste Section, re: RCRA Compliance Monitoring Inspections Report(s), September 15, 1986.

52. Map of Phillips-Lee Plant, Lea County, New Mexico, September 16, 1987.

53. Groundwater Monitoring Wells Static Water Levels, September 3, 1987.

54. Memorandum to Phillips from J. Gould re: Closure; March 4, 1988.

55. Report on the Installation of a Groundwater Monitoring System at Phillips Lee Plant, June 6, 1988.

56. Letter to Tom Clark, U.S. EPA Region VI, from Ann Anderson, A.T. Kearney, re: Phillips, PR/VSI Report, June 24, 1988.

APPENDIX A

OFFICE EVALUATION CHECKLIST

Facility Name: Phillips Petroleum-Lee Natural Gas Plant
EPA I.D. Number: NMD000709659

Revision 1
October 1988

APPENDIX A

Office Evaluation Checklist: Technical Evaluation of the Design of the Ground-Water Monitoring System

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Notes:

1. This checklist is adapted from OSWER Directive Number 9950.2, "Final RCRA Comprehensive Ground-Water Monitoring Evaluation (CME) Guidance Document."

2. One of these checklists must be completed for each CME office evaluation that is conducted; the completed checklist then must be included in the CME office evaluation report as well as the final CME report.

3. This checklist is a tool to be used by the technical reviewer to assure that all elements of a CME office evaluation are covered and to identify data gaps. Each line in the right-hand column should be filled out using a "Y" (YES) or "N" (NO) for each corresponding question in the left-hand column. Where the file information is incomplete, use the designation "I" (Incomplete).

	Information Provided (Y/N/I)
A. Review of relevant documents:	
1. What documents were obtained for use in the Office Evaluation:	
a. RCRA Part A permit application?	Y
b. RCRA Part B permit application?	Y
c. Correspondence between the owner/operator and appropriate agencies or citizens' groups?	Y
d. Previously conducted facility inspection reports?	Y
e. Facility's contractor reports?	Y
f. Regional hydrogeologic, geologic, or soil reports?	Y
g. The facility's Sampling and Analysis Plan?	Y
h. Ground-Water Quality Assessment Program Outline (or Plan, if the facility is in assessment monitoring)?	Y

	Information Provided (Y/N/I)
B. Evaluation of the Owner/Operator's Hydrogeologic Assessment:	
1. Did the owner/operator use the following direct techniques in the hydrogeologic assessment:	
a. Logs of the soil borings/rock corings (documented by a professional geologist, soil scientist, or geotechnical engineer)?	Y*
b. Materials tests (e.g., grain size analyses, standard penetration tests)?	N
c. Piezometer installation for water level measurements at different depths?	N
d. Slug tests?	N
e. Pump tests?	N
f. Geochemical analyses of soil samples?	N
g. Other (specify) (e.g., hydrochemical diagrams and wash analysis) None	N
2. Did the owner/operator use the following indirect techniques to supplement direct techniques data:	
a. Geophysical well logs?	N
b. Tracer studies?	N
c. Resistivity and/or electromagnetic conductance?	N
d. Seismic survey?	N
e. Hydraulic conductivity measurements of cores?	N
f. Aerial photography?	N

* Only logs from wells constructed in 1988, not for logs from wells constructed in 1984.

Information Provided (Y/N/I)

C. Characterization of Subsurface Geology of Site

1. Soil boring/test pit program:

a. Were the soil borings/test pits performed under the supervision of a qualified professional? Y*

b. Did the owner/operator provide documentation for selecting the spacing for borings? Y

c. Were the borings drilled to the depth of the first confining unit below the uppermost zone of saturation or ten feet into bedrock? I **

d. Were the following method(s) of drilling used:

- o Auger (hollow or solid stem)? N
- o Mud rotary? Y
- o Reverse rotary? N
- o Cable tool? N
- o Jetting? N
- o Other (specify) Air rotary was used to penetrate caliche layer near surface, followed by mud rotary to bottom of borehole. Water was used as the drilling fluid.

e. Were continuous sample corings taken? N***

f. Were the samples obtained by the following methods:

- o Split spoon? N
- o Shelby tube, or similar? N
- o Rock coring? N

---

* Only the borings completed in 1988, not the borings completed in 1984.

** Confining unit not identified.

*** Attempted but unsuccessful.

		Information Provided (Y/N/I)
	b. Streams, rivers, lakes, or wetlands near the facility?	Y
	c. Discharging or recharging wells near the facility?	N
7.	Did the owner/operator obtain a regional hydrogeologic map?	N
	If yes, does this hydrogeologic map indicate:	
	a. Major areas of recharge/discharge?	N/A
	b. Regional ground-water flow direction?	N/A
	c. Potentiometric contours which are consistent with observed water level elevations?	N/A
8.	Did the owner/operator prepare a facility site map?	Y
	If yes, does the site map show:	
	a. Regulated units of the facility (e.g., landfill areas, impoundments)?	Y
	b. Any seeps, springs, streams, ponds, or wetlands?	Y
	c. Location of monitoring wells, soil borings, or test pits?	Y
	d. How many regulated land-based units does the facility have (specify)?	
	If more than one regulated unit then,	One*
	o Does the waste management area encompass all regulated units?	N/A
	OR	
	o Is a waste management area delineated for each regulated unit?	N/A

* Surface impoundment undergoing RCRA closure.

		Information Provided (Y/N/I)
	g. Ground penetrating radar?	N
	h. Other (specify) None	
3.	Did the owner/operator document and present the raw data from the site hydrogeologic assessment?	N
4.	Did the owner/operator document methods (criteria) used to correlate and analyze the information?	N
5.	Did the owner/operator prepare the following:	
	a. Narrative description of geology?	Y
	b. Geologic cross-sections?	N
	c. Geologic and soil maps?	N*
	d. Boring/coring logs?	Y
	e. Structure contour maps of the differing water-bearing zones and confining layer?	N**
	f. Narrative description and calculation of ground-water flows?	N
	g. Water table/potentiometric map?	Y***
	h. Hydrologic cross sections?	N
6.	Did the owner/operator obtain a regional map of the area and delineate the facility?	Y
	If yes, does this map illustrate:	
	a. Surficial geology features?	Y

* Geologic maps not prepared; regional soil map provided.

** Owner/operator has not fully characterized uppermost aquifer and/has not identified a confining layer.

*** Potentiometric surface map inadequate.

	Information Provided (Y/N/I)
o Ditch sampling?	N
o Other (specify) Drill cuttings; coring was unsuccessful due to fine-grained sediments	
g. Were the sample corings logged by a qualified professional in geology?	Y*
h. Does the field boring log include the following information:	
o Hole name/number?	Y*
o Date started and finished?	Y*
o Driller's name?	Y*
o Hole location (i.e., map and elevation)?	Y*
o Drill rig type and bit/auger size?	Y*
o Gross petrography (e.g., rock type) for each geologic unit?	Y*
o Gross mineralogy of each geologic unit?	Y*
o Gross structural interpretation of each geologic unit and structural features (e.g., fractures, gouge material, solution channels, buried streams or valleys, identification of depositional material)?	N
o Development of soil zones and vertical extent and description of soil type?	N
o Depth of water-bearing unit(s) and vertical extent of each?	N

* Only the borings completed in 1988, not the borings completed in 1984.

	Information Provided (Y/N/I)
o Depth and reason for termination of borehole?	N*
o Depth and location of any contaminant encountered in borehole?	Y**
o Sample location/number?	N
o Percent sample recovery?	N
o Narrative descriptions of:	
-- Geologic observations?	Y***
-- Drilling observations?	N
i. Were the following analytical tests performed on the borehold samples:	
o Mineralogy (e.g., microscopic tests and x-ray diffraction)?	N
o Petrographic analysis:	
- degree of crystallinity and cementation of matrix?	N
- degree of sorting, size fraction (i.e., sieving), textural variations?	N
- rock type(s)?	N
- soil type?	N
- approximate bulk geochemistry?	N
- existence of microstructures that affect or indicate fluid flow?	N
o Falling head tests?	N

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* Reason for termination not provided.

** Well log not provided for MW-1A. This boring was plugged and abandoned when explosive vapors were detected after penetrating the zone of saturation.

*** Only in 1984 logs, not in 1984 logs.

	Information Provided (Y/N/I)
o Static head tests?	N
o Settling measurements?	N
o Centrifuge tests?	N
o Column drawings?	N

	Information Provided (Y/N/I)
D. Verification of subsurface geological data	
1. Has the owner/operator used indirect geophysical methods to supplement knowledge of geological conditions between borehole locations?	N
2. Do the number of borings and analytical data indicate that the confining layer displays a low enough permeability to impede the migration of contaminants to any stratigraphically lower water-bearing units?	I*
3. Is the confining layer laterally continuous across the entire site?	I*
4. Did the owner/operator consider the chemical compatibility of the site-specific waste types and the geologic materials of the confining layer?	I*
5. Did the geologic assessment address or provide means for resolution of any information gaps of geologic data?	N
6. Do the laboratory data corroborate the field data for petrography?	N**

* Confining layer not identified.

** No laboratory data provided.

Information Provided (Y/N/I)

7. Do the laboratory data corroborate the field data for mineralogy and subsurface geochemistry? N*

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* No laboratory data generated.

	Information Provided (Y/N/I)
E. Presentation of geologic data	
1. Did the owner/operator present geologic cross-sections of the site?	N
2. Do cross-sections:	
a. identify the types and characteristics of the geologic materials present?	N/A
b. define the contact zones between different geologic materials?	N/A
c. note the zones of high permeability or fracture?	N/A
d. give detailed borehole information including:	
o location of borehole?	N/A
o depth of termination?	N/A
o location of screen (if applicable)?	N/A
o depth of zone(s) of saturation?	N/A
o backfill procedure?	N/A
3. Did the owner/operator provide a topographic map which was constructed by a licensed surveyor?	N
4. Does the topographic map provide:	
a. contours at a maximum interval of two feet?	N/A*
b. locations and illustrations of man-made features (e.g., parking lots, factory buildings, drainage ditches, storm drains, pipelines)?	N/A
c. descriptions of nearby water bodies?	N/A

* No topographic map provided.

		Information Provided (Y/N/I)
d.	descriptions of off-site wells?	N/A
e.	site boundaries?	N/A
f.	individual RCRA units?	N/A
g.	delineation of the waste management area(s)?	N/A
h.	well and boring locations?	N/A

5. Did the owner/operator provide an aerial photograph depicting the site and adjacent off-site features? Y

6. Does the photograph clearly show surface water bodies, adjacent municipalities, and residences and are these clearly labelled? Y*

* Residences are not labelled, but are clearly visible.

	Information Provided (Y/N/I)
F. Identification of the Uppermost Aquifer	
1. Ground-water flow direction:	
a. Were the well casing heights measured by a licensed surveyor to the nearest 0.01 feet?	Y
b. Were the well water levels allowed to stabilize after construction and development for a minimum of 24 hours prior to measurements?	Y
c. Were the well water level measurements taken to the nearest 0.01 feet?	Y
d. Were the well water level measurements taken from all wells within a 24-hour period?	Y
e. Was the water level information obtained from (check appropriate one):	
o multiple piezometers placed in single borehole?	N
o vertically nested piezometers in closely spaced separate boreholes?	N
o monitoring wells?	Y
f. Did the owner/operator provide construction details for the piezometers or wells?	Y
g. How were the static water levels measured:	
o Electric water sounder?	Y
o Wetted tape?	Y
o Air line?	N
o Other (specify) None	
h. Was the well water level measured in wells with equivalent screened intervals at an equivalent depth below the saturated zone?	Y

	Information Provided (Y/N/I)
i. Has the owner/operator provided a site water table (potentiometric) contour map? If yes:	Y*
o Do the potentiometric contours appear logical and accurate based on topography and presented data? (Consult water level data.)	Y
o Are ground-water flow-lines indicated?	Y
o Are static water levels shown?	N
o Can hydraulic gradients be estimated?	Y
j. Did the owner/operator develop hydrologic cross-sections of the vertical flow component across the site using measurements from all wells?	N
k. Did the owner construct flow nets?	N
l. Do the owner/operator's flow nets include:	
o piezometer locations?	N/A
o depth of screening?	N/A
o width of screening?	N/A
o measurements of water levels from all wells and piezometers?	N/A
2. Seasonal and temporal fluctuations in ground-water level	
a. Do fluctuations in static water levels occur?	Y
o If yes, are the fluctuations caused by any of the following:	
-- Off-site well pumping?	I
-- Tidal processes or other intermittent natural variations (e.g., river stage)?	N
-- On-site well pumping?	I

* Based on data from 5/88.

	Information Provided (Y/N/I)
-- Off-site, on-site construction or changing land use patterns?	N
-- Deep well injection?	I
-- Seasonal variations?	Y
-- Other (specify) None	

b. Has the owner/operator documented sources and patterns that contribute to or affect the ground-water patterns below the waste management units? N

c. Do water level fluctuations alter the general ground-water gradients and flow directions? I

d. Based on water level data, do any head differentials occur that may indicate a vertical flow component in the saturated zone? N*

e. Did the owner/operator implement means for gauging long-term effects on water movement that may result from on-site or off-site construction or changes in land-use patterns? N

3. Hydraulic conductivity

a. How were hydraulic conductivities of the subsurface materials determined?

- o Single-well tests (slug tests)? N
- o Multiple-well tests (pump tests)? N
- o Other (specify) Not determined; estimates submitted based on values found in literature.

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* Data not adequate to determine.

	Information Provided (Y/N/I)
b. If single-well tests were conducted, was it done by:	
o Adding or removing a known volume of water?	N/A
o Pressurizing the well casing?	N/A
c. If single well tests were conducted in a highly permeable formation, were pressure transducers and high-speed recording equipment used to record the rapidly changing water levels?	N/A
d. Since single well tests only measure hydraulic conductivity in a limited area, were enough tests run to ensure a representative measure of conductivity in each hydrogeologic unit?	N/A
e. Is the owner/operator's slug test data (if applicable) consistent with existing geologic information (e.g., boring logs)?	N/A
f. Were other hydraulic conductivity properties determined?	N
g. If yes, provide any of the following data, if available:	
o Transmissivity	N/A
o Storage coefficient	N/A
o Leakage	N/A
o Permeability	N/A
o Porosity	N/A
o Specific capacity	N/A
o Other (specify) N/A	

	Information Provided (Y/N/I)
4. Identification of the uppermost aquifer	
a. Has the extent of the uppermost saturated zone (aquifer) in the facility area been defined? If yes,	N
o Are soil boring/test pit logs included?	Y*
o Are geologic cross-sections included?	N
b. Is there evidence of confining (component, unfractured, continuous, and low permeability) layers beneath the site?	I **
c. What is the hydraulic conductivity of the confining unit (if present)? Not determined How was it determined? Not determined	
d. Does potential for other hydraulic communication exist (e.g., lateral incontinuity between geologic units, facies changes, fracture zones, cross-cutting structures, or chemical corrosion/alteration of geologic units by leachate)?	I***
If yes or no, what is the rationale? ______	I***

* Only lithologic logs from monitoring well boreholes from 60' to 115' deep.

** Confining layer not identified.

*** Hydrogeologic assessment incomplete; confining layer not identified.

Information Provided (Y/N/I)

G. Evaluation of the Facility's Ground-Water Monitoring Wells' Design and Construction

Note: These questions should be answered for each different well design present at the facility.

Note: All four wells have same design.

1. Drilling methods

   a. What drilling method was used for the well:

   - o Hollow-stem auger? — N
   - o Solid-stem auger? — N
   - o Mud rotary? — Y
   - o Air rotary? — Y
   - o Reverse rotary? — N
   - o Cable tool? — N
   - o Jetting? — N
   - o Air drill with casing hammer? — N
   - o Other (specify) ________________

   b. Were any cutting fluids (including water) or additives used during drilling? — Y

   If yes, specify:

   Type of drilling fluid Potable water

   Source of water used Not identified — I

   Foam No

   Polymers No

   Other (specify) No

   c. Was the cutting fluid, or additive, identified? — Y

   d. Was the drilling equipment steam-cleaned prior to drilling the well? — N

   Other methods Hot-water washed

	Information Provided (Y/N/I)
e. Was compressed air used during drilling?	Y
o If yes, was the air filtered to remove oil?	N*
f. Did the owner/operator document procedure for establishing the potentiometric surface?	Y
o If yes, explain how the location was established? Rising water level in borehole was monitored with an electronic water level indicator until static conditions were reached.	
g. Formation samples	
o Were formation samples collected initially during drilling?	Y
o Were any continuous cores taken?	N**
o If not, at what interval were samples taken?	5 ft**
o How were the samples obtained:	
- Split spoon?	N
- Shelby tube?	N
- Core drill?	N
- Other (specify) Drill cuttings	
o Identify any physical and/or chemical tests performed on the formation samples: None indicated	
2. Monitoring well construction materials	
a. Identify construction materials (by number) and diameters (ID/OD).	***

* Information not provided.

** No documentation was provided as to what type of sampling was performed during construction of former GWMS in 1984.

*** See Exhibit 5-1 in report text.

Information Provided (Y/N/I)

		Material	Diameter (ID/OD)
o	Primary casing	PVC	2" ID
o	Secondary or outside casing (double) construction)	Stainless steel	2" ID
o	Screen	Stainless Steel	2" ID (Slots 0.02")

b. How are the sections of casing and screen connected:

- o Pipe sections threaded? Y
- o Couplings (friction) with adhesive or solvent? N
- o Couplings (friction) with retainer screws? N
- o Other (specify) ______

c. Were the materials steam-cleaned prior to installation? Y*

If no, how were the materials cleaned?

3. Well intake design and well development

a. Was a well intake screen installed? Y

- o What is the length of the screen for the well? 15 feet (screen extends 5' above SWL)
- o Is the screen manufactured? Y

---

* Pre-packaged, factory steam-cleaned casing was used.

	Information Provided (Y/N/I)
b. Was a filter pack installed?	Y
o What kind of filter pack was employed? (specify) Pre-packaged 12/20 grade silica sand	
o Is the filter pack compatible with formation materials?	Y
o How was the filter pack installed? Through a tremie pipe	
o What are the dimensions of the filter pack? MW-1 = 6.5" x 30.77'; MW-2 = 6.5" x 26.56'; MW-3 = 6.5" x 28.48'; MW-4 = 6.5" x 28.83';	
o Has a turbidity measurement of the well water ever been made?	Y
o Have the filter pack and screen been designed for the in-site materials?	Y
c. Was the well developed?	Y
o What technique was used for well development:	
- Surge block?	N
- Bailer?	N
- Air surging?	N
- Water pumping?	Y
- Other (specify) Overpumping using a 1.5-inch stainless steel air-lift development pump. Surging was used occasionally to dislodge fines from the formation. Surging utilized distilled water and formation water.	

Information Provided (Y/N/I)

4. Annular space seals

a. What is the annular space in the saturated zone directly above the filter pack filled with:

- Sodium bentonite? (specify type and grit) **Y***
  Pellets; grit not indicated
- Cement? (specify neat or concrete) ______ **N**
- Other (specify) None

o Was the seal installed by:
  - Dropping material down the hole and tamping? **Y****
  - Dropping material down the inside of a hollow-stem auger? **N**
  - Tremie pipe method? **N**
  - Other (specify) See footnote **

b. Was a different seal used in the unsaturated zone? **Y**

If yes,

o Was this seal made with:
  - Sodium bentonite? (specify type and grit) N/A
  - Cement? (specify neat or concrete) N/A
  - Other (specify) Neat cement slurry w/5% bentonite

o Was this seal installed by:
  - Dropping material down the hole and tamping? **N**

---

* One to three feet of 20/40 grade silica sand was placed over the filter pack, then bentonite seal. See Exhibit 5-1 in report text.

** Tamping not indicated. About 1 foot of 20/40 sand was placed above the bentonite to keep it from being dislodged when the borehole was grouted.

Information Provided (Y/N/I)

	- Dropping material down the inside of hollow stem auger?	N
	- Other (specify) Tremie pipe	
c.	Is the upper portion of the borehole sealed with a concrete cap to prevent infiltration from the surface?	Y
d.	Is the well fitted with an above-ground protective device and bumper guards?	Y
e.	*Has the protective cover been installed with* locks to prevent tampering?	Y

Information Provided (Y/N/I)

H. Evaluation of the Facility's Detection Monitoring Program

1. Placement of downgradient detection monitoring wells

   a. Are the ground-water monitoring wells or clusters located immediately adjacent to the waste management area? Y

   b. How far apart are the detection monitoring wells? MW-2 is approximately 66' from MW-3 and MW-3 is approximately 75' from MW-4 according to field measurements. See Figure 1-1 in text of report.

   c. Does the owner/operator provide a rationale for the location of each monitoring well or cluster? Y*

   d. Has the owner/operator identified the well screen lengths of each monitoring well or clusters? Y

   e. Does the owner/operator provide an explanation for the well screen lengths of each monitoring well or cluster? Y

   f. Do the actual locations of monitoring wells or clusters correspond to those identified by the owner/operator? Y**

2. Placement of upgradient monitoring wells

   a. Has the owner/operator documented the location of each upgradient or background monitoring well or cluster? Y

   b. Does the owner/operator provide an explanation for the location(s) of the upgradient or background monitoring wells? Y

---

* Location based on data from former GWMS.

** Confirmed during field evaluation.

Information Provided (Y/N/I)

c. What length screen has the owner/operator employed in the background monitoring well(s)?

15.33 feet

d. Does the owner/operator provide an explanation for the screen length(s) chosen? Y

e. Does the actual location of each background monitoring well or cluster correspond to that identified by the owner/operator? Y*

* Confirmed during field evaluation.

	Information Provided (Y/N/I)
I. Evaluation of the Facility's Assessment Monitoring Program	
1. If the facility is in detection monitoring, has the owner/operator prepared a ground water quality assessment program outline?	Y
2. Does the owner/operator maintain a copy of the outline at the facility? (If so, try to obtain a copy of the outline during the field evaluation)	N
3. Does the outline meet the requirements orf 40 CFR Part 265.93(a)?	Y
4. If the facility is in assessment monitoring, does the owner/operator have a ground-water quality assessment program plan which has been approved by EPA or the appropriate state agency?	N/A
5. Does the owner/operator maintain a copy of the plan at the facility? (If so, try to obtain a copy of the plan during the field evaluation.)	N/A
6. Does the assessment plan specify:	
a. The number, location, and depth of wells?	N/A
b. The rationale for their placement and identify the basis that will be used to select subsequent sampling locations and depths in later assessment phases?	N/A

		Information Provided (Y/N/I)
7.	Does the list of monitoring parameters include all hazardous waste constituents from the facility?	N/A
	a. Does the water quality parameter list include other important indicators not classified as hazardous waste constituents?	N/A
	b. Does the owner/operator provide documentation for the listed wastes which are not included?	N/A
8.	Does the owner/operator's assessment plan specify the procedures to be used to determine the rate of constituent migration in the ground water?	N/A
9.	Has the owner/operator specified a schedule of implementation in the assessment plan?	N/A
10.	Have the assessment monitoring objectives been clearly defined in the assessment plan?	N/A
	a. Does the plan include analyses and/or re-evaluation to determine if significant contamination has occurred in any of the detection monitoring wells?	N/A
	b. Does the plan provide for a comprehensive program of investigation to fully characterize the rate and extent of contaminant migration from the facility?	N/A
	c. Does the plan call for determining the concentrations of hazardous wastes and hazardous waste constituents in the ground water?	N/A

		Information Provided (Y/N/I)
11.	Does the assessment plan identify the investigatory methods that will be used in the assessment phase?	N/A
a.	Is the role of each method in the evaluation fully described?	N/A
b.	Does the plan provide sufficient descriptions of the direct methods to be used?	N/A
c.	Does the plan provide sufficient descriptions of the indirect methods to be used?	N/A
d.	Will the method contribute to the further characterization of the contaminant movement?	N/A
12.	Are the investigatory techniques utilized in the assessment program based on direct methods?	N/A
a.	Does the assessment approach incorporate indirect methods to further support direct methods?	N/A
b.	Will the planned methods called for in the assessment approach ultimately meet performance standards for assessment monitoring?	N/A
c.	Are the procedures well defined?	N/A
d.	Does the approach provide for monitoring wells similar in design and construction to the detection monitoring wells?	N/A
e.	Does the approach employ taking samples during drilling or collecting core samples for further analysis?	N/A

	Information Provided (Y/N/I)
13. Are the indirect methods to be used based on reliable and accepted geophysical techniques?	N/A
a. Are they capable of detecting subsurface changes resulting from contaminant migration at the site?	N/A
b. Is the measurement at an appropriate level of sensitivity to detect ground-water quality changes at the site?	N/A
c. Is the method appropriate considering the nature of the subsurface materials?	N/A
d. Does the approach consider the limitations of these methods?	N/A
e. Will the extent of contamination and constituent concentration be based on direct methods and sound engineering judgment? (using indirect methods to further substantiate the findings)	N/A
14. Does the assessment approach incorporate any mathematical modeling to predict contaminant movement?	N/A
a. Will site specific measurements be utilized to accurately portray the subsurface?	N/A
b. Will the derived data be reliable?	N/A
c. Have the assumptions been identified?	N/A
d. Have the physical and chemical properties of the site-specific wastes and hazardous waste constituents been identified?	N/A

	Information Provided (Y/N/I)
J. Conclusions	
1. Subsurface geology:	
a. Has sufficient data been collected to adequately define petrography and petrographic variation?	N*
b. Has the subsurface geochemistry been adequately defined?	N*
c. Was the boring/coring program adequate to define subsurface geologic variation?	N*
d. Was the owner/operator's narrative description complete and accurate in its interpretation of the data?	N*
e. Does the geologic assessment address or provide means to resolve any information gaps?	N*
2. Ground-Water flowpaths:	
a. Did the owner/operator adequately establish the horizontal and vertical components of ground-water flow?	N*
b. Were appropriate methods used to establish ground-water flowpaths?	N*
c. Did the owner/operator provide accurate documentation?	N*
d. Are the potentiometric surface measurements valid?	Y*
e. Did the owner/operator adequately consider the seasonal and temporal effects on the ground water?	N*

* See Table 2-1 and Section 5.1.1 of this report.

	Information Provided (Y/N/I)
f. Were sufficient hydraulic conductivity tests performed to document lateral and vertical variation in hydraulic conductivity in the entire hydrogeologic subsurface below the site?	N*
3. Uppermost aquifer:	
a. Did the owner/operator adequately define the uppermost aquifer?	N
4. Monitoring well construction and design:	
a. Do the design and construction of the owner/operator's ground-water monitoring wells permit depth discrete ground-water samples to be taken?	Y
b. Are the samples representative of ground-water quality?	Y**
c. Are the ground-water monitoring wells structurally stable?	Y
d. Does the ground-water monitoring well's design and construction permit an accurate assessment of aquifer characteristics?	Y**
5. Detection monitoring:	
a. Downgradient wells: Do the location and screen lengths of the ground-water monitoring wells or clusters in the detection monitoring system allow the immediate detection of a release of hazardous waste or constituents from the hazardous waste management area to the uppermost aquifer?	Y

* See Table 2-1 and Section 5.1.1 of this report.

** Only for the upper portion of the aquifer.

	Information Provided (Y/N/I)
b. Do the location and screen lengths of the upgradient (background) ground-water monitoring wells ensure the capability of collecting ground-water samples representative of upgradient (background) ground-water quality including any ambient heterogeneous chemical characteristics?	Y
6. Assessment monitoring:	
a. Has the owner/operator adequately characterized site hydrogeology to determine contaminant migration?	N/A
b. Is the detection monitoring system adequately designed and constructed to immediately detect any contaminant release?	N/A
c. Are the procedures used to make a first determination of contamination adequate?	N/A
d. Is the assessment plan adequate to detect, characterize, and track contaminant migration?	N/A
e. Will the assessment monitoring wells, given site hydrogeologic conditions, define the extent and concentration of contamination in the horizontal and vertical planes?	N/A
f. Are the assessment monitoring wells adequately designed and constructed?	N/A
g. Are the sampling and analysis procedures adequate to provide true measures of contamination?	N/A
h. Do the procedures used for evaluation of assessment monitoring data result in determinations of the rate of migration, extent of migration, and hazardous constituent composition of the contaminant plume?	N/A

		Information Provided (Y/N/I)
i.	Are the data collected at sufficient frequency and duration to adequately determine the rate of migration?	N/A
j.	Is the schedule of implementation adequate?	N/A
k.	Is the owner/operator's assessment monitoring plan adequate?	N/A
	o If the owner/operator had to implement his assessment monitoring plan, was it implemented satisfactorily?	N/A

APPENDIX B

FIELD EVALUATION CHECKLIST
FOR
PHILLIPS PETROLEUM
LEE NATURAL GAS PLANT
BUCKEYE, NEW MEXICO

Facility Name: Phillips Petroleum - Lee Natural Gas Plant
EPA I.D. Number: NMD000709659

Revision 1
July, 1988

APPENDIX B

Field Evaluation Checklist: Technical Evaluation of the Operation of the Ground-Water Monitoring System

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Notes:

1. This checklist is adapted from OSWER Directive Number 9950.2, "Final RCRA Comprehensive Ground-Water Monitoring Evaluation (CME) Guidance Document."

2. One of these checklists must be completed for each CME field evaluation that is conducted; the completed checklist then must be included in the CME report.

3. This checklist is a tool to be used by the technical reviewers to assure that all elements of a CME field evaluation are covered and to identify data gaps. Each line in the right-hand column should be filled out using a "Y" (YES) or "N" (NO) for each corresponding question in the left-hand column. Where the information is incomplete or unavailable at the time of the field evaluation, use the designation "U" (UNKNOWN). As appropriate, attempt to obtain the necessary information after the field evaluation, or indicate in the CME report that the information is unavailable. Specify in the report where missing information constitutes violations of 40 CFR Parts 265 or 270.

Information Provided (Y/N/U)

I. Check of Ground-Water Monitoring System

Note: Responses in this section apply to all wells in the system.

A. Ground-water monitoring system design: Do the numbers, depths, and locations of monitoring wells correspond with those reported in the facility's hydrogeologic assessment — Y

B. Monitoring well construction:

1. Identify construction materials and well diameters:

		Material	Diameter (ID/OD)
a.	Primary casing	PVC *	2" ID
b.	Secondary or outside casing (guard casing)	Steel	6" OD
c.	Surface casing	Steel	8" OD

2. Is the upper portion of the borehole sealed with concrete to prevent infiltration from the surface? — Y

3. Is the well fitted with an above-ground protective device? — Y

* As-built drawings indicate a ten foot section of stainless steel casing between the screen and the bottom of the PVC and a two foot section of stainless steel pipe at the top of the PVC. Two-inch stainless steel casing was visible at the surface.

	Information Provided (Y/N/U)
4. Is the protective cover fitted with locks to prevent tampering?	Y

Information Provided (Y/N/U)

II. Review of Sample Collection Procedures

A. Measurement of well depth elevations:

1. Are measurements made of both depth to standing water and depth to the bottom of the well? — Y

2. Are measurements taken to the nearest 0.01 feet? — Y

3. What measuring device is used? Olympic Model 150 Electric well probe and wetted steel tape

4. Is there a reference point established by a licensed surveyor? — Y

5. Is the measuring equipment properly cleaned between well locations to prevent cross-contamination? — Y

B. Detection of immiscible layers:

1. Are procedures used which will detect light-phase immiscible layers? — N

	Information Provided (Y/N/U)
2. Are procedures used which will detect dense-phase immiscible layers?	N*
C. Sampling of immiscible layers:	
1. Are the immiscible layers sampled separately prior to well evacuation?	N**
2. Do the procedures used minimize mixing with water-soluble phases?	N
D. Well evacuation:	
1. Are low-yielding wells evacuated to dryness?	N/A
2. Are high-yielding wells evacuated so that at least three casing volumes are removed?	Y
3. What device is used to evacuate the wells? Pre-cleaned, Dedicated Teflon bailer	

* A dark dense-phase immiscible layer was detected in MW-4 in the first bailer withdrawn from the well during smpling. Subsequent withdrawals did not indicate presence of immiscibles. An interface probe is not used to identify the presence of immiscible layers prior to well evacuation.

** The inspection team checked field parameters on the immisicible layer detected in MW-4. Volume was insufficient to submit for laboratory analysis.

	Information Provided (Y/N/U)
4. If any problems are encountered (e.g., equipment malfunction), are they noted in a field logbook?	Y

	Information Provided (Y/N/U)
E. Sample withdrawal:	
1. For low-yielding wells, are samples for volatile, pH, and oxidation/reduction potential drawn first after the well recovers?	Y*
2. Are sampling devices either bottom valve bailers or positive gas displacement bladder pumps?	Y
3. If bailers are used, is fluorocarbon resin-coated wire, single-strand stainless steel wire, or monofilament used to raise and lower the bailer?	N**
4. If bladder pumps are used, are they operated in a continuous manner to prevent aeration of the sample?	N/A
5. If bailers are used, are they lowered slowly to prevent degassing of the water?	Y
6. If bailers are used, are the contents transferred to the sample container in a way that minimizes agitation and aeration?	N

---

* Initially, the facility o/o was using the first bailer volume to run field parameters before collecting the volatiles sample. The inspection team commented on this, and the o/o subsequently changed this procedure.

** Retrieval line is braided propylene rope.

	Information Provided (Y/N/U)
7. Is care taken to avoid placing clean sampling equipment on the ground or other contaminated surfaces prior to insertion into the well?	Y
8. If dedicated sampling equipment is not used, is equipment disassembled and thoroughly cleaned between samples?	N/A
9. If samples are for inorganic analysis, does the cleaning procedure for sampling equipment include the following sequential steps:	
a. Nonphosphate detergent wash?	Y
b. Dilute acid rinse (HNO_3 or HCl)?	N*
c. Tap water rinse?	N**
d. Type II reagent-grade water?	Y***
10. If samples are for organic analysis, does the cleaning procedure for sampling equipment include the following sequential steps:	
a. Nonphosphate detergent wash?	Y
b. Tap water rinse?	Y
c. Distilled/deionized water rinse?	N**

---

* Tap Water

** Methanol.

*** Distilled water.

	Information Provided (Y/N/U)
d. Acetone rinse?	N*
e. Pesticide-grade hexane rinse?	N*
11. Is sampling equipment thoroughly dry before use?	Y
12. Are equipment blanks taken to ensure that sample cross-contamination has not occurred?	N
13. If volatile samples are taken with a positive gas displacement bladder pump, are pumping rates below 100 ml/min?	N/A
F. In-situ or field analyses:	
1. Are the following labile (chemically unstable) parameters determined in the field:	
a. pH?	Y
b. Temperature?	Y
c. Specific conductivity?	Y
d. Redox potential?	N
e. Chlorine?	N
f. Dissolved oxygen?	N
g. Turbidity?	N
h. Other (specify) None	
2. Are the in-situ determinations made after well evacuation and sample removal?	Y

---

* Distilled water.

	Information Provided (Y/N/U)
3. If a sample is withdrawn from the well, are parameters measured from a split portion?	Y
4. Is monitoring equipment calibrated according to manufacturers' specifications and consistent with SW-846?	Y
5. Is the date, procedure, and maintenance for equipment calibration documented in the owner/operator's field logbook?	Y

	Information Provided (Y/N/U)
III. Review of Sample Preservation and Handling Procedures	
A. Sample containers:	
1. Are samples transferred from the sampling device directly to their compatible containers?	N*
2. Are sample containers for metals (inorganics) analyses polyethylene with polypropylene caps?	Y
3. Are sample containers for organics analyses glass bottles with fluorocarbon resin-lined caps?	Y
4. If glass bottles are used for metals samples, are the caps fluorocarbon resin-lined?	N/A
5. Are the sample containers for metal analyses cleaned using these sequential steps:	
a. Nonphosphate detergent wash?	I**
b. 1:1 nitric acid rinse?	I
c. Tap water rinse?	I
d. 1:1 hydrochloric acid rinse?	I
e. Tap water rinse?	I

* Samples were collected in polyethylene beakers and transferred to appropriate containers. The beakers were rinsed with well water prior to collecting the samples.

** Procedures for decontamination of sample containers for metals analyses were not provided in the Sampling and Analysis plan.

	Information Provided (Y/N/U)
f. Distilled/deionized water rinse?	I
6. Are the sample containers for organic analyses cleaned using these sequential steps:	
a. Nonphosphate detergent/hot water wash?	Y
b. Tap water rinse?	Y
c. Distilled/deionized water rinse?	Y
d. Acetone rinse?	Y
e. Pesticide-grade hexane rinse?	Y
7. Are trip blanks used for each sample container type to verify cleanliness?	N*

* VOA vials only.

		Information Provided (Y/N/U)

B. Sample preservation procedures:

1. Are samples for the following analyses cooled to 4°C:

a.	TOC?	Y
b.	TOX?	Y
c.	Chloride?	Y
d.	Phenols?	N/A
e.	Sulfate?	Y
f.	Nitrate?	Y
g.	Coliform bacteria?	Y
h.	Cyanide?	N/A
i.	Oil and grease?	N/A
j.	Hazardous constituents (Modified Appendix IX)?	Y*

2. Are samples for the following analyses field acidified to pH <2 with HNO_3:

a.	Iron?	N/A
b.	Manganese?	N/A
c.	Sodium?	N/A
d.	Total metals?	N/A
e.	Dissolved metals?	Y
f.	Fluoride?	N**
g.	Endrin?	Y
h.	Lindane?	Y
i.	Methoxychlor?	Y
j.	Toxaphene?	Y
k.	2,4, D?	Y
l.	2,4,5, TP Silvex?	Y
m.	Radium?	Y
n.	Gross alpha?	Y

---

* Purgeables and pesticides/herbicides only.

	Information Provided (Y/N/U)
o. Gross beta?	Y
3. Are samples for the following analyses field-acidified to pH <2 with H_2SO_4:	
a. Phenols?	N/A
b. Oil and grease?	N/A
4. Is the sample for TOC analysis field-acidified to pH <2 with HCl?	N*
5. Is the sample for TOX analysis preserved with 1 ml of 1.1 M sodium sulfite?	N*
6. Is the sample for cyanide analysis preserved with NaOH to pH >12?	N/A
C. Special handling considerations:	
1. Are organic samples handled without filtering?	Y
2. Are samples for volatile organics analyses transferred to the appropriate vials to eliminate headspace over the sample?	Y
3. Are samples for metals analyses split into two portions?	N

* Acidified to pH <2 with H_2SO_4 with no headspace.

		Information Provided (Y/N/U)
4.	Is the sample for dissolved metals filtered through a 0.45-micron filter?	Y
5.	Is the second portion analyzed for total metals without being filtered?	N*
6.	Is one equipment blank prepared each day of ground-water sampling?	N**

* Samples are not analyzed for total metals.

** No equipment blanks were prepared.

	Information Provided (Y/N/U)
IV. Review of Chain-of Custody Procedures	
A. Sample labels:	
1. Are sample labels used?	Y
2. Do labels contain the following information:	
a. Sample identification number?	Y
b. Name of collector?	Y
c. Date and time of collection?	Y
d. Place of collection?	Y
e. Parameter(s) requested and preservatives used?	Y
3. Do the labels remain legible even if wet?	Y
B. Sample seals:	
1. Are sample seals placed on containers or cooler to ensure that the samples are not altered?	Y
C. Field logbook:	
1. Is a field logbook maintained by the owner/operator?	Y
2. Does the logbook document the following:	
a. Purpose of sampling (e.g., detection or assessment monitoring)?	N
b. Location of well(s)?	Y
c. Total depth of each well?	Y

		Information Provided (Y/N/U)
d.	Static water level depth and measurement technique?	Y
e.	Presence of immiscible layers and detection method?	N
f.	Collection method for immiscible layers and sample identification numbers?	N
g.	Well evacuation procedures?	Y
h.	Sample withdrawal procedure?	Y
i.	Date and time of collection?	Y
j.	Well sampling sequence?	Y
k.	Types of sample containers and sample identification number(s)?	N*
l.	Preservative(s) used?	Y
m.	Parameters requested?	Y
n.	Field analysis data and method(s)?	Y
o.	Sample distribution and transporter?	N
p.	Field observations?	
	o Unusual well recharge rates?	N
	o Equipment malfunction(s)?	N
	o Possible sample contamination?	N
	o Sampling rate?	N

* Only sample identification number.

	Information Provided (Y/N/U)
D. Chain-of-custody record:	
1. Is a chain-of-custody record included with each sample?	Y
2. Does it document the following:	
a. Sample number?	Y
b. Signature of collector?	Y
c. Date and time of collection?	N*
d. Sample type?	Y
e. Station location?	Y
f. Number of containers?	Y
g. Parameters requested?	Y
h. Signatures of persons involved in the chain-of-possession?	Y
i. Inclusive dates of possession?	Y
E. Sample analysis request sheet:	
1. Does a sample analysis request sheet accompany each sample?	Y
2. Does the request sheet document the following:	
a. Name of person receiving the sample?	Y
b. Date of sample receipt?	Y
c. Laboratory sample number (if different than field number)?	Y
d. Analyses to be performed?	Y

* Form does not request date or time of collection.

	Information Provided (Y/N/U)
V. Review of Quality Assurance/Quality Control Program	
A. Is the validity and reliability of the laboratory and field-generated data ensured by a Quality Assurance/Quality Control program?	Y
B. Does the Quality Assurance/Quality Control program include:	
1. Documentation of any deviations from approved procedures?	Y
2. Documentation of analytical results for:	
a. Blanks?	Y*
b. Standards?	Y
c. Duplicates?	Y
d. Spiked Samples?	Y
e. Detectable limits for each parameter being analyzed?	Y
C. Are approved statistical methods used?	
D. Are QC samples used to correct data?	N
E. Are all data critically examined to ensure it has been properly calculated and reported?	Y

* See Section 5.2.3 of the report text.

	Information Provided (Y/N/U)

VI. Surficial Well Inspection and Field Observations

A.	Are the wells adequately maintained?	Y
B.	Are the monitoring wells protected and secure?	Y
C.	Do the wells have surveyed casing elevations?	Y
D.	Are the ground-water samples turbid?	Y*
E.	Have all physical characteristics of the site been noted in the inspector's field notes (i.e., surface waters, topography, surface features)?	Y
F.	Has a site sketch been prepared by the field inspector with a scale, north arrow, location(s) of buildings, location(s) of regulated units, location of monitoring wells, and a rough depiction of the site drainage pattern?	N

* Some samples were turbid upon visual inspection and analytical results verify this.

APPENDIX C

FIELD LOG

SE 1/4 Sec 30 & NE 1/4 Sec 31 } T17S R35E Lea County New Mexico } for RCRA permit

Marianne Smith & Phebe Duval

Name Kearney / Centaur

Address 225 Reinekers Lane
Alexandria, VA 22314

Phone 703/683-7932

SW/4 SE/4 of Sec 30 T17S R35E) for OCD discharge plan

This book is published on a fine 50% cotton-content ledger paper, specially treated for maximum archival service, and protected by a water resistant surface sizing.

DT-0659

Projects Phillips 66 Lee Plant
Buckeye, New Mexico
Lea County

T 18 S
R 35 E

18S 35E 30 444

32° 48' N 103° 29' W

Lee Plant EPA ID No.= NMD 000 709 659

Field Log
Phillips Lee CME
R26-06-04
OCT 31, 1988 - ~~OCT~~ MS
NOV. 1, 1988

ELAN Publishing Co., Inc.
Meredith, N.H. 03253

Projects (continued)

Monday 10/31/88 1-1

0920 arrived at the facility. Met Mike Ford signed in and proceeded to MW 1

Mike Ford stated the reason for one foot total depth measurement on all wells was due to the one foot add-on tape.

Good condition of concrete pad. MW-1 casing was locked.

Photo 1-1 View of set up for purging MW-1,
~~0927~~ facing west
1029 - will reset camera to correct time
HNU readings 0
Depth to water - ACTAT Electrone Sounder Water Level recorder - to determine depth of steel tape

depth to H_2O 94.84 (1st reading)

Photo 1-2 View facing north, determining
0935 depth to water

depth to water 94.84 (2nd reading

Total depth

There is a ~~submer~~ pump at the bottom of this well (3' in length)

100' at top of the pump at the bottom of the well. Therefore, the depth of the well (reported as 105.36' in the report) is actually 3 feet deeper due to the pump, 2.36' for casing
Will purge 7 gallons from the well

Casing

Photo 1-3 View of 1st ~~well~~ purged to be sampled
0950 . for pH, Cond., facing south.
Field readings
Conduct. 540 ~~gp~~ at 65°F
pH 7.2 at 65°F

Water appears moderately turbid

$2''(d) = 1''(r'')$

$\pi(1)^2 h$

60°F $5/9\,(60 - 32) \simeq 15.5°C$

~~323.58''~~ BP — 2.25

$2'' = .083' = r$ — $1.125'' = r$

$.00694 = r^2$ — $.00878 = r^2$

2.298 ft³ for one well volume

Well elevations - Licensed Surveyor
Well #1 Elevations & Location
280.98 FSL & 1390.02 FEL
Ground Elev. 3977.51'
Brass Cap Elev. 3977.85'
Top 6" Casing Elev. 3978.77'
Top 2" Stl Pipe Elevation 3979.27'

Well #2 Elevations & Location
11.82 FNL & 1531.66 FEL
Ground Elev. 3977.63'
Brass Cap Elev. 3979.98'
Top 6" Casing Elev. 3979.98'
Top 2" Stl Pipe Elev. 3980.59'

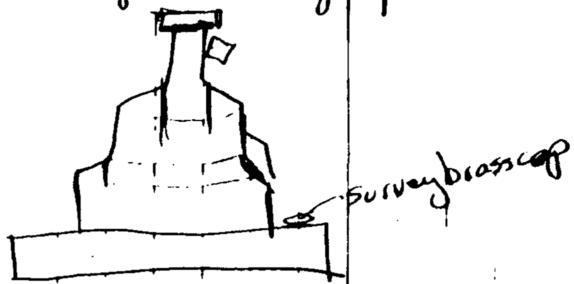
Well #3 Elevations & Locations

9.09 FNL + 1597.74 FEL
Ground Elev 3977.88'
Brass Cap Elev. 3978.25'
Top 6" Casing Elev. 3979.86'
Top 2" Stl. Pipe Elev. 3980.37'

Well #4 Elevations + Locations
5.10 FSL + 1671.23 FEL
Ground Elev. 3977.86'
Brass Cap Elev. 3978.23'
Top 6" Casing Elev. 3979.87'
Top 2" - Stl. Pipe Elev: 3980.29'

~~Mike Smithee's~~ ~~Ac~~ wastewater injection well 1/4 ~~mile~~ south of pits at Artesia. 25000' below surface wastewater
- there is no injection well w/in a 1000' radius - but other injection wells exist
2° 3° Oil recovery - injecting CO2 and H2O to recover oil

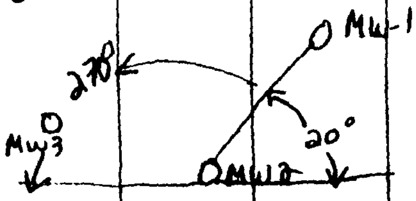
MW-1
Completed Purging 1015



1030 moved to MW-2
Photo 1-4
1029 facing NW view of former Surface impoundment location.
Photo 1-5 View of east edge of former
1030 SI facing NE. MW-1 is adjacent to FRP tank in background

HNu reading of Headspace 0.05 ppm
MW-2
97.02' depth to Water (1st reading)
Photo 1-6 View of MW-2 facing NW.
1035

97.02' depth to Water (2nd reading)



107.7' total depth of well
7.41 gallons to be purged from MW-2

7.48 ft³/gal = constant

facility used 109 ft for total depth of well

2.979 ft³
3.0096 ft³ $\frac{1 gal}{7.48 ft^3}$ = ~~.4~~

2.5 gal × 3 = ~~6~~ 7 gallons / 3 well volumes

MW-2

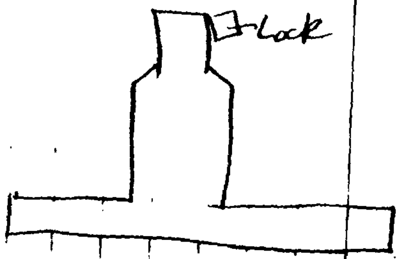


Photo 1-7 View of first bailer from MW-2,
1054 facing North. Note the water appeared not turbid

Field measurements
Conductivity 250 μ at 68°F
pH 6.8 at 68°F

Oil Well depths are between 5,000 and 7000 feet.

Photo 1-8 View of last bailer prior
1103 to emptying 2 gallon bucket
(~ 1 well volume)

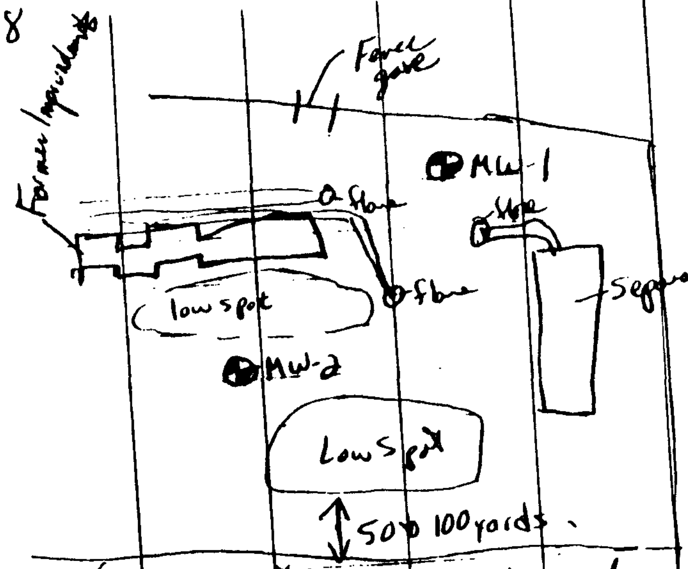


Photo 1-9 Facing SE View of purging MW-2. Note low spot behind the well. Reportedly collects water after rainfall.
No surface water runoff occurs at the facility according to operator.

~~Sampling~~ done May
Aug & Sep.
Now - end of October
1130 finished purging 8 gallons from MW-2

Photo 1-10 MW 3
1134 Facing NE, view of MW-3 note low spot to the left and former SI. are to extreme left on other side of pipes.

HNu ~ 0ppm
reading

Weather now sunny, light NE winds ~5 knots. Temp 75-80°F

96.81 ft Depth to Water (1st reading)
96.81 ft Depth to Water (2nd reading)

107.5 Depth of well measured by o/o.
106.61 Total depth of well (according to diagram).

~~2.96 ft³ = 1 well volume~~
will purge 7 gallons from well.

Decontamination
① Rinse w/ Tap
② Dawn Soap
③ Rinse
④ Methanol
⑤ Distilled

1-10

10.69' water

6.62 gallons to be evacuated

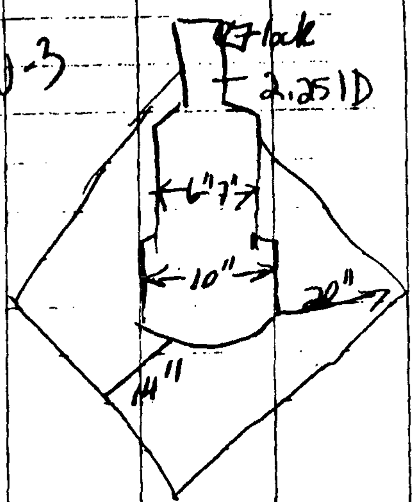
Facility removed ~ 108 feet of line ~~on~~ prior to connecting dedicated bailer

photo 1-11 ~~facing NW - first bailer full~~
1204 for MW-3

~~Field measurements~~

Conductivity 482 at 68°F
pH 7.3 at 68°F

MW-3



1-11

Photo 1-12 View facing east
1231 Purging MW-3

Slightly turbid water observed at the conclusion of purging

Broke for lunch 1245
Returned to MW-4 for purging
1315 Facility o/o removed approximately 10 feet of tie line from trailer connection point. Replaced new section of rope onto "new" dedicated bailer

HNu reading pegged at 0-20 range
HNu reading 100 ppm to 150 ppm
O/O says this well has 1800 ppb.
~~Benzene~~

96.72' depth to water (1st reading)
96.72' depth to water (2nd reading)

104.7' depth to bottom of well

10.1' water = 2.08 gal × 3 = 6.258

M2

Will purge 7 gallons

1st bailer

grey to black sediment

sour smell

collected 4 cups for field parameters
2 cups from 1st bailer (diagnostic)
2 cup from 2nd bailer (no sediment

photo 1-13 facing southeast view of bailer w/ sediment
" 1-14 facing

" 1-15 view of flare for plant facing east
time 1350 flare is ~ 100 feet to the east

conductance 1450 @ 69°F
pH 7.1 @ 69°F

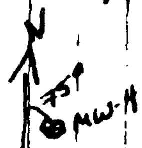
grey silt evident in turbid samples
moderate to very turbid.

1-13

Winds from the NE ~ 10 knotts.
Temperature 77°F

Completed purging MW-4 at 1410 10/31/88

Design of MW-4 is identical to MW-3



Left facility 1530 10/31/88

11/1/88 Arrived at Lee Plant 0835
Will run an equipment blank on
d/a equipment

OCD may received wastewater discharge
plan - submitted which may include
site hydrogeology. Make well seal
copy of as

Photo 1-16 facing west, preparation for sampling
0856 MW-1. Note plastic sheeting
Bailer in plastic sleeve.

1-14

0900 ~~1000~~ ~~Rigging equipment~~ (MW-5)

Weather 60°F winds 10-15 knots from the southwest

$5/9(58-32) = 14.4°C$
26

0.5-0.6 HNu reading may have come from flare

0915

Photo 1-17 collecting MW-1 VOA
0919 facing SE.

H_2O sample appeared slightly turbid,

+ no water level needed or taken, on this well. Faulkly says ~~they~~ the well levels are always the same
Rinse beakers with well water three times. The beakers were used to collect all samples except for VOAs.

1-15

Faulkly o/o uses
YSI field pH and EC
Model 33 S-C-T Meter

Our measurements for pH & Conductivity for MW-1

63.5°F = 17.5°C
conductivity 586 μm
pH 7.2

Faulkly 490 μm conduction } 18°C
Reading 1. pH 7. }
Faulkly field filtering water for Metals
Whatman Membrane Filter
.45 micron

Photo 1-18 View of Faulkly sample containers
1002 on MW-1 pad facing west

Faulkly 2nd readings
7.14 = pH

Bailer cord is braided polypropylene
Completed MW-1 at 1020
Moved on to MW-2

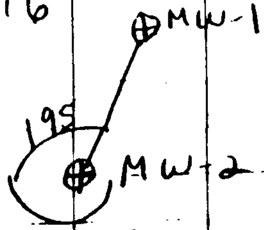


photo 1-19
1031 View of ~~MW-2 preparation~~, facing SW. Note Underground pipe in right foreground ~25 feet NE of MW-2

[pegged on 0-20
0-200
HNu 90 to 100 ppm on ~~0-20~~

Winds Gusting to 20 Knots

Faulty records water level on MW-2 = 97.02 feet

Fritz will pull one extra VOA 40 ml volatiles well
S&AP ~~will~~ Extra VOA on one well of the his choice

1045 MW-2 lowered bailer for Samples (VOA)

photo 1-20 View of bailer (1st) for VOA
1046 sample, facing SW.

1115 Field Measurements (ours) for MW-2
Temp 64°F
pH 6.8①, 7.2②
Conductivity 1976 umhos

Faulty measurements (field)
①st 6.64 pH 2100 umhos
2nd 6.76 pH 2000 umhos

1130 Prepared Trip Blank - MW-6 VOA, BNA, Turbidity, Total Metals

Finished and moved to MW-3

Initial HNu reading around the cap prior to removal of the cap were ~150 ppm. When cap removed readings ~75 to 80 ppm for 3 minutes

1-18
MW-3
Water level 96.80'

photo 1-21 facing SE view of 1st
1211 bailer for MW-3.

MW-3 Field Parameters
SC = 443
Temp = 67 °F
pH = 8.0

Facility temp 20°C
Measure. pH 7.84
Initial Cond 550 µmos

completed Sampling at 1305 will
move on MW-4

- facility Samples for following Analyses

250 ml	plastic	pH	1-19
250 ml	plastic	pH Conductivity	
250 ml	"	" "	
125 ml	"	coliform	
500 ml	amber glass	NO_3^- TOX, TOC	
500 ml	amber glass	NO_3 TOX, TOC H_2SO_4	
1 l	poly ethylene	Radiochem. HNO_3	
1 l	"	Radiochem HNO_3	
1 l	polyethylene (none)	Cl^-, Fl, SO_4, turbidity, pH Conductivity	
500 ml	amberglass (H_2SO_4)	NO_3^- TOX, TOC	
"	"	" "	
1 l	amber glass	Pesticides + Herb.	
1 l	amber glass	" "	
2	Septum vials	VOAs	
1	500 ml polyethylene	priority metals (field filtered)	

1-20 MW-4 1350

95 ppm around cap (w/ capon)

Some condensate from boiler blowdown noted

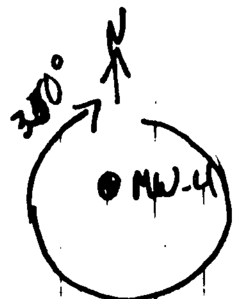
MW-4 samples will be 1400 time

photo 1-22 View of MW-4 facing
155 west prior to sampling

HNu upon removal of cap 100 ppm
the smell of benzene was noted

Depth to water on MW 4
96.71'

Field Parameters MW-4
SC 1185
Temp 68°F
pH 6.4



collecting samples MW-4 @ 1400

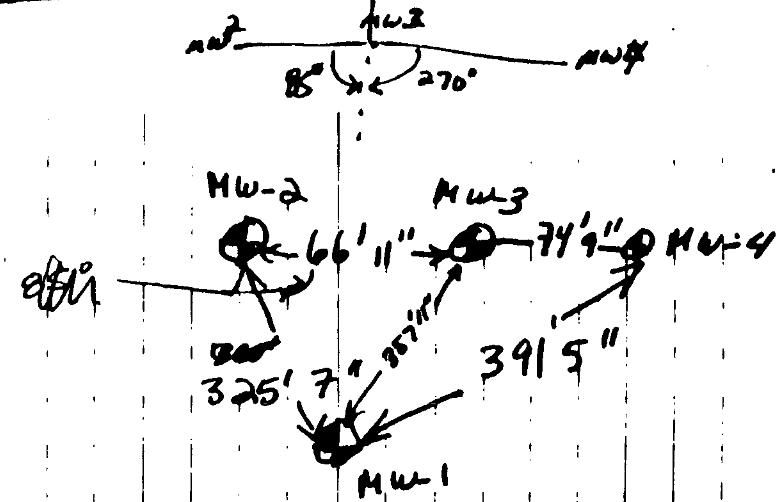
Facility Field Measurements

Temp 20°C
Initial pH 6.98
final pH 6.98

initial cond 1200
Final cond 1150

Signed out & left facility at 1545.

11/2 Return to Measure Distance
1700 Between Wells

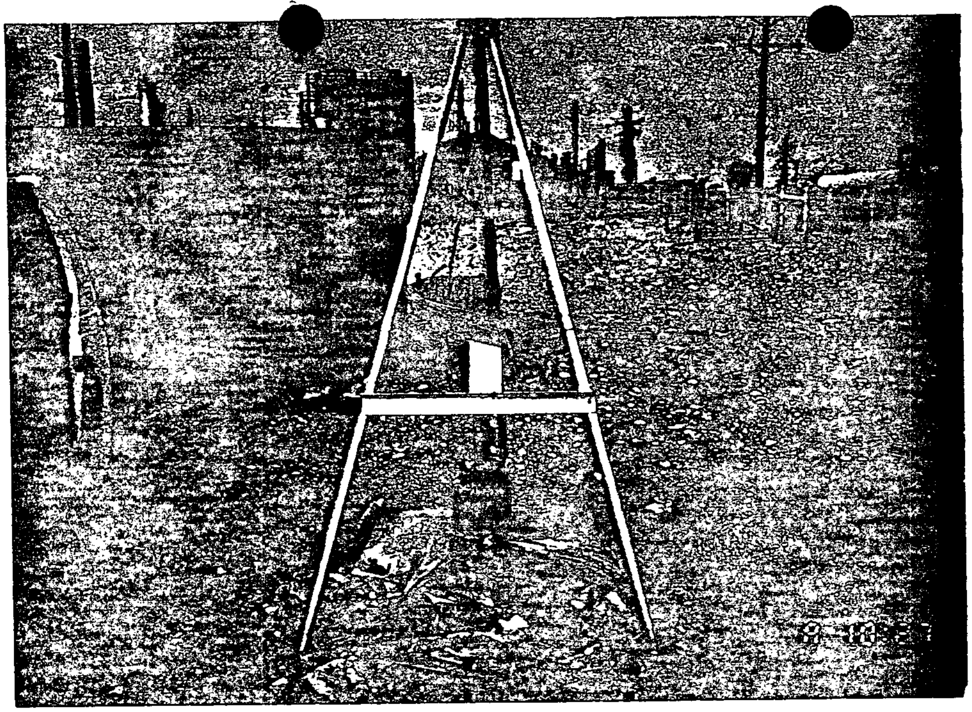


Bearings to due North

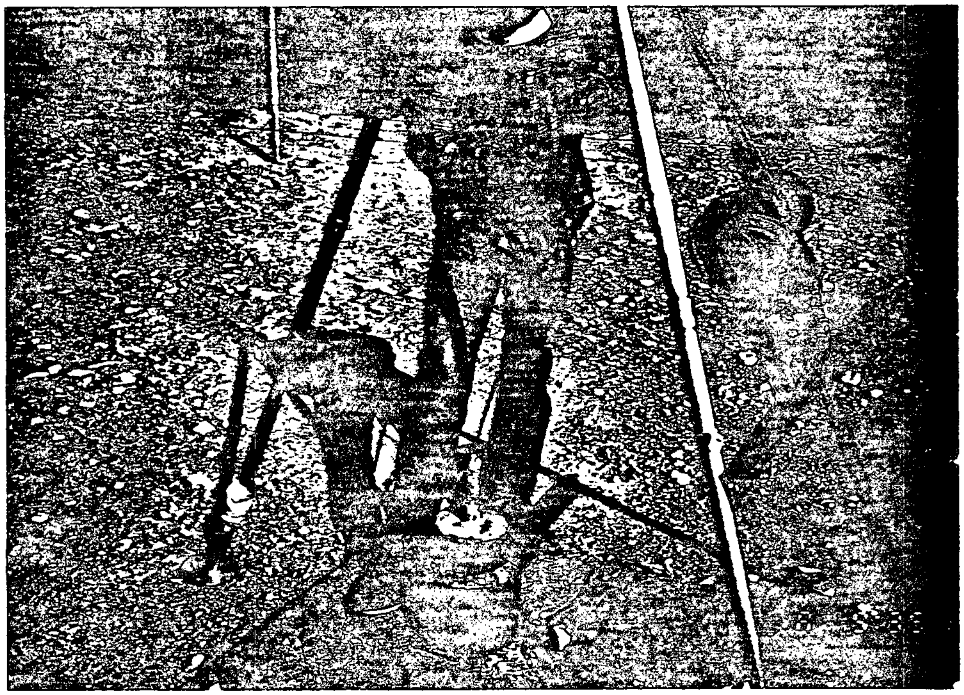
From	MW-4	to	MW-1	40°
From	MW-2	to	MW-1	20°
From	MW-3	to	MW-1	30°

APPENDIX D

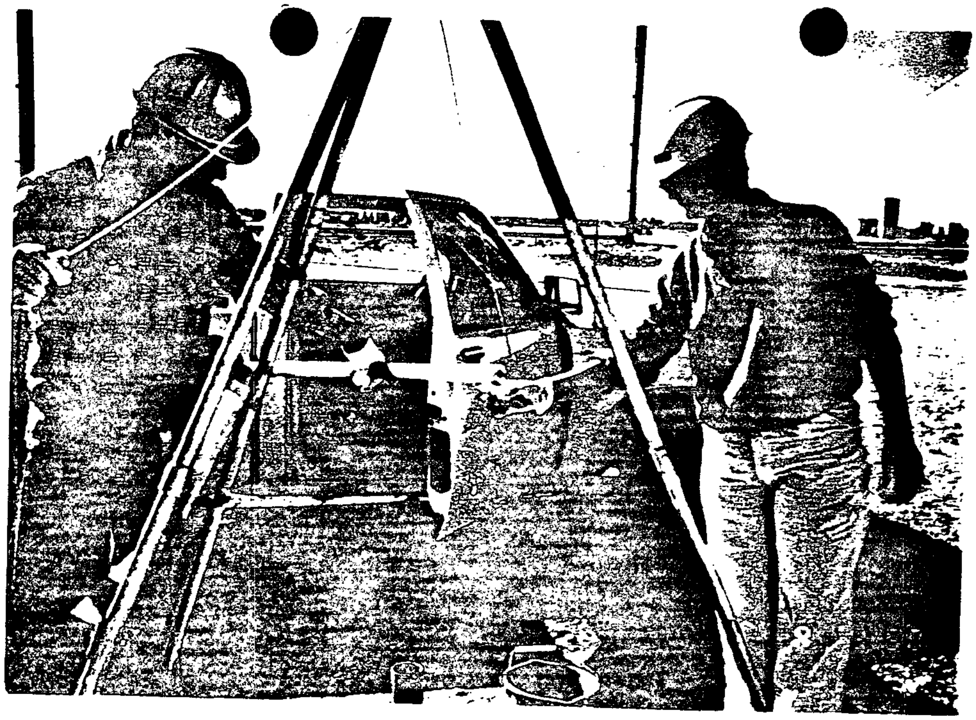
PHOTOGRAPH LOG
PHILLIPS LEE CME



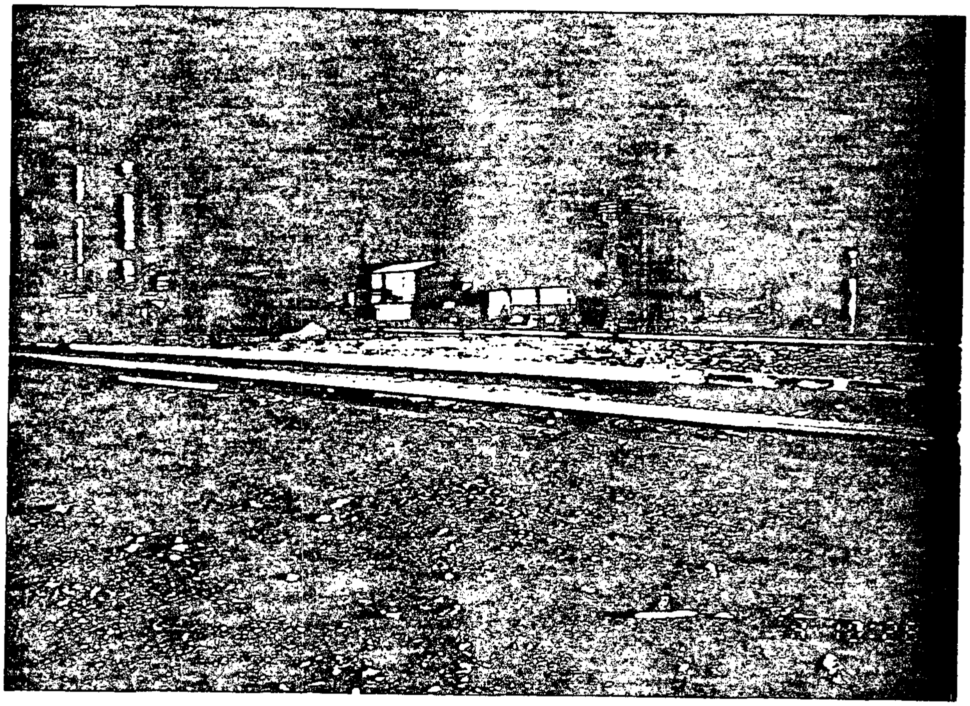
D.1 View facing west of tripod used for purging at Phillips-Lee, prior to unlocking the well cap at MW-1. Tank in left background was used during well installation for mixing bentonite slurry.



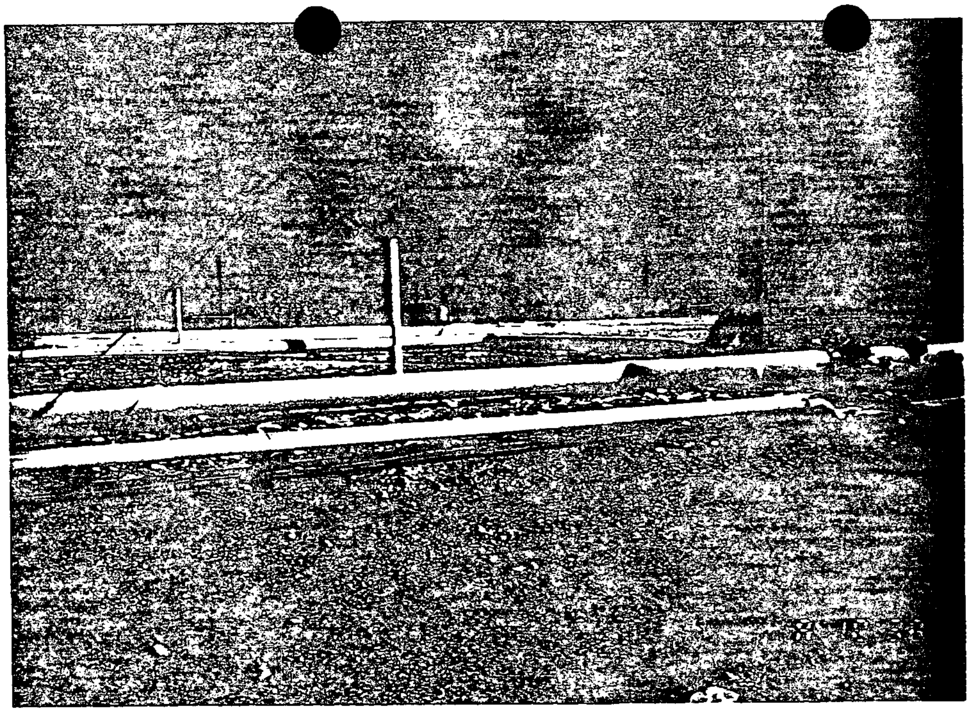
D.2 Facility operator measuring static water level at MW-1; facing north.



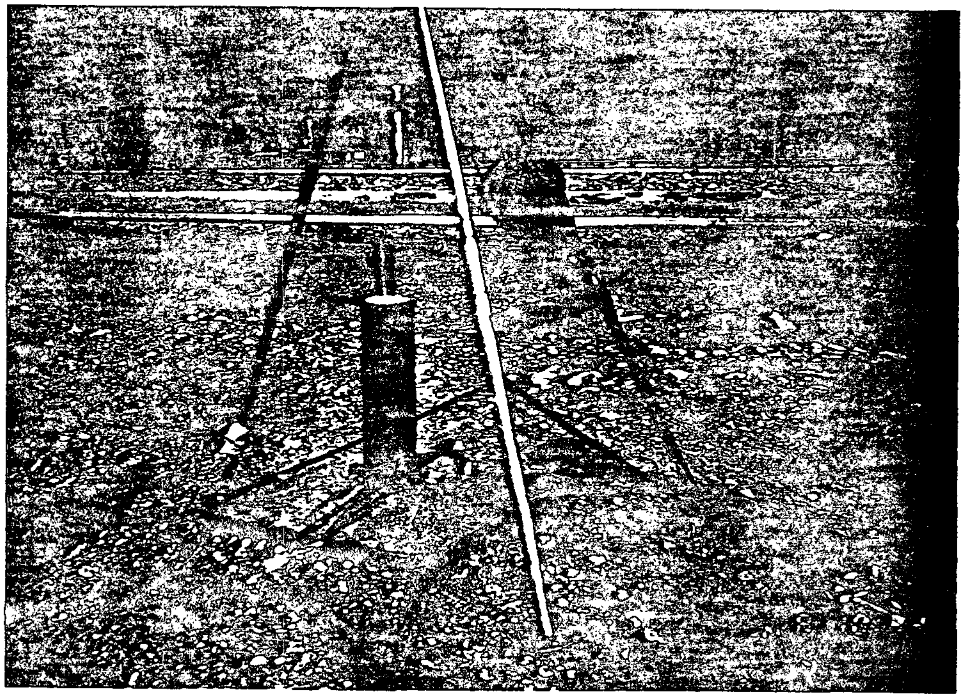
D.3 View of first bailer withdrawn from MW-1, facing south. Note moderate turbidity of sample.



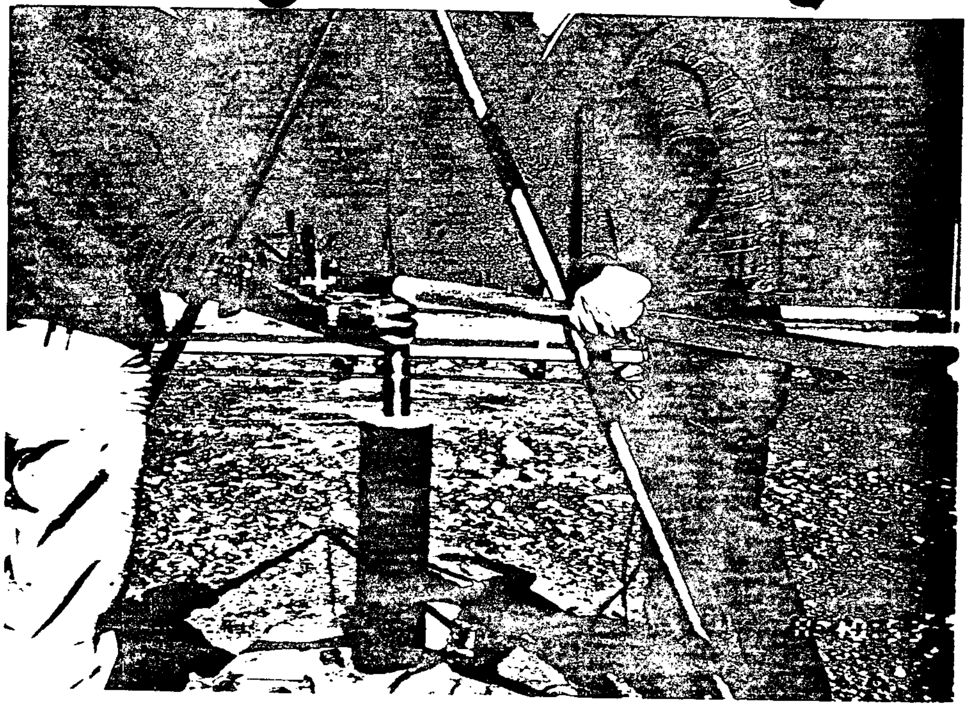
D.4 View from MW-2 facing northwest of Phillips-Lee facility showing location of former surface impoundment (between lateral pipes).



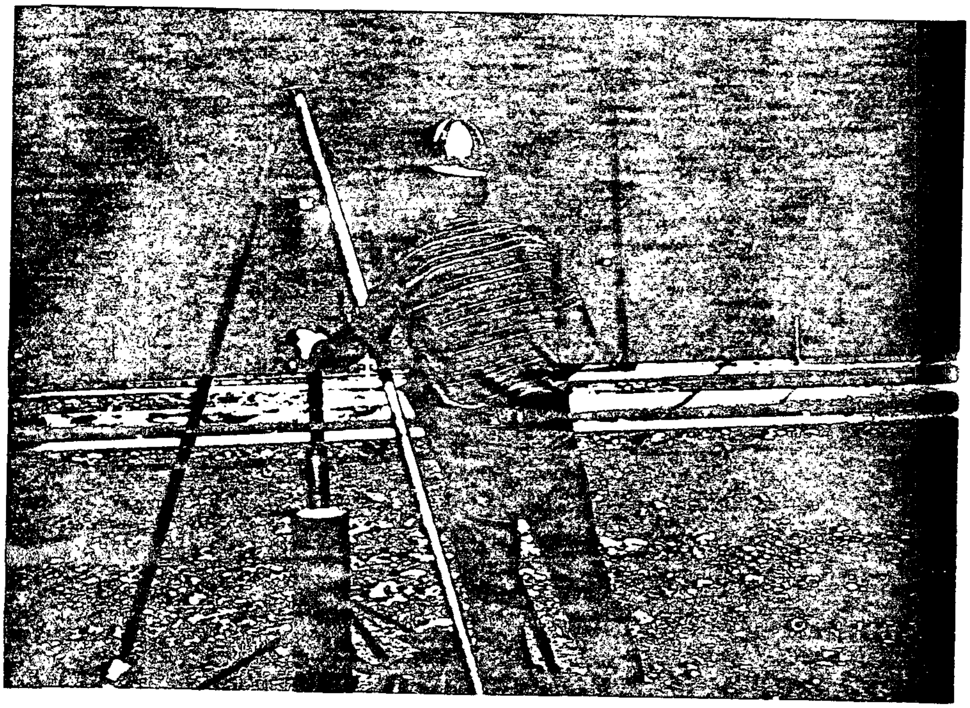
D.5 View facing northeast toward MW-1 from MW-2 showing eastern edge of former surface impoundment. Process pipelines overlie. The former surface impoundment, and the flare stack can be seen on the left. MW-1 is visible in the far background adjacent to the tank.



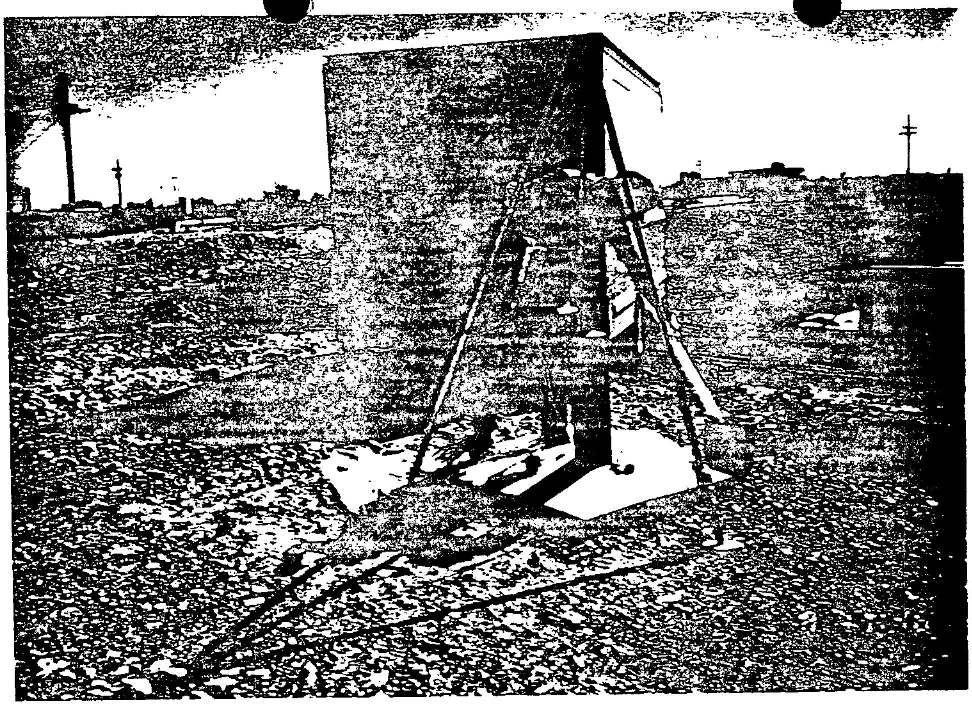
D.6 View of equipment set up prior to purging MW-2. Note former surface impoundment is beyond lateral pipe in background.



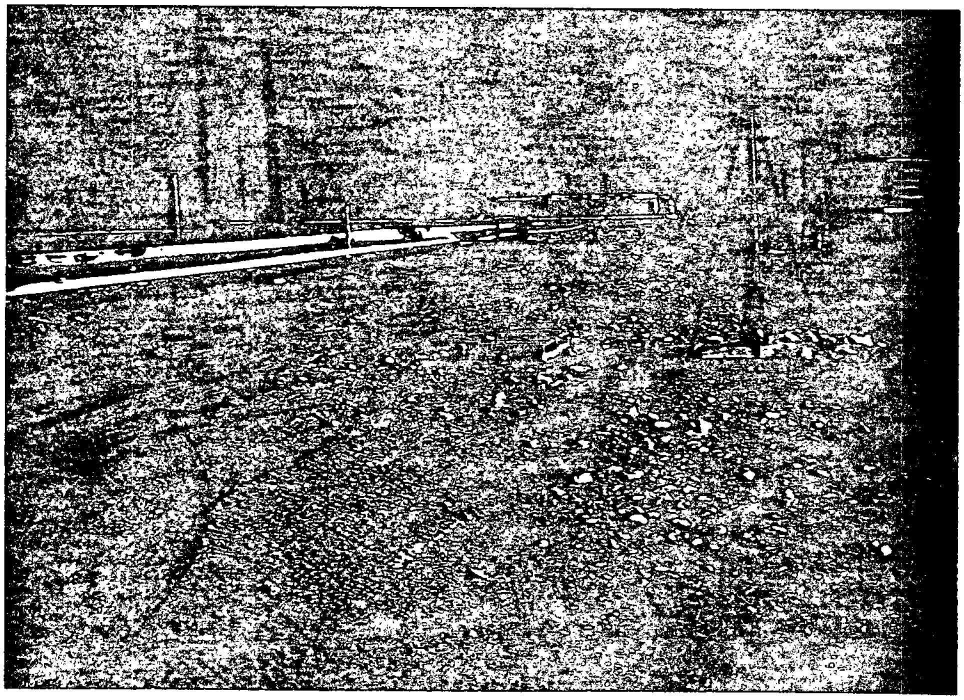
D.7 View facing north of first bailer during purging at MW-2. Note the sample is not turbid.



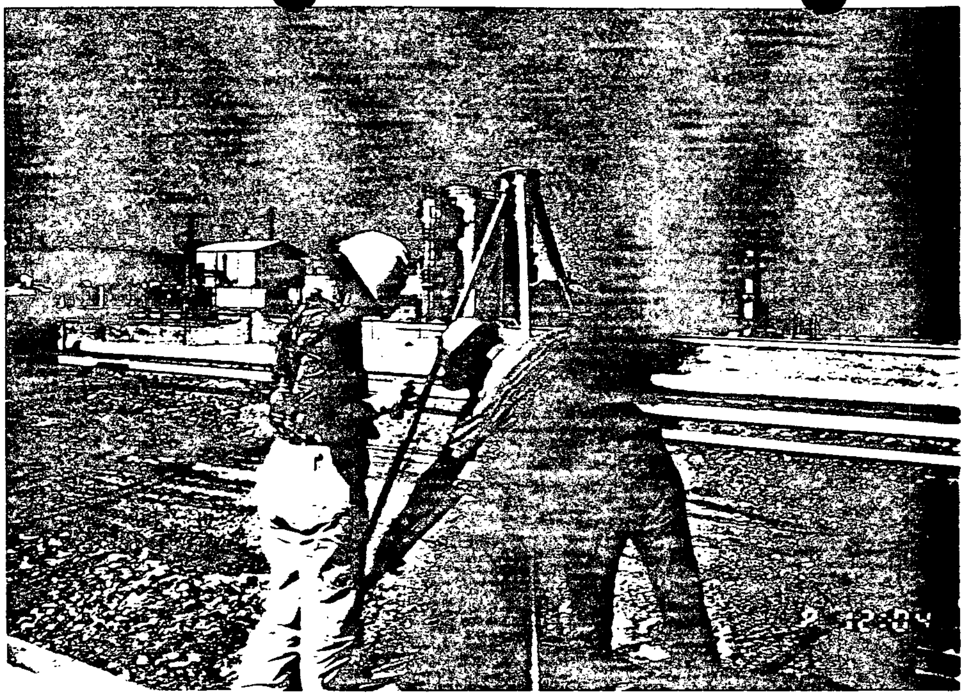
D.8 View facing north of last bailer withdrawn while purging MW-2. Note water is moderate to very turbid.



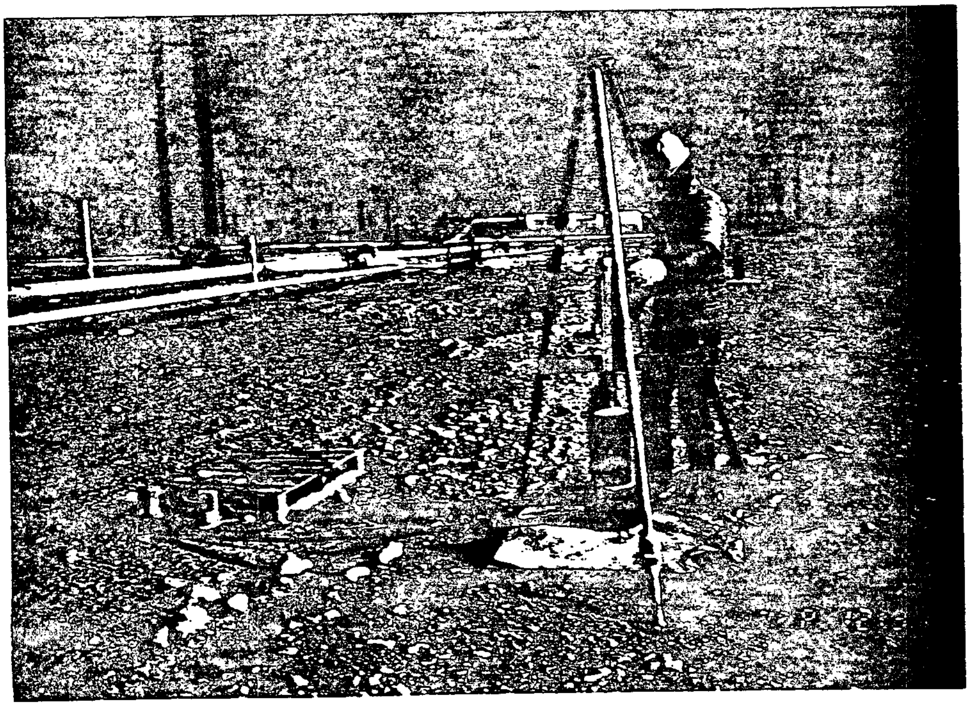
D.9 Purging MW-2, facing southeast. Note low spot in the background that reportedly collects precipitation during rainfall events.



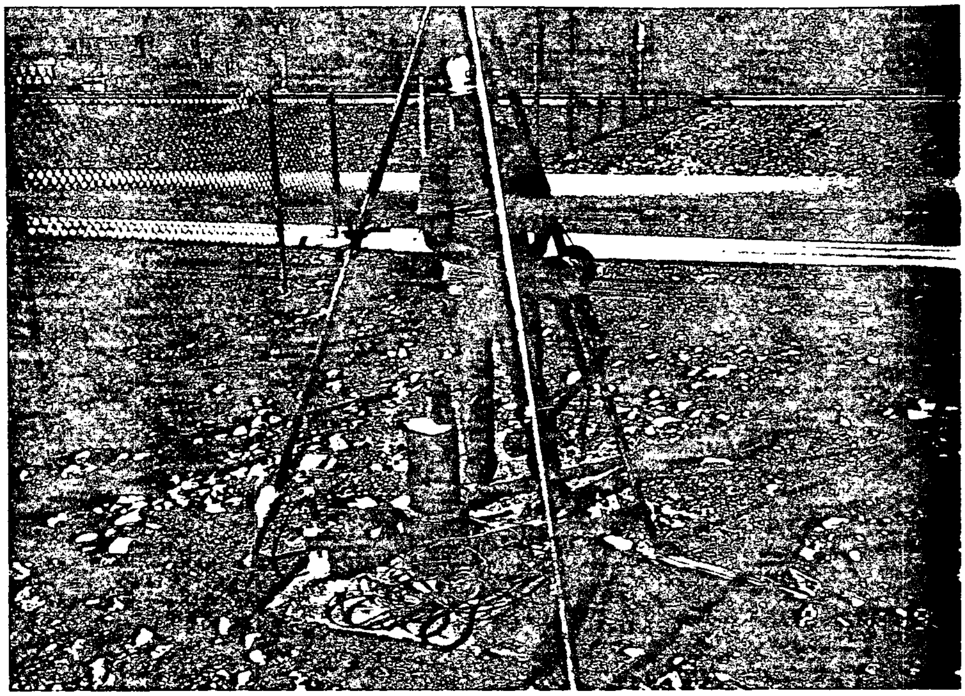
D.10 View facing northeast from monitoring well #3looking toward MW-2. Note low area to the left. Former surface impoundment is located to the left of the lateral pipes.



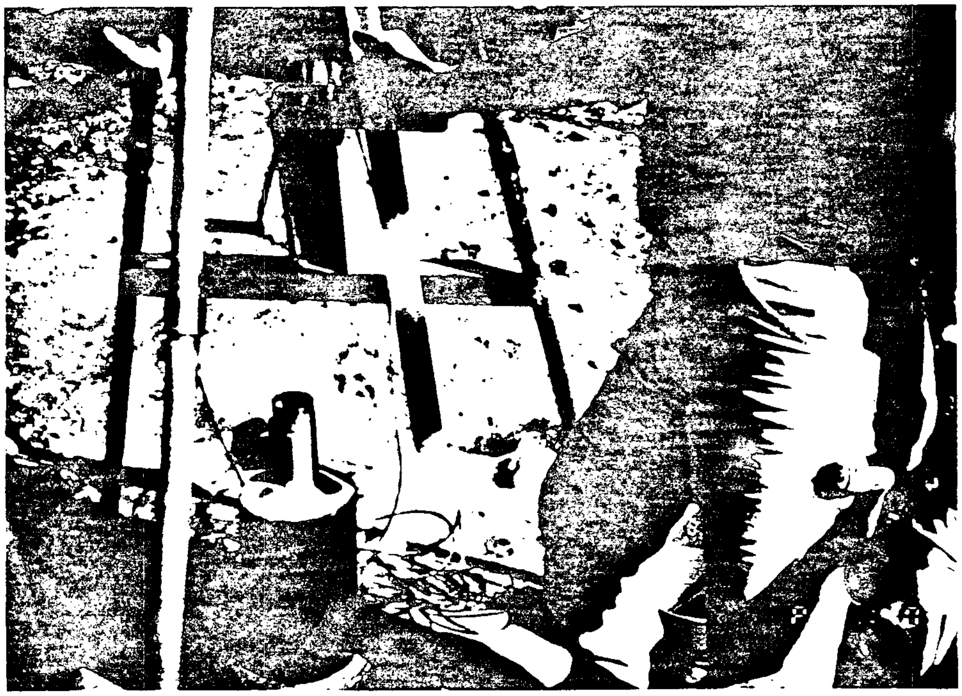
D.11 View facing northwest during purging of MW-3.



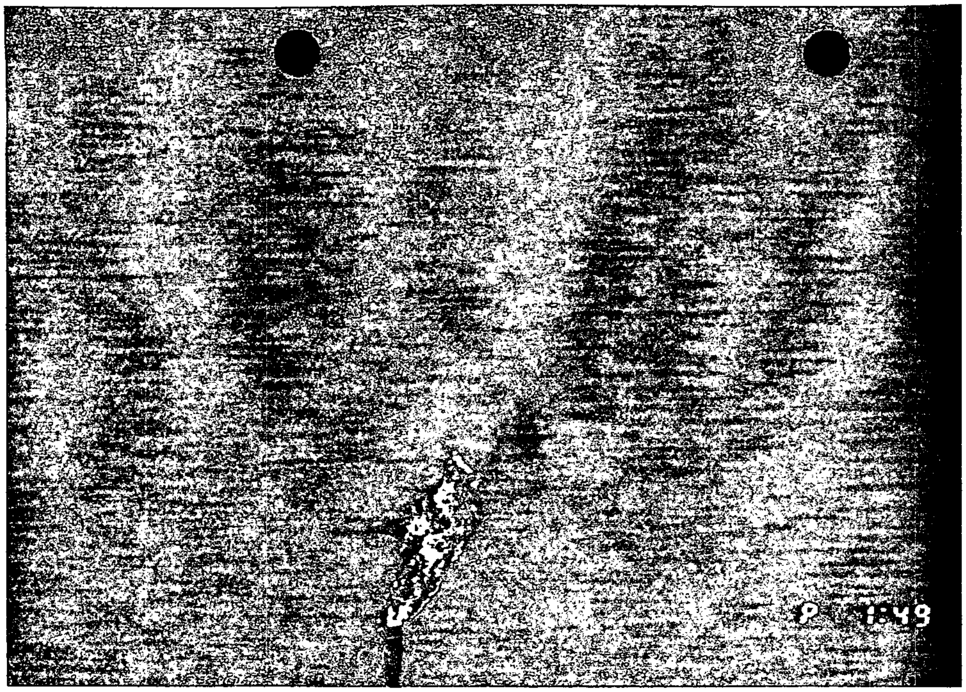
D.12 Purging MW-3, facing east. Note former surface impoundment is to the left of the lateral pipes. MW-2 is visible in the background.



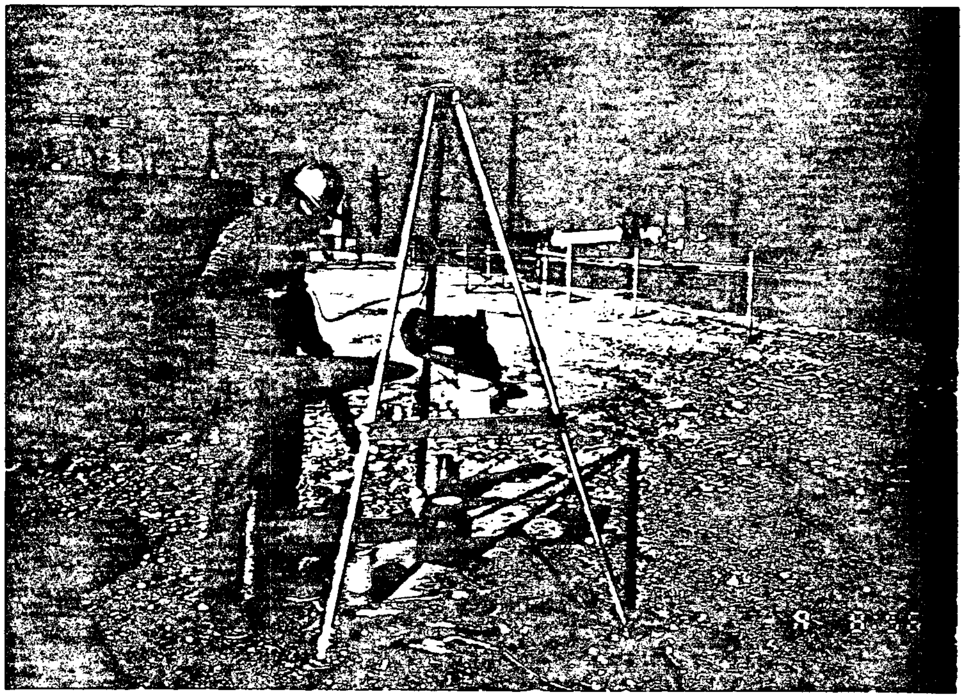
D.13 View facing northwest of equipment set up prior to unlocking well cap at MW-4. Former surface impoundment is to the right background and facility is to the left. Bailer retrieval line is lying on concete apron.



D.14 First bailer retrieved from MW-4 during purging. Note dark sediment in the bottom of the bailer. View is to the southeast.

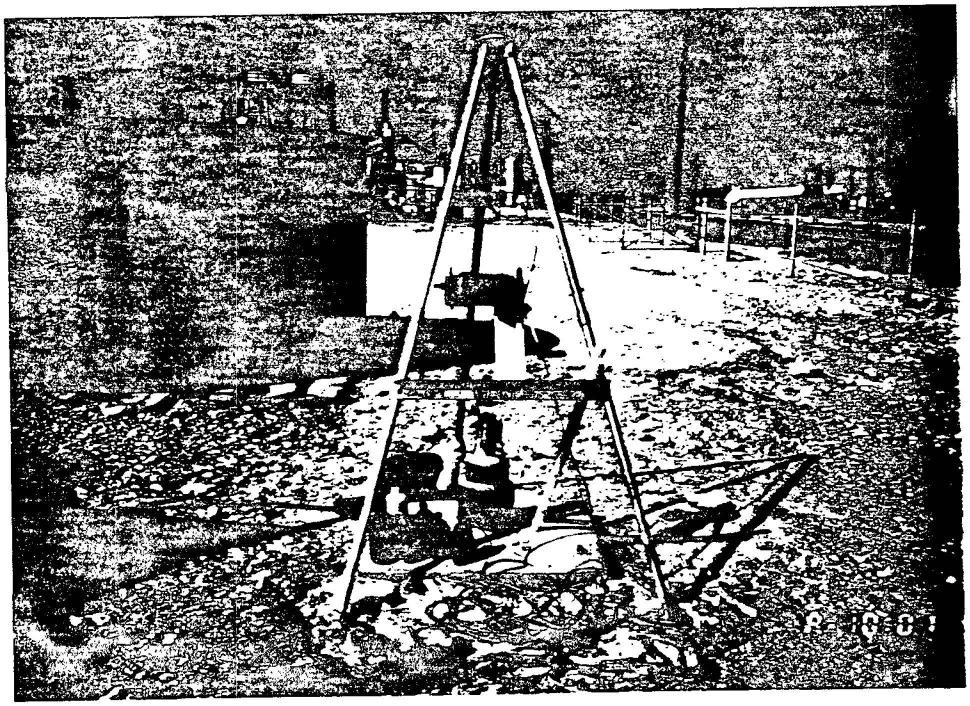


D.15 View facing east showing flare located near MW-2.

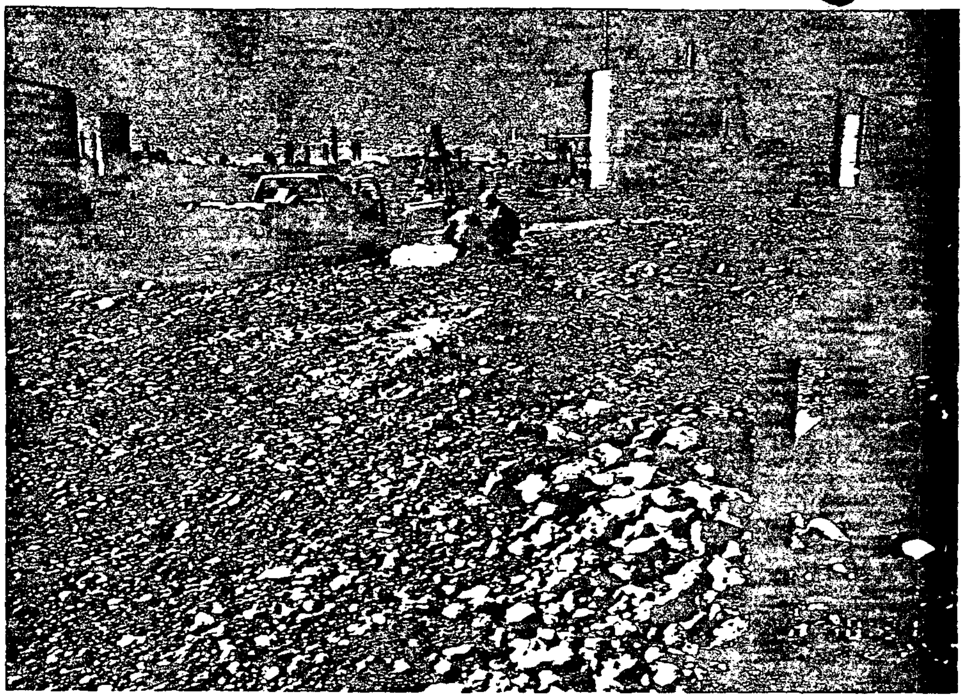


D.16 View facing west showing equipment set up prior to sampling at MW-1, and showing pre-cleaned, dedicated bailer being attached to new polypropylene rope. Note facility operator collects sample in polyethylene located on the corner of the pad.

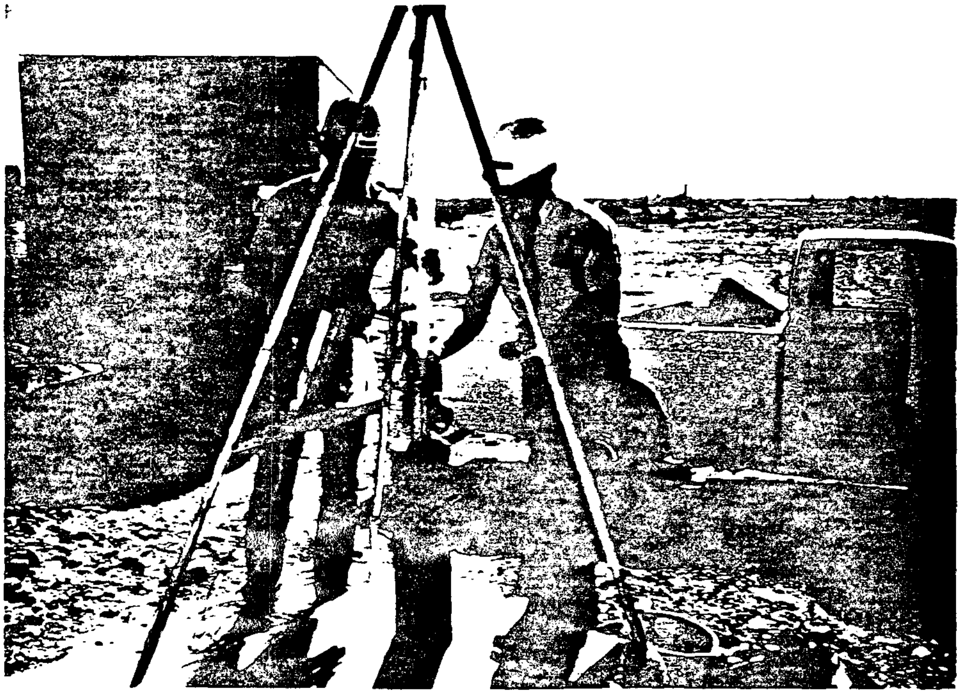
D.17 View facing south, showing technique used to collect VOA samples from MW-1.



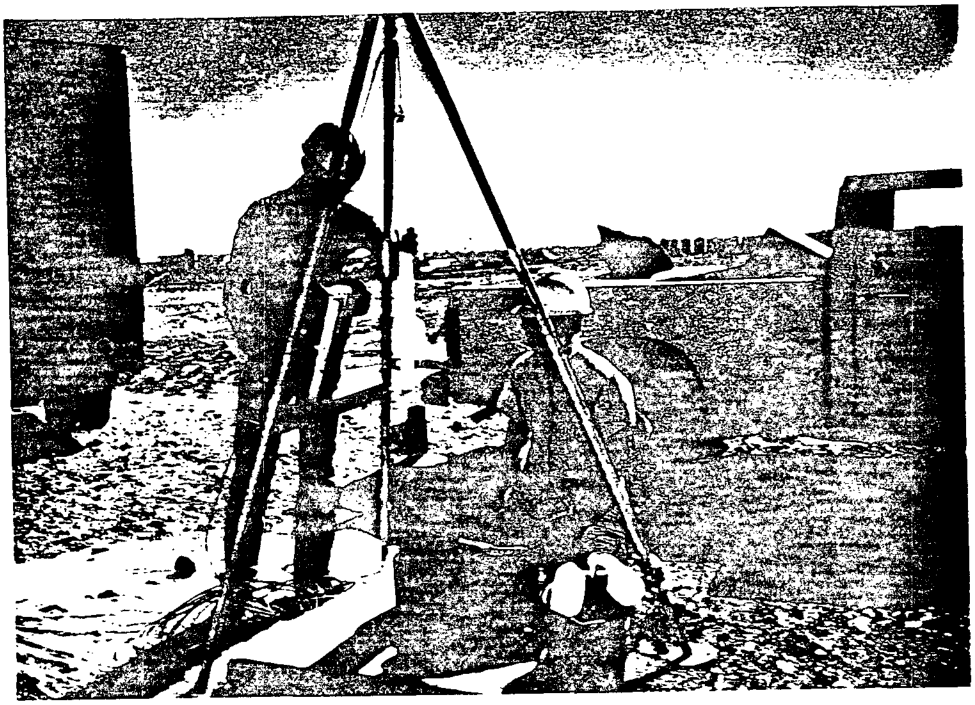
D.18 View facing west showing facility sample containers on pad after completing sample collection at MW-1. The bailer used to sample has just been removed from the retrieval line.



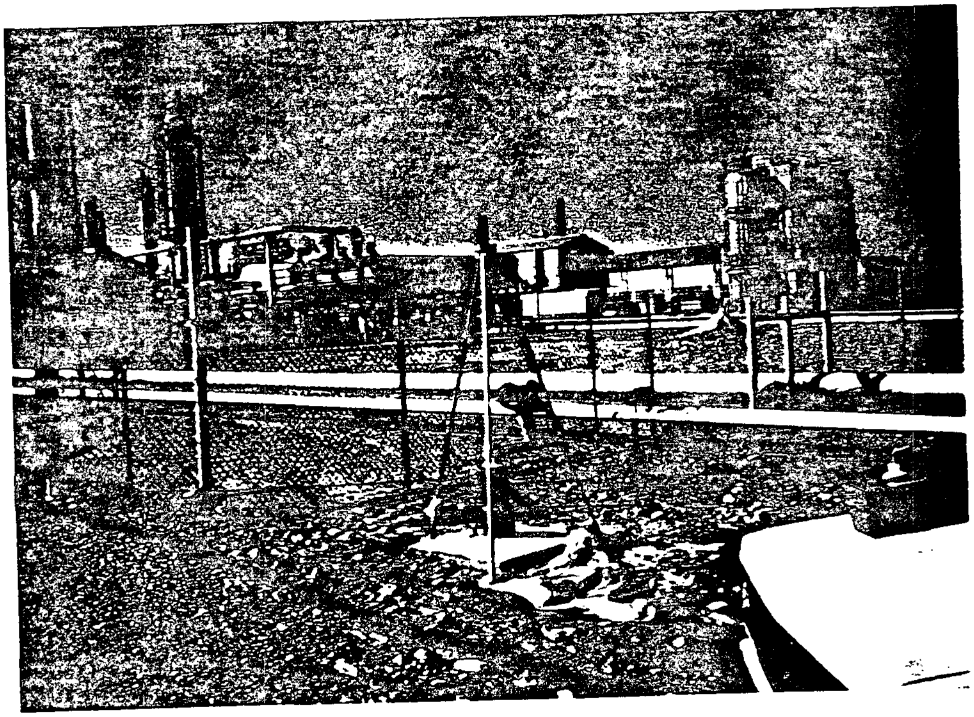
D.19 View facing southwest showing equipment set-up prior to sampling at MW-2. Note guards for underground pipe in the right foreground.



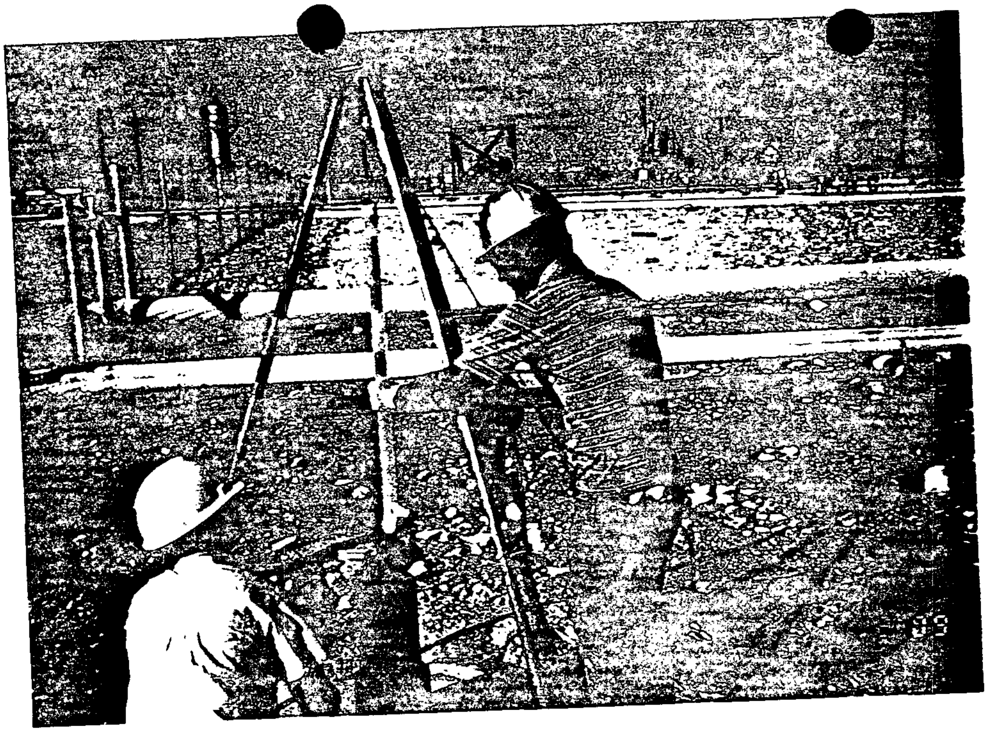
D.20 View facing southwest showing first bailer retrieval from MW-2, preparing to collect VOA samples.



D.21 View facing southeast showing first bailer retrieved while sampling MW-3. Note facility sample containers are in the center foreground.



D.22 Sampling equipment set-up for MW-4, facing northwest. Main plant area is located in the background.



D.23 First bailer retrieved while sampling at MW-4; facing north. Former surface impoundment is located in the background between the lateral pipes.

APPENDIX E

ANALYTICAL RESULTS
PHILLIPS LEE CME

COMBUSTION ENGINEERING

December 5, 1988

In reply refer to EMSI88-1851

Steve Muse
A.T. Kearney
225 Reinekers Lane, Suite 300
Alexandria, VA 22314

Dear Mr. Muse:

Enclosed are the results for the analysis of twenty-four (24) water samples that were received on October 27 through November 3, 1988 from the following sites:

1. Lusk (R26-06-5)
2. Artesis (R26-06-02)
3. Lee (R26-06-04)
4. Eunice (R26-06-03)

The samples were analyzed for turbidity, volatile and semivolatile CLP target compounds. In addition to the CLP target compound list, the samples were also analyzed for 2-Butanone, 1-Methylnaphthalene, (o,m,p) Cresol, and 7,12-Dimethylanthracene. All samples were analyzed and extracted within the contractual holding times. Since all samples carried the same identification, a suffix of three alphabetic letters for the site was added into the original sample ID in order to differentiate between them.

The results of the analysis are summarized on Form I, while the QC results are reported on Form II and III. A copy of the seven EPA defined qualifers is also enclosed for your reference.

If you have any questions, please do not hesitate to call.

Sincerely,

Leon Levan
Program Manager

LL/rt

G.O: 51407-0452
51407-0459
51407-0465
51407-0466

C-E Environmental, Inc.
A Subsidiary of
Combustion Engineering, Inc.

4765 Calle Quetzal
Camarillo, California 93010

(805) 388-5700

If gel permation chromatography, "GPC Cleanup" was performed, enter "Y" for yes. Otherwise, enter "N" for no, if GPC was not performed.

Enter pH for semivolatile and pesticides/PCBs, reported to 0.1 pH units.

"Date Received" is the date of sample receipt at the laboratory, as noted on the Traffic Report (i.e., the VTSR). It should be entered as MM/DD/YY.

"Date Extracted" and "Date Analyzed" should be entered in a similar fashion. For pesticide/PCB samples, the date of analysis should be the date of the first GC analysis performed. The date of sample receipt will be compared with the extraction and analysis dates of each fraction to ensure that contract holding times were not exceeded.

If a sample has been diluted for analysis, enter the "Dilution Factor" as a single number, such as 100 for a 1 to 100 dilution of the sample. Enter 0.1 for a concentration of 10 to 1. If a sample was not diluted, enter 1.

For positively identified TCL compounds, the contractor shall report the concentrations detected as uncorrected for blank contaminants.

For volatile and semivolatile results, report analytical results to one significant figure if the value is less than 10, and two significant figures above 10.

Report all pesticides/PCB results to two significant figures.

The appropriate concentration units, ug/L or ug/kg, must be entered.

If the result is a value greater than or equal to the quantitation limit, report the value.

Under the column labeled "Q" for qualifier, flag each result with the specific Data Reporting Qualifiers listed below. The Contractor is encouraged to use additional flags or footnotes. The definition of such flags must be explicit and must be included in the Case Narrative.

For reporting results to the USEPA, the following contract specific qualifiers are to be used. The seven qualifiers defined below are not subject to modification by the laboratory. Up to five qualifiers may be reported on Form I for each compound.

The seven EPA-defined qualifiers to be used are as follows:

U - Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture. For example, 10 U for phenol in water if the sample final volume is the protocol-specified final volume. If a 1 to 10 dilution of extract is necessary, the reported limit is 100 U. For a soil sample, the value must also be adjusted for percent moisture. For example, if the sample had 24% moisture and a 1 to 10 dilution factor, the sample quantitation limit f(or) phenol (330 U) would be corrected to:

$$\frac{(330\ U)}{D} \times df \quad \text{where } D = \frac{100 - \%\ \text{moisture}}{100}$$

and df = dilution factor

$$\text{at 24\% moisture, } D = \frac{100-24}{100} = 0.76$$

$$\frac{(330\ U)}{.76} \times 10 = 4300\ U$$ rounded to the appropriate number of significant figures

For soil samples subjected to GPC clean-up procedures, the CRQ(L) is also multiplied by 2, to account for the fact that only hal(f) of the extract is recovered.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identificati(on) criteria but the result is less than the sample quantitation limit but greater than zero. For example, if the sample quantitation limit is 10 ug/L, but a concentration of 3 ug/L is calculated, report it as 3J. The sample quantitation limit must be adjusted for both dilution and percent moisture as discussed for the U flag, so that if a sample with 24% moisture and a 1 to 10 dilution factor has a calculated concentration of 300 ug/L and a sample quantitation limit of 430 ug/kg, report the concentration as 300J on Form I.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS. Single component pesticides $\geq$10 ng/ul in the final extract shall be confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. This flag must be used for a TIC as well as for a positively identified TCL compound.

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. This flag will not apply to pesticides/PCBs analyzed by GC/EC methods. If one or more compounds have a response greater than full scale, the sample or extract must be diluted and re-analyzed according to the specifications in Exhibit D. All such compounds with a response greater than full scale should have the concentration flagged with an "E" on the Form I for the original analysis. If the dilution of the extract causes any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses shall be reported on separate Forms I. The Form I for the diluted sample shall have the "DL" suffix appended to the sample number.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and all concentration values reported on that Form I are flagged with the "D" flag.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

X - Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the Sample Data Summary Package and the Case Narrative. If more than one is required, use "Y" and "Z", as needed. If more than five qualifiers are required for a sample result, use the "X" flag to combine several flags, as needed. For instance, the "X" flag might combine the "A", "B", and "D" flags for some sample.

The combination of flags "BU" or "UB" is expressly prohibited. Blank contaminants are flagged "B" only when they are also detected in the sample.

If analyses at two different dilution factors are required (see Exhibit D), follow the data reporting instructions given in Exhibit D and with the "D" and "E" flags above.

2. Form I VOA-TIC and Form I SV-TIC

Fill in all header information as above.

Report Tentatively Identified Compounds (TIC) including CAS number, compound name, retention time, and the estimated concentration (criteria for reporting TICs are given in Exhibit D, Section IV). Retention time must be reported in minutes and decimal minutes, not seconds or minutes:seconds.

If in the opinion of the mass spectral interpretation specialist, no valid tentative identification can be made, the compound shall be reported as unknown.

Include a Form I VOA-TIC or SV-TIC for every volatile and semivolatile fraction of every sample and method blank analyzed, even if no TICs are found. Total the number of TICs found, including aldol-condensation products (but see below), and enter this number in the "Number TICs found If none were found, enter "0" (zero).

If the name of a compound exceeds the 28 spaces in the TIC column, truncate the name to 28 characters. If the compound is an unknown, restrict description to no more than 28 characters (i.e., unknown hydrocarbon, etc.).

1.0 NARRATIVE

A. T. KEARNEY

Contract Nos. 51407-0452, 51407-0459, 51407-0465, 51407-0466

Introduction

The results of analysis of twenty-four (24) water samples (MW-1ART through MW-6ART, MW-1EUN through MW-6EUN, MW-1LEE through MW-6LEE, and MW-1LUS through MW-6LUS) are discussed in this narrative. The samples were received on October 27 and 31, and November 2 and 4, 1988. All samples were received intact.

Sample Extraction and Analysis

The samples were analyzed for volatile organics on November 2, 3, 7 and 8, 1988, within the holding time deadline.

The semivolatile samples were extracted on October 21, November 2, 3, 7 and 16, 1988, and analyzed on November 10-18, 1988.

Analysis for six additional compounds was requested. Methylethyl ketone in the volatile fraction and 1-Methylnaphthalene, (o,m,p)-Cresol and 7,12-Dimethylbenzanthracene in the semivolatile fraction.

Surrogate Recoveries

For the volatile sample MW-4LEE, recovery of 1,2-Dichloroethane-d4 was outside QC limits. For the semivolatile sample MW-2LUS, recovery of 2-Fluorophenol was outside QC limits. For sample MW-3ART, three of the six surrogate compounds were outside QC limits. The sample was re-extracted and analyzed with Phenol-d5 diluted out and 2-Fluorophenol below QC limits. For sample MW-6LEE recovery of Phenol-d5 was higher than the QC limits. Besides the above exceptions, the recoveries of surrogates for the remaining samples were within the QC limits.

Matrix Spike/Matrix Spike Duplicate Recoveries

For the volatile sample MW-4ART MS/MSD, only the RPD for 1,1-Dichloroethene was outside QC limits.

Conclusion

The reported data appears good and meets all contractual requirements, except where noted. However, should there be questions or other matters which require clarification, please contact Leon Levan or Sue Ozdemir.

Sue Ozdemir for
Leon Levan
Project Manager

12-6-88
Date

Astrid Bergeron
Astrid Bergeron
QC Coordinator

12-6-88
Date

ENVIRONMENTAL MONITORING AND SERVICES, INC.
Analytical Results Summary for A.T. KEARNEY
PHILLIPS - LEE PLANT
RFS: 80465

Client Sample I.D.	EMSI Number	Date Received	Rep	Method	Analyte	Result	Detection Limit (*)	Units	Date Analyzed	Dil Factor
MW-1	CAT-880024	11/02/88	Orig		TURBIDITY	77.0	.020	NTU	11/29/88	1.0
MW-2	CAT-880025	11/02/88	Orig		TURBIDITY	55.0	.020	NTU	11/29/88	1.0
MW-3	CAT-880026	11/02/88	Orig		TURBIDITY	81.0	.020	NTU	11/29/88	1.0
MW-4	CAT-880027	11/02/88	Orig		TURBIDITY	102.	.020	NTU	11/29/88	1.0
			Dup		TURBIDITY	102.	.020	NTU	11/29/88	1.0
MW-5	CAT-880028	11/02/88	Orig		TURBIDITY	.200	.020	NTU	11/29/88	1.0
MW-6	CAT-880029	11/02/88	Orig		TURBIDITY	.050	.020	NTU	11/29/88	1.0

* - To obtain the true detection limit, multiply this value by the value under the "Dil Factor" column.

ND - Not detected at the true detection limit.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-1LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C06

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-1LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C06

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

FORM I VOA-TIC 1/87 Rev.

Date Received 11/4/88 | Lab No. [redacted]-597 | User Code Conf / Delete | ☐ 59400 ☐ 59300 [redacted] | ☐ 53400 ☐ 59500 | ☒ 53300

COLLECTION DATE & TIME: yy 88 | mm 11 | dd 01 | hh 14 | mm 15

COLLECTION SITE DESCRIPTION: Phillips - LEE MW-1

COLLECTED BY: M. Smith (Kearney/Centaur)

TO: Jim Ashby

OWNER: Phillips

GROUND WATER & HAZARDOUS WASTE BUREAU
NEW MEXICO EID/HED
PO BOX 968 - RUNNELS BUILDING
SANTA FE, NM 87504-0968

SITE LOCATION:
County: LEA

Township, Range, Section, Tract: (10N06E24342)
18S+35E+30+444

ATTN: Julie Wanslow
PHONE:

STATION/ WELL CODE: MW-1

LATITUDE, LONGITUDE: 32° 48' N 103° - 29' W

SAMPLING CONDITIONS:

☒ Bailed ☐ Dipped	☐ Pump ☐ Tap	Water Level: 94.84 FT	Discharge:	Sample Type: Ground water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
7.2	540 umho	65°F ~~°C~~	umho

FIELD COMMENTS: Upgradient well

Ok

AMPLE FIEL
Check prop
☒ WPN: W
Preserved
Non-Filter

Pb (<0.1 to 0.1)

ater
w/HNO$_3$

LAB ANALYSIS REQUESTED:
Field Acid, Fixed - Do NOT Filter
☒ ICAP Scan
Mark box next to metal if AA
is required.

CAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	2.1		Silicon	22.	
Barium	1.7	X ~~0.80~~ 1.9	Silver	<0.1	X 0.001
Beryllium	<0.1		Strontium	1.1	
Boron	<0.1		Tin	0.2	
Cadmium	<0.1	☐ X 0.053	Vanadium	<0.1	
Calcium	610.		Zinc	0.1	
Chromium	<0.1	☐ X ~~0.013~~ 0.043	Arsenic		☐ X 0.024
Cobalt	<0.05		Selenium		☐ X <0.005
Copper	<0.1	X <0.05	Mercury		☐
Iron	23. X				☐
Lead	<0.1	☐ X 0.032			☐
Magnesium	13.				☐
Manganese	0.91 X				☐
Molybdenum	<0.1				☐
Nickel	<0.1	X <0.05			☐

Per telephone w/ Julie Meyer 3-6-89 SMW

LAB COMMENTS: 5.0 ml HNO$_3$ added at SLD. DIGESTED 11/16/88
Ca (1st) = 0.06 12/14/88 Cd - Too high for furnace.

COC Relinquished by M Smith 11/03/88 at 5pm

ICAP Analyst: DA Reviewer:

Analysis Date: 12/14/88 Date Reviewed:

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (505) [illegible]-2555

wmn

GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 11 | 4 | 88 LAB NO. WC-4575 USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 53300 EID

Collection DATE 88 | 11 | 01
Collection TIME 0915
Collected by — Person/Agency Marianne Smith / Kearney/Centaur
Phelie Daval

SITE INFORMATION ►
Sample location Phillips - LEE
Collection site description

RECEIVED
(MS) 88-1-2 881101

NOV 21 1988

GROUND WATER/HAZARDOUS WASTE BUREAU

SEND FINAL REPORT TO
GROUND WATER & HAZARDOUS WASTE BUREAU
NM ENVIRONMENT IMPROVEMENT DIVISION/HED
PO Box 968
Santa Fe, NM 87504-0968
Attn: Julie Wanslow

Chris Dean

Station/well code MW-1
Owner Phillips

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level 94.84 ft	Discharge	Sample type
pH (00400) 7.2	Conductivity (Uncorrected) 540 µmho	Water Temp. (00010) 65°F ~~°C~~	Conductivity at 25°C (00094) µmho

Field comments Upgradient well

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted 1 | ☒ NF: Whole sample (Non-filtered) | ☐ F: Filtered in field with 0.45 µmembrane filter | ☐ A: 2 ml H_2SO_4/L added

☒ NA: No acid added ~~Other-specify~~ (MS)

ANALYTICAL RESULTS from SAMPLES

NF, NA		Units	Date analyzed
☐ Conductivity (Corrected) 25°C (00095)		µmho	
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: TURBIDITY	7NTU		11/4/88
☐ Other:			
☐ Other:			

NF, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N+, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

F, NA		Units	Date analyzed
☐ Calcium (00915)		mg/l	
☐ Magnesium (00925)		mg/l	
☐ Sodium (00930)		mg/l	
☐ Potassium (00935)		mg/l	
☐ Bicarbonate (00440)	RECEIVED	mg/l	
☐ Chloride (00940)		mg/l	
☐ Sulfate (00945)		mg/l	
☐ Total filterable residue (dissolved) (70300)	NOV 22 1988	mg/l	
☐ Other:	HAZARDOUS WASTE SECTION		

F, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N+, Nitrate-N dissolved (00631)		mg/l	
☐ Ammonia-N dissolved (00608)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Other:			

Analyst | Date Reported 11 | 18 | 88 | Reviewed by [illegible]

Laboratory remarks Analyze Turbidity immed. after shaking
COC Relinquished by Marianne Smith 11/3/88 @ 5:00 pm

SLD 726 (8/85) *DISTRIBUTION:* WHITE — EID, GW&HW Bureau CANARY — WS System PINK — EID Local Office GOLDENROD — SLD

700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2500

Date Received	11/4/88	Lab No.	ICP-599	User Code	☐ 59400 ☐ 59300	☐ 53400 ☐ 59500	☒ 53300 ☐

COLLECTION DATE & TIME: yy 88 | mm 11 | dd 01 | hh 10 | mm 45

COLLECTION SITE DESCRIPTION: Phillips - LEE MW-2

COLLECTED BY: M. Smith (Kearney / Centaur)

OWNER: Phillips

TO:

Jim Ashby
GROUND WATER & HAZARDOUS WASTE BUREAU
NEW MEXICO EID/HED
PO BOX 968 - RUNNELS BUILDING
SANTA FE, NM 87504-0968

ATTN: Julie Wanslow
PHONE:

SITE LOCATION:
County: LEA

Township, Range, Section, Tract: (10N06E24342)
18S+35E+30+444

STATION/ WELL CODE: MW-2

LATITUDE, LONGITUDE: 32° 48' N 103° - 29' W

SAMPLING CONDITIONS:

☒ Bailed ☐ Dipped	☐ Pump ☐ Tap	Water Level: 94.84 FT	Discharge:	Sample Type: Ground Water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
7.2	540 µmho	65°F ~~°C~~	µmho

FIELD COMMENTS: Down Gradient well

SAMPLE FIELD TREATMENT
Check proper boxes:
☒ WPN: Water Preserved w/HNO_3 Non-Filtered
☐ WPF: Water Preserved w/HNO_3 Filtered

LAB ANALYSIS REQUESTED:
Field Acidified - Do NOT Filter
☒ ICAP Scan
Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE
Aluminum	5.0	
Barium	0.9 (MS)	X 0.9
Beryllium	<0.1	
Boron	0.2	
Cadmium	<0.1	☐ X <0.001
Calcium	430.	
Chromium	<0.1	☐ X <0.005
Cobalt	<0.05	
Copper	<0.1	X <0.05
Iron	2.6 X	
Lead	<0.1	☐ X <0.005
Magnesium	35.	
Manganese	1.1 X	
Molybdenum	<0.1	
Nickel	<0.1	X <0.05

ELEMENT	ICAP VALUE	AA VALUE
Silicon	18.	
Silver	<0.1	X <0.001
Strontium	2.2	
Tin	0.1	
Vanadium	<0.1	
Zinc	0.2	
Arsenic		☐ X 0.021
Selenium		☐ X <0.005
Mercury		☐

RECEIVED
FEB 17 1989
HAZARDOUS WASTE SECTION

LAB COMMENTS: 5.0 ml HNO3 added at SLD. DIGESTED 11/16/88

COC Relinquished by M Smith 11/03/88 @ 5pm.

ICAP Analyst: JAA
Analysis Date: 12/14/88

Reviewer: [signature]
Date Reviewed: 2/9/89

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (5 41-2555

OC WNA

GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 11/4/88 | LAB NO. WC-4577 | USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 53300

Collection DATE 88/11/01
Collection TIME 1045
Collected by — Person/Agency: Mariano Smith / (Kearney Center)

SITE INFORMATION ►
Sample location: Phillips - LEE
Collection site description: MW-2

RECEIVED
NOV 21 1988
GROUND WATER/HAZARDOUS WASTE BUREAU

Station/well code: MW-2
Owner: Phillips

SEND FINAL REPORT TO:
ATTN: Chris Dean
GROUND WATER & HAZARDOUS WASTE BUREAU
NM ENVIRONMENT IMPROVEMENT DIVISION/HED
PO Box 968
Santa Fe, NM 87504-0968
Attn: Julie Winslow

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level 97.02 ft	Discharge	Sample type Ground water
pH (00400) 6.8	Conductivity (Uncorrected) 250 µmho	Water Temp. (00010) 68°F	Conductivity at 25°C (00094) µmho

Field comments: Down gradient well

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted: 1
☒ NF: Whole sample (Non-filtered) ☐ F: Filtered in field with 0.45 µmembrane filter ☐ A: 2 ml H_2SO_4/L added
☒ NA: No acid added ☐ Other-*specify*:

ANALYTICAL RESULTS from SAMPLES

NF, NA		Units	Date analyzed
☐ Conductivity (Corrected) 25°C (00095)		µmho	
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: TURBIDITY	>200		11/14
☐ Other:			
☐ Other:			

F, NA		Units	Date analyzed
☐ Calcium (00915)		mg/l	
☐ Magnesium (00925)		mg/l	
☐ Sodium (00930)		mg/l	
☐ Potassium (00935)		mg/l	
☐ Bicarbonate (00440)		mg/l	
☐ Chloride (00940)		mg/l	
☐ Sulfate (00945)		mg/l	
☐ Total filterable residue (dissolved) (70300)		mg/l	
☐ Other:			

RECEIVED
NOV 2 1988
HAZARDOUS WASTE SECTION

NF, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N +, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

F, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N +, Nitrate-N dissolved (00631)		mg/l	
☐ Ammonia-N dissolved (00608)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Other:			

Analyst	Date Reported	Reviewed by
	11/14/88	[illegible]

Laboratory remarks: Analyze Turbidity immed. after shaking.
COC Relinquished by Mariano Smith 11-03-88 at 5pm

700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM
Telephone: (505)841-2500

Date Received	11/14/88	Lab No. ICP-601	User Code	☐ 59400 ☐ 59300	☐ 53400 ☐ 59500	☒ 53300 ☐

COLLECTION DATE & TIME: yy 88 mm 11 dd 01 hh 12 mm 15

COLLECTION SITE DESCRIPTION: Phillips-LEE MW-3

COLLECTED BY: M Smith (Kearney/Centaur)

OWNER: Phillips

TO:
Jim Ashby
GROUND WATER & HAZARDOUS WASTE BUREAU
NEW MEXICO EID/HED
PO BOX 968 - RUNNELS BUILDING
SANTA FE, NM 87504-0968

ATTN: Julie Winslow
PHONE:

SITE LOCATION:
County: LEA

Township, Range, Section, Tract: (10N06E24342)
1|1|8|S+3|5|E+3|0+4|4|4|

STATION/ WELL CODE: MW-3

LATITUDE, LONGITUDE: 32° 48' N 103° - 29' W

SAMPLING CONDITIONS:

☒ Bailed ☐ Dipped	☐ Pump ☐ Tap	Water Level: 96.91 FT	Discharge:	Sample Type: Ground water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
7.3	482 umho	68°F ~~20~~	umho

FIELD COMMENTS: Down gradient well

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED: Field Acidified - Do Not Filter
☒ WPN: Water Preserved w/HNO_3 Non-Filtered	☐ WPF: Water Preserved w/HNO_3 Filtered	☒ ICAP Scan Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	4.8		Silicon	14.	
Barium	0.3	X 0.4	Silver	<0.1	X <0.001
Beryllium	<0.1		Strontium	0.1	
Boron	0.1		Tin	0.1	
Cadmium	<0.1	☐ X <0.001	Vanadium	<0.1	
Calcium	46.		Zinc	<0.1	
Chromium	<0.1	☐ X <0.005	Arsenic		☐ X 0.29
Cobalt	<0.05		Selenium		☐ X <0.005
Copper	<0.1	X <0.05	Mercury		☐
Iron	2.4 X				☐
Lead	<0.1	☐ X 0.006			☐
Magnesium	3.1				☐
Manganese	0.09 X			RECEIVED	☐
Molybdenum	<0.1				☐
Nickel	<0.1	X <0.05		FEB 1	☐

LAB COMMENTS: 5.0ml HNO_3 added at SLD. 11/16/88 DIGESTED.

HAZARDOUS WASTE SECTION

COC Relinquished by M Smith 11/03/88 at 5pm.

ICAP Analyst: JTA
Analysis Date: 12/14/88

Reviewer: [signature]
Date Reviewed: 2/6/89

SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (505) 841-2555

WMC

GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 11/4/88 LAB NO. WC-4579 USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 53300

Collection DATE 88/11/01
Collection TIME 1215

SITE INFORMATION ►

Sample location Phillips - LEE
Collection site description MW-3

Collected by — Person/Agency Marianne Smith (Kearney Center)

ATTN: Chris Dean

SEND FINAL REPORT TO ►
GROUND WATER & HAZARDOUS WASTE BUREAU
NM ENVIRONMENT IMPROVEMENT DIVISION/HED
PO Box 968
Santa Fe, NM 87504-0968
Attn: Julie Wanslow

RECEIVED
NOV 21 1988
GROUND WATER/HAZARDOUS WASTE BUREAU

Station/well code MW-3
Owner Phillips

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level 96.81 ft	Discharge	Sample type Ground water
pH (00400) 7.3	Conductivity (Uncorrected) 482 μmho	Water Temp. (00010) 68°F ~~°C~~	Conductivity at 25°C (00094) μmho

Field comments Down gradient well

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted | ☒ NF: Whole sample (Non-filtered) | ☐ F: Filtered in field with 0.45 μmembrane filter | ☐ A: 2 ml H_2SO_4/L added

☒ NA: No acid added ☐ Other-*specify:*

ANALYTICAL RESULTS from SAMPLES

NF, NA		Units	Date analyzed
☐ Conductivity (Corrected) 25°C (00095)		μmho	
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: Turbidity	15		11/14
☐ Other:			
☐ Other:			

NF, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N + , Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

F, NA		Units	Date analyzed
☐ Calcium (00915)		mg/l	
☐ Magnesium (00925)		mg/l	
☐ Sodium (00930)		mg/l	
☐ Potassium (00935)		mg/l	
☐ Bicarbonate (00440)		mg/l	
☐ Chloride (00940)		mg/l	
☐ Sulfate (00945)		mg/l	
☐ Total filterable residue (dissolved) (70300)		mg/l	
☐ Other:			

RECEIVED
NOV 22 1988
HAZARDOUS WASTE SECTION

F, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N + , Nitrate-N dissolved (00631)		mg/l	
☐ Ammonia-N dissolved (00608)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Other:			

Analyst	Date Reported	Reviewed by
	11/14/88	LE

Laboratory remarks Analyze Turbidity immediately after shaking.
COC Relinquished by Marianne Smith 11/3/88 @ 5pm

SLD 726 (8/85) *DISTRIBUTION:* WHITE — EID, GW&HW Bureau CANARY — WS System PINK — EID Local Office GOLDENROD — SLD

700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2500

Date Received	Lab No.	User Code			
11/4/88	ICP-603	☐ 59400 ☐ 59300	☐ 53400 ☐ 59500	☒ 53300 ☐	

COLLECTION DATE & TIME: yy 88 mm 11 dd 01 hh 14 mm 00

COLLECTION SITE DESCRIPTION: Phillips - LEE MW-4

COLLECTED BY: M Smith (Kearney/Centaur)

TO: Jim Ashby

OWNER: Phillips

GROUND WATER & HAZARDOUS WASTE BUREAU
NEW MEXICO EID/HED
PO BOX 968 - RUNNELS BUILDING
SANTA FE, NM 87504-0968

SITE LOCATION:
County: LEA

Township, Range, Section, Tract: (10N06E24342)
18S+35E+30+444

ATTN: Julie Wanslow
PHONE:

STATION/ WELL CODE: MW-4

LATITUDE, LONGITUDE: 32° 48' N 103° -29' W

SAMPLING CONDITIONS:

☒ Bailed ☐ Dipped	☐ Pump ☐ Tap	Water Level: 96.72 FT	Discharge:	Sample Type: Ground water

pH (00400)	Conductivity (Uncorr.)	Water Temp. (00010)	Conductivity at 25°C (00094)
7.1	1450 umho	69°F	umho

FIELD COMMENTS: Down gradient well

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED: Field Acidified - DO NOT Filter
☒ WPN: Water Preserved w/HNO_3 Non-Filtered	☐ WPF: Water Preserved w/HNO_3 Filtered	☒ ICAP Scan Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	1.7		Silicon	15.	
Barium	0.6	X 0.6	Silver	<0.1	X <0.001
Beryllium	<0.1		Strontium	0.9	
Boron	0.2		Tin	0.1	
Cadmium	<0.1	☐ X <0.001	Vanadium	<0.1	
Calcium	160.		Zinc	<0.1	
Chromium	<0.1	☐ X ~~<0.05~~ 0.005 JAA	Arsenic		☐ X ~~0.014~~ 0.013
Cobalt	<0.05		Selenium		☐ X <0.005
Copper	<0.1	X <0.005 JAA	Mercury		☐
Iron	3.3 X				☐
Lead	<0.1	☐ X <0.005			☐
Magnesium	18.				☐
Manganese	0.78 X				☐
Molybdenum	<0.1				☐
Nickel	<0.1	X <0.05			☐

RECEIVED FEB 1 1989 HAZARDOUS WASTE SECTION

LAB COMMENTS: 5.0 ml HNO_3 added at SLD. 1/16/89 DIGESTED.

COC Relinquished by M Smith 11/03/88 at 5pm.

ICAP Analyst: JAA
Analysis Date: 12/14/88

Reviewer: [illegible]
Date Reviewed: 2/6/89

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (50[illegible]1-2555

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GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 11/4/88	LAB NO. WC-4581	USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 53300 EID	
Collection DATE 88/11/01	SITE INFORMATION ►	Sample location Phillips - LEE	
Collection TIME 1400		Collection site description MW - 4	
Collected by — Person/Agency Marianne Smith (Kearney)			

RECEIVED
NOV 21 1988
GROUND WATER/HAZARDOUS WASTE BUREAU

SEND FINAL REPORT TO ►

ATTN: Chris Dean
GROUND WATER & HAZARDOUS WASTE BUREAU
NM ENVIRONMENT IMPROVEMENT DIVISION/HED
PO Box 968
Santa Fe, NM 87504-0968
Attn: Julie Wanslow

Station/well code: MW - 4
Owner: Phillips

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level 96.72 ft	Discharge	Sample type Ground water
pH (00400) 7.1	Conductivity (Uncorrected) 1450 µmho	Water Temp. (00010) 69°F ~~°C~~	Conductivity at 25°C (00094) µmho

Field comments: Down gradient well

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted 1	☒ NF: Whole sample (Non-filtered)	☐ F: Filtered in field with 0.45 µmembrane filter	☐ A: 2 ml H_2SO_4/L added

☒ NA: No acid added ☐ Other-*specify*:

ANALYTICAL RESULTS from SAMPLES

NF, NA		Units	Date analyzed
☐ Conductivity (Corrected) 25°C (00095)		µmho	
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: TURBIDITY	30		11/4
☐ Other:			
☐ Other:			

F, NA		Units	Date analyzed
☐ Calcium (00915)		mg/l	
☐ Magnesium (00925)		mg/l	
☐ Sodium (00930)		mg/l	
☐ Potassium (00935)		mg/l	
☐ Bicarbonate (00440)		mg/l	
☐ Chloride (00940)		mg/l	
☐ Sulfate (00945)		mg/l	
☐ Total filterable residue (dissolved) (70300)		mg/l	
☐ Other:			

RECEIVED
NOV 2[illegible] 198[illegible]
HAZARDOUS WASTE SECTION

NF, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N⁺, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

F, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N⁺, Nitrate-N dissolved (00631)		mg/l	
☐ Ammonia-N dissolved (00608)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Other:			

Analyst	Date Reported	Reviewed by
	11/14/88	CC

Laboratory remarks:
Analyze TURBIDITY immediately after shaking.
COC Relinquished by Marianne Smith 11/03/88 @ 5pm

SLD 726 (8/85) *DISTRIBUTION:* **WHITE** — EID, GW&HW Bureau **CANARY** — WS System **PINK** — EID Local Office **GOLDENROD** — SLD

700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2500

Date Received	11/4/88	Lab No. ICP-605	User Code	☐ 59400 ☐ 59300	☐ 53400 ☐ 59500	☒ 53300

COLLECTION DATE & TIME: yy 88 mm 11 dd 01 hh 09 mm 00

COLLECTION SITE DESCRIPTION: Phillips - LEE MW-5

COLLECTED BY: M Smith (Kearney / Centaur)

OWNER: Phillips

TO: Jim Ashby

GROUND WATER & HAZARDOUS WASTE BUREAU
NEW MEXICO EID/HED
PO BOX 968 - RUNNELS BUILDING
SANTA FE, NM 87504-0968

ATTN: Julie Wanslow
PHONE:

SITE LOCATION:
County: LEA

Township, Range, Section, Tract: (10N06E24342)
18S+35E+30+444

STATION/ WELL CODE:

LATITUDE, LONGITUDE: 32° 48' N 103° - 29' W

SAMPLING CONDITIONS:

☐ Bailed ☐ Dipped	☐ Pump ☒ Tap	Water Level: —	Discharge:	Sample Type: Distilled water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
—	— umho	— °C	umho

FIELD COMMENTS: EQUipment Blank

SAMPLE FIELD TREATMENT
Check proper boxes:

☒ WPN: Water Preserved w/HNO_3 Non-Filtered
☐ WPF: Water Preserved w/HNO_3 Filtered

LAB ANALYSIS REQUESTED: Field Acidified - Do Not Filter
☒ ICAP Scan
Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	<0.1		Silicon	<0.1	
Barium	<0.1	X <0.1	Silver	<0.1	X<0.001
Beryllium	<0.1		Strontium	<0.1	
Boron	<0.1		Tin	<0.1	
Cadmium	<0.1	☐ X <0.001	Vanadium	<0.1	
Calcium	<0.1		Zinc	<0.1	
Chromium	<0.1	☐ X <0.005	Arsenic		☐ X <0.005
Cobalt	<0.05		Selenium		☐ X <0.005
Copper	<0.1	X <0.05	Mercury		☐
Iron	<0.1 X				☐
Lead	<0.1	☐ X <0.005			☐
Magnesium	<0.1				☐
Manganese	<0.05 X				☐
Molybdenum	<0.1				☐
Nickel	<0.1	X <0.05			☐

RECEIVED
FEB 1 7 1989
HAZARDOUS WASTE SECTION

LAB COMMENTS: 5.0 ml HNO_3 added at SLD.

COC: Relinquished by M. Smith 11/03/88 at 5pm.

ICAP Analyst: JA
Analysis Date: 1/9/89

Reviewer: [illegible signature]
Date Reviewed: 2/-/89

New Mexico Health and Environment Department
SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (50[illegible]1-2555

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GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED	11 / 4 / 88
LAB NO.	WC-4583
USER CODE	☐ 59300 ☐ 59600 ☒ OTHER: 53300
Collection DATE	88 / 11 / 01
Collection TIME	0900
Collected by — Person/Agency	M. Smith (Kearney/Centaur)
SITE INFORMATION ► Sample location	Phillips-LEE
Collection site description	MW-5
Station/well code	MW-5
Owner	Phillips

RECEIVED
NOV 21 1988
GROUND WATER/HAZARDOUS WASTE BUREAU

Attn: Chris Dean

SEND FINAL REPORT TO ►
GROUND WATER & HAZARDOUS WASTE BUREAU
NM ENVIRONMENT IMPROVEMENT DIVISION/HED
PO Box 968
Santa Fe, NM 87504-0968
Attn: Julie Wanslow

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level ____	Discharge	Sample type: distilled water
pH (00400) ____	Conductivity (Uncorrected) ____ µmho	Water Temp. (00010) ____ °C	Conductivity at 25°C (00094) µmho

Field comments: EQUIPMENT BLANK

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted | ☒ NF: Whole sample (Non-filtered) | ☐ F: Filtered in field with 0.45 µmembrane filter | ☐ A: 2 ml H_2SO_4/L added

☒ NA: No acid added ☐ Other-*specify:*

ANALYTICAL RESULTS from SAMPLES

NF, NA		Units	Date analyzed
☐ Conductivity (Corrected) 25°C (00095)		µmho	
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: TURBIDITY	0.14		11/16/88
☐ Other:			
☐ Other:			

F, NA		Units	Date analyzed
☐ Calcium (00915)		mg/l	
☐ Magnesium (00925)		mg/l	
☐ Sodium (00930)		mg/l	
☐ Potassium (00935)		mg/l	
☐ Bicarbonate (00440)		mg/l	
☐ Chloride (00940)		mg/l	
☐ Sulfate (00945)		mg/l	
☐ Total filterable residue (dissolved) (70300)		mg/l	
☐ Other:			

RECEIVED
NOV 2_ 1988
HAZARDOUS WASTE SECTION

NF, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N⁺, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

F, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N⁺, Nitrate-N dissolved (00631)		mg/l	
☐ Ammonia-N dissolved (00608)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Other:			

Analyst	Date Reported	Reviewed by
	11 / 16 / 88	[illegible]

Laboratory remarks
Analyze Turbidity immed. after shaking.
COC Relinquished by Marianne Smith 11/3/88 @ 5 pm

SLD 726 (8/85) *DISTRIBUTION:* WHITE — EID, GW&HW Bureau CANARY — WS System PINK — EID Local Office GOLDENROD — SLD

700 Camino de Salud NE
Albuquerque, NM 87106

HEAVY METAL ANALYSIS FORM

Telephone: (505)841-2500

Date Received	1/4/88	Lab No.	ICP-607	User Code	☐ 59400 ☐ 59300	☐ 53400 ☐ 59500	☒ 53300 ☐

COLLECTION DATE & TIME: yy 88 mm 11 dd 01 hh 11 mm 30

COLLECTION SITE DESCRIPTION: Phillips - LEE MW-6

COLLECTED BY: M. Smith (Kearney/centaur)

TO: Jim Ashby

OWNER: Phillips

GROUND WATER & HAZARDOUS WASTE BUREAU
NEW MEXICO EID/HED
PO BOX 968 - RUNNELS BUILDING
SANTA FE, NM 87504-0968

SITE LOCATION:
County: LEA

Township, Range, Section, Tract: (10N06E24342)
19S+35E+30+4 4 4

ATTN: Julie Wanslow
PHONE:

STATION/ WELL CODE:

LATITUDE, LONGITUDE: 32°48' N 103° - 29' W

SAMPLING CONDITIONS:

☐ Bailed ☐ Dipped	☐ Pump ☒ Tap	Water Level:	Discharge:	Sample Type: Distilled water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
—	— umho	— °C	umho

FIELD COMMENTS: FIELD BLANK

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED: Field Acidified - Do not Filter
☒ WPN: Water Preserved w/HNO_3 Non-Filtered	☐ WPF: Water Preserved w/HNO_3 Filtered	☒ ICAP Scan Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE	ELEMENT	ICAP VALUE	AA VALUE
Aluminum	<0.1		Silicon	<0.1	
Barium	<0.1	X <0.1	Silver	<0.1	X <0.001
Beryllium	<0.1		Strontium	<0.1	
Boron	<0.1		Tin	<0.1	
Cadmium	<0.1	☐ X <0.001	Vanadium	<0.1	
Calcium	<0.1		Zinc	<0.1	
Chromium	<0.1	☐ X <0.005	Arsenic		☐ X <0.005
Cobalt	<0.05		Selenium		☐ X <0.005
Copper	<0.1	<0.05 X ~~<0.05~~ JAA	Mercury		☐
Iron	<0.1 X				☐
Lead	<0.1	☐ X <0.005		RECEIVED	☐
Magnesium	<0.1				☐
Manganese	<0.05 X			FEB 1 1989	☐
Molybdenum	<0.1				☐
Nickel	<0.1	X <0.05		HAZARDOUS WASTE SECTION	☐

LAB COMMENTS: 5.0ml HNO_3 added at SLD.

COC: Relinquished by M. Smith 11/03/88 @ 5pm.

ICAP Analyst: JAA
Analysis Date: 01/9/89

Reviewer: [illegible signature]
Date Reviewed: 2/9/89

SCIENTIFIC LABORATORY DIVISION
700 Camino de Salud NE
Albuquerque, NM 87106 — (505) 841-2555

W

GENERAL WATER CHEMISTRY and NITROGEN ANALYSIS

DATE RECEIVED 11/4/88	LAB NO. WC-4585
USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 53300	
Collection DATE 88/11/01	Sample location Phillips-LEE
Collection TIME 1130	Collection site description MW-6
Collected by — Person/Agency M Smith (Kearney/Centaur)	

SITE INFORMATION ►

RECEIVED
NOV 2?
GROUND WATER/HAZARDOUS WASTE BUREAU

ATTN: Chris Dean

SEND FINAL REPORT TO
GROUND WATER & HAZARDOUS WASTE BUREAU
NM ENVIRONMENT IMPROVEMENT DIVISION/HED
PO Box 968
Santa Fe, NM 87504-0968
Attn: Julie Wanslow

Station/well code: MW-6
Owner: Phillips

SAMPLING CONDITIONS

☐ Bailed ☐ Pump ☐ Dipped ☒ Tap	Water level —	Discharge	Sample type Distilled water
pH (00400) —	Conductivity (Uncorrected) — µmho	Water Temp. (00010) — °C	Conductivity at 25°C (00094) µmho

Field comments: Field Blank

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted: 1	☒ NF: Whole sample (Non-filtered)	☐ F: Filtered in field with 0.45 µmembrane filter	☐ A: 2 ml H_2SO_4/L added

☒ NA: No acid added ☐ Other-*specify*:

ANALYTICAL RESULTS from SAMPLES

NF, NA		Units	Date analyzed
☐ Conductivity (Corrected) 25°C (00095)		µmho	
☐ Total non-filterable residue (suspended) (00530)		mg/l	
☒ Other: TURBIDITY	0.05		11/4/88
☐ Other:			
☐ Other:			

NF, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N +, Nitrate-N total (00630)		mg/l	
☐ Ammonia-N total (00610)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Chemical oxygen demand (00340)		mg/l	
☐ Total organic carbon ( )		mg/l	
☐ Other:			
☐ Other:			

F, NA		Units	Date analyzed
☐ Calcium (00915)		mg/l	
☐ Magnesium (00925)		mg/l	
☐ Sodium (00930)		mg/l	
☐ Potassium (00935)		mg/l	
☐ Bicarbonate (00440)		mg/l	
☐ Chloride (00940)		mg/l	
☐ Sulfate (00945)		mg/l	
☐ Total filterable residue (dissolved) (70300)		mg/l	
☐ Other:			

RECEIVED NOV 2? HAZARDOUS WASTE SECTION

F, A-H_2SO_4		Units	Date analyzed
☐ Nitrate-N +, Nitrate-N dissolved (00631)		mg/l	
☐ Ammonia-N dissolved (00608)		mg/l	
☐ Total Kjeldahl-N ( )		mg/l	
☐ Other:			

Analyst	Date Reported	Reviewed by
	11/14/88	[illegible]

Laboratory remarks:
Analyze TURBIDITY immed. after shaking.
COC Relinquished by Marianne Smith 11/03/88 @ 5PM

SLD 726 (8/85) *DISTRIBUTION:* WHITE — EID, GW&HW Bureau CANARY — WS System PINK — EID Local Office GOLDENROD — SLD

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-1LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S12

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-1LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S12

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	3	J
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U
90-12-0	1-Methylnaphthalene	10	U
108-39-4	meta-Cresol	10	U

(1) - Cannot be separated from Diphenylamine

57-97-6---------7,12-Dimethylbenzanthracene		10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-1LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S12

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	UNKNOWN	10.47	10	J

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID:

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C07

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. Date Analyzed: 11/07/88

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-2LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C07

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2LEE

Lab Name: EMSI   Contract: 0452 0459

Lab Code: EMSI   Case No.: ATK-2   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) WATER   Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML   Lab File ID: 111588S13

Level: (low/med) LOW   Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT   Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N   pH: ____   Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S13

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U
90-12-0	1-Methylnaphthalene	10	U
108-39-4	meta-Cresol	10	U

(1) - Cannot be separated from Diphenylamine

57-97-6---------7,12-Dimethylbenzanthracene	10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-2LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S13

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CONCENTRATION UNITS:

Number TICs found: 2 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	UNKNOW	6.90	14	J
2. 000-00-0	UNKNOWN KETONE	9.72	8.0	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3LEE

Lab Name: EMSI   Contract: 0465 0466

Lab Code: EMSI   Case No.: ATK-2   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) WATER   Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 110788C08

Level: (low/med) LOW   Date Received: 11/02/88

% Moisture: not dec. ____   Date Analyzed: 11/07/88

Column: (pack/cap) CAP   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	2	J
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-3LEE

Lab Name: EMSI   Contract: 0465 0466

Lab Code: EMSI   Case No.: ATK-2   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) WATER   Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 110788C08

Level: (low/med) LOW   Date Received: 11/02/88

% Moisture: not dec. ____   Date Analyzed: 11/07/88

Column (pack/cap) CAP   Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3LEE

Lab Name: EMSI   Contract: 0452 0459

Lab Code: EMSI   Case No.: ATK-2   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) WATER   Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML   Lab File ID: 111588S14

Level: (low/med) LOW   Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT   Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N   pH: ____   Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S14

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	3	J
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U
90-12-0	1-Methylnaphthalene	10	U
108-39-4	meta-Cresol	10	U

(1) - Cannot be separated from Diphenylamine

57-97-6---------7,12-Dimethylbenzanthracene__		10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-3LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S14

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C09

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	1100	E
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	4	J
1330-20-7	Total Xylenes	230	E

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-4LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C09

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 8

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	UNKNOWN	2.03	120	J
2. 000-00-0	UNKNOWN	2.37	110	J
3. 000-00-0	UNKNOWN	4.00	160	J
4. 000-00-0	UNKNOWN HYDROCARBON	4.63	35	J
5. 000-00-0	UNKNOWN	7.10	140	J
6. 000-00-0	UNKNOWN	9.60	210	J
7. 000-00-0	ISOMER	15.04	67	J
8. 000-00-0	ISOMER	34.01	15	J

1A

VOLATILE ORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4LEEDL

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 2.5 (g/mL) ML Lab File ID: 110788C14

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column: (pack/cap) CAP Dilution Factor: 30.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	600	U
74-83-9	Bromomethane	600	U
75-01-4	Vinyl Chloride	600	U
75-00-3	Chloroethane	600	U
75-09-2	Methylene Chloride	250	BDJ
67-64-1	Acetone	110	DJ
75-15-0	Carbon Disulfide	300	U
75-35-4	1,1-Dichloroethene	300	U
75-34-3	1,1-Dichloroethane	300	U
540-59-0	1,2-Dichloroethene (total)	300	U
67-66-3	Chloroform	300	U
107-06-2	1,2-Dichloroethane	300	U
78-93-3	2-Butanone	600	U
71-55-6	1,1,1-Trichloroethane	300	U
56-23-5	Carbon Tetrachloride	300	U
108-05-4	Vinyl Acetate	600	U
75-27-4	Bromodichloromethane	300	U
78-87-5	1,2-Dichloropropane	300	U
10061-01-5	cis-1,3-Dichloropropene	300	U
79-01-6	Trichloroethene	300	U
124-48-1	Dibromochloromethane	300	U
79-00-5	1,1,2-Trichloroethane	300	U
71-43-2	Benzene	6700	D
10061-02-6	Trans-1,3-Dichloropropene	300	U
75-25-2	Bromoform	300	U
108-10-1	4-Methyl-2-Pentanone	600	U
591-78-6	2-Hexanone	600	U
127-18-4	Tetrachloroethene	300	U
79-34-5	1,1,2,2-Tetrachloroethane	300	U
108-88-3	Toluene	300	U
108-90-7	Chlorobenzene	300	U
100-41-4	Ethylbenzene	160	DJ
100-42-5	Styrene	300	U
1330-20-7	Total Xylenes	220	DJX

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-4LEEDL

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 2.5 (g/mL) ML Lab File ID: 110788C14

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column (pack/cap) CAP Dilution Factor: 30.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S15

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	49	
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	4	J
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	2	J
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S15

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	3	J
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U
90-12-0	1-Methylnaphthalene	10	U
108-39-4	meta-Cresol	10	U

(1) - Cannot be separated from Diphenylamine

57-97-6	7,12-Dimethylbenzanthracene	10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-4LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S15

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

Number TICs found: 6

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	DIMETHYL BENZENE ISOMER	6.92	52	J
2. 000-00-0	UNKNOWN CHLORINATED	8.02	12	J
3. 000-00-0	METHYL ETHYL BENZENE ISOMER	8.34	12	J
4. 000-00-0	METHYL ETHYL BENZENE ISOMER	8.72	10	J
5. 000-00-0	TRIMETHYL BENZENE ISOMER	8.99	14	J
6. 000-00-0	TRIMETHYL BENZENE ISOMER	9.55	10	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-5LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C10

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	BJ
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-5LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C10

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

FORM I VOA-TIC 1/87 Rev.

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-5LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S16

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-5LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S16

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U
90-12-0	1-Methylnaphthalene	10	U
108-39-4	meta-Cresol	10	U

(1) - Cannot be separated from Diphenylamine

57-97-6----------7,12-Dimethylbenzanthracene		10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-5LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S16

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	UNKNOWN CHLORINATED	8.02	8.0	J

A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C11

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	BJ
67-64-1	Acetone	29	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	18	
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-6LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C11

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S17

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	67	
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	50	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	4	J
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	2	J
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	50	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	50	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6LEE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S17

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N pH: ____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	50	U
100-02-7	4-Nitrophenol	50	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	50	U
534-52-1	4,6-Dinitro-2-Methylphenol	50	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	50	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U
90-12-0	1-Methylnaphthalene	10	U
108-39-4	meta-Cresol	10	U

(1) - Cannot be separated from Diphenylamine

57-97-6---------7,12-Dimethylbenzanthracene	10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-6LEE

Lab Name: EMSI   Contract: 0452 0459

Lab Code: EMSI   Case No.: ATK-2   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) WATER   Lab Sample ID: ______

Sample wt/vol: 1000 (g/mL) ML   Lab File ID: 111588S17

Level: (low/med) LOW   Date Received: 11/02/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/03/88

Extraction: (SepF/Cont/Sonc) CONT   Date Analyzed: 11/15/88

GPC Cleanup: (Y/N) N   pH: ____   Dilution Factor: 1.0

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	DIMETHYL BENZENE ISOMER	6.88	50	J
2. 000-00-0	METHYL ETHYL BENZENE ISOMER	8.30	10	J
3. 000-00-0	METHYL ETHYL BENZENE	8.69	10	J
4. 000-00-0	TRIMETHYL BENZENE ISOMER	8.95	12	J
5. 000-00-0	TRIMETHYL BENZENE ISOMER	9.54	8.0	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6LEE

Lab Name: EMSI Contract: 0465 0466

Lab Code: EMSI Case No.: ATK-2 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: ______

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110788C11

Level: (low/med) LOW Date Received: 11/02/88

% Moisture: not dec. ____ Date Analyzed: 11/07/88

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	BJ
67-64-1	Acetone	29	
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	18	
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

PHILLIPS 66 NATURAL GAS COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY

ODESSA, TEXAS 79762
4001 PENBROOK

April 5, 1989

Groundwater Monitoring Analyses
Artesia, Eunice, Lee and Lusk Plants

Mr. Dave Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Boyer:

Per your request, attached please find copies of the fourth quarter groundwater monitoring analyses for the above referenced plants.

If you should have any questions regarding this information, please contact me at (915) 367-1316.

Very truly yours,

Michael D. Ford

Michael D. Ford
Environmental Analyst

MDF

Attachments

RADIAN
CORPORATION

Page 1 RAS - Austin REPORT Work Order # 89-02-026
Received: 02/02/89 03/01/89 09:22:46

REPORT TO: Radian
Bl. 1
Austin

ATTEN: Linda Bendele

CLIENT: PHILLIPS P SAMPLES: 4
COMPANY: Phillips Petroleum
FACILITY: Odessa, TX

WORK ID: Lee MW 1 and 2
TAKEN: MF
TRANS: UPS
TYPE:
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
8501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088

ATTEN:
PHONE: 512-454-4797

CERTIFIED BY

CONTACT: BENDELE

Unknown compounds present in GC samples 01,02, and 03.

Previously Reported on 02/27/89.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	MW-1
02	MW-2
03	MW-2 duplicate
04	reagent blank

4th Quarter
2/89

TEST CODES and NAMES used on this report

AG E	Silver, ICPES
AS G	Arsenic, graphite AA
BA E	Barium, ICPES
CD E	Cadmium, ICPES
CL IC	Chloride, IC
CR E	Chromium, ICPES
DG3020	Digestion, method 3020
DG6010	Digestion, method 6010
EPA602	EPA method 602
FE E	Iron, ICPES
F IC	Fluoride, IC
HG C	Mercury, cold vapor
MHO	Specific conductance
MN E	Manganese, ICPES
NA E	Sodium, ICPES
NO3	Nitrate, colorimetric
PB G	Lead, graphite AA
PH	pH
PHEN	Total phenolics
SE G	Selenium, graphite AA
SO4 IC	Sulfate, IC
TOC	Total organic carbon
TOX	Total organic halides
TURB	Turbidity
XYLENE	Xylenes, EPA 602

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results By Test

Work Order # 89-02-026

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 MW-1	<0.03	0.057	0.22	<0.005	29
02 MW-2	<0.03	0.023	0.57	<0.005	450

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 MW-1	<0.03	02/06/89	02/06/89	0.10*	0.5*
02 MW-2	<0.03	02/06/89	02/06/89	<0.04	0.5*
03 MW-2 duplicate	<0.03		02/06/89		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 MW-1	600	0.061	23	1.6	<0.002
	620				
	600				
	590				
02 MW-2	2000	0.90	96	0.21	<0.002

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results By Test

Work Order # 89-02-026
Continued From Above

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
	2000				
	2000				
	2000				

SAMPLE Sample Id	Test: PH pH units	Test: PHEN mg/L as phenol	Test: SE G ug/ml	Test: SO4 IC mg/L as SO4	Test: TOC mg/L
01	6.91	<0.005	<0.005	33	5
MW-1	6.93				4*
	6.95				4*
	7.00				4*
02	6.71	0.018*	<0.005	20	22
MW-2	6.70				23
	6.71				21
	6.56				21

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT Work Order # 89-02-026

Results By Test

SAMPLE Sample Id		Test: TOX mg/L
MW-1	01	0.01*
		0.01*
		0.01*
		0.01*
MW-2	02	0.07
		0.07
		0.07
		0.08

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-1

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	7.5	0.20
108-88-3	Toluene	0.6*	0.20
100-41-4	Ethylbenzene	0.7*	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	105%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

SAMPLE ID MW-1 FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-1 FRACTION 01I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 01/31/89 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403

ANALYZED 02/08/89

UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available

SAMPLE ID MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

VERIFIED LM

ANALYST LKM
INSTRMT HACH

ANALYZED 02/02/89

UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	38	1.0

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026
Continued From Above

SAMPLE ID MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G
INJECTD 02/03/89
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	0.5*	0.20
108-38-3	m-Xylene	0.9*	0.20
95-47-6	o-Xylene	0.7	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 105% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID MW-1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

Q = daily EPA standard recovery outside
95% confidence interval.
Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-2

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	2.4	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	112% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026
Continued From Above

SAMPLE ID MW-2 FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-2

FRACTION 02I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 01/31/89 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403

ANALYZED 02/08/89

UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-2

FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

VERIFIED LM

ANALYST LKM
INSTRMT HACH

ANALYZED 02/02/89

UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	18	1.0

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026
Continued From Above

SAMPLE ID MW-2 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-2 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G
INJECTD 02/03/89
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	0.6*	0.20
95-47-6	o-Xylene	1.5	0.10

SURROGATES
98-08-8 a,a,a-Trifluorotoluene 112% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID MW-2 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-2 duplicate

FRACTION 03B TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	2.4	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	111% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID MW-2 duplicate FRACTION 03B TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT

Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-2 duplicate

FRACTION 03B TEST CODE XYLENE NAME Xylenes, EPA 602

Date & Time Collected 01/31/89 Category ______

VERIFIED CL

ANALYST BM FILE # ______

INSTRMT G INJECTD 02/03/89 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	0.5*	0.20
95-47-6	o-Xylene	1.5	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 111% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT

ND = not detected at detection limit

NA = not analyzed

* = less than 5 times the detection limit

N\A = not available

Second column confirmation NOT performed unless otherwise noted.

Q = daily EPA standard recovery outside 95% confidence interval.

Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID reagent blank

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category ______

VERIFIED CL

ANALYST CL
INSTRMT G

INJECTED 02/03/89 FILE # ______ UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	N/A% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID reagent blank FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT Work Order # 89-02-026
Results by Sample

SAMPLE ID reagent blank FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category ______

VERIFIED CL

ANALYST CL FILE # ______
INSTRMT G INJECTD 02/03/89 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene N/A% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 89-02-027
Received: 02/02/89 02/27/89 16:59:13

REPORT TO: Radian
B1.1
Austin

ATTEN: Linda Bendele

CLIENT: PHILLIPS P SAMPLES 4
COMPANY: Phillips Petroleum
FACILITY: Odessa, TX

WORK ID: ~~Lee MW 3 and 4~~
TAKEN: MF
TRANS: UPS
TYPE:
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
8501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088

ATTEN:
PHONE: 512-454-4797

CERTIFIED BY

CONTACT **BENDELE**

Unknown compounds present in GC sample MW3.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 MW-3
02 MW-4 ✓ check benzene
03 trip blank
04 reagent blank

4th Quarter
2/89

TEST CODES and NAMES used on this report

AG E	Silver, ICPES
AS G	Arsenic, graphite AA
BA E	Barium, ICPES
CD E	Cadmium, ICPES
CL IC	Chloride, IC
CR E	Chromium, ICPES
DG3020	Digestion, method 3020
DG6010	Digestion, method 6010
EPA602	EPA method 602
FE E	Iron, ICPES
F IC	Fluoride, IC
HG C	Mercury, cold vapor
MHO	Specific conductance
MN E	Manganese, ICPES
NA E	Sodium, ICPES
NO3	Nitrate, colorimetric
PB G	Lead, graphite AA
PH	pH
PHEN	Total phenolics
SE G	Selenium, graphite AA
SO4 IC	Sulfate, IC
TOC	Total organic carbon
TOX	Total organic halides
TURB	Turbidity
XYLENE	Xylenes, EPA 602

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results By Test

Work Order # 89-02-027

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 MW-3	<0.03	0.24	0.14	<0.005	110
02 MW-4	<0.03	0.14	0.55	<0.005	240

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 MW-3	<0.03	02/06/89	02/06/89	0.073*	1.0*
02 MW-4	<0.03	02/06/89	02/06/89	2.6	1.2

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 MW-3	1100	0.061	240	0.31	0.002*
	1100				
	1100				
	1100				
02 MW-4	1400	1.1	140	0.22	0.002*
	1400				

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results By Test

Work Order # 89-02-027
Continued From Above

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
	1400				
	1400				

SAMPLE Sample Id	Test: PH pH units	Test: PHEN mg/L as phenol	Test: SE G ug/ml	Test: SO4 IC mg/L as SO4	Test: TOC mg/L
01	7.22	<0.005	<0.005	37	19
MW-3	7.20				17
	7 23				15
	7.07				15
02	6.85	0.52	<0.005	25	5
MW-4	6.93				6
	6 85				8
	6.83				8

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT

Results By Test

Work Order # 89-02-027

SAMPLE	Sample Id	Test: TOX mg/L
01	MW-3	0.02*
		0.01*
		0.01*
		0.01*
02	MW-4	0.03*
		0.03*
		0.03*
		0.03*

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT - Work Order # 89-02-027
Results by Sample

SAMPLE ID MW-3

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G
INJECTED 02/03/89
FILE #
UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	2.9	0.20
108-88-3	Toluene	0.4*	0.20
100-41-4	Ethylbenzene	1.9	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	123% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID MW-3 FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027

SAMPLE ID MW-3 FRACTION 01I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 01/31/89 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403
ANALYZED 02/08/89
UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-3 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

VERIFIED LM

ANALYST LKM
INSTRMT HACH
ANALYZED 02/02/89
UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	46	1.0

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID MW-3 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-3 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM FILE #
INSTRMT G INJECTD 02/03/89 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	0.6*	0.20
95-47-6	o-Xylene	1.4	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 123% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID MW-3

FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

Q = daily EPA standard recovery outside 95% confidence interval.

Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027

SAMPLE ID MW-4

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category ______

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89

FILE # ______

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	21000	100
108-88-3	Toluene	5900	100
100-41-4	Ethylbenzene	720*	150
108-90-7	Chlorobenzene-A	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
541-73-1	1,3-Dichlorobenzene	ND	200
95-50-1	1,2-Dichlorobenzene	ND	200

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	96% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted

SAMPLE ID MW-4 FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027

SAMPLE ID MW-4 FRACTION 02I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 01/31/89 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403 ANALYZED 02/08/89 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

VERIFIED LM

ANALYST LKM
INSTRMT HACH ANALYZED 02/02/89 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	17	1.0

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID MW-4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM FILE #
INSTRMT G INJECTD 02/03/89 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	430*	100
108-38-3	m-Xylene	560	100
95-47-6	o-Xylene	560	50

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 96% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID MW-4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category ______

Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027

SAMPLE ID trip blank

FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41 4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	97% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

SAMPLE ID trip blank FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027

SAMPLE ID trip blank

FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category ______

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTD 02/03/89

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 97% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 89-02-027
Received: 02/02/89 Results by Sample

SAMPLE ID reagent blank FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT G INJECTED 02/03/89 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	N/A%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID reagent blank FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT

Results by Sample

Work Order # 89-02-027

SAMPLE ID reagent blank

FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602

Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL

INSTRMT G

INJECTD 02/03/89

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene N/A% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT

ND = not detected at detection limit

NA = not analyzed

* = less than 5 times the detection limit

N\A = not available

Second column confirmation NOT performed unless otherwise noted.

Q = daily EPA standard recovery outside 95% confidence interval.

Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 01/31/89

RAS - Austin REPORT
02/13/89 17:14:37

Work Order # 89-01-290

REPORT TO: Radian
B1. 1
Austin

ATTEN: Linda Bendele

CLIENT: PHILLIPS P
SAMPLES: 4
COMPANY: Phillips Petroleum
FACILITY: Odessa, TX

PREPARED BY: Radian Analytical Services
8501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088

ATTEN:
PHONE: 512-454-4797

Barbara Hayes
CERTIFIED BY

CONTACT: BENDELE

WORK ID: Lee coliforms
TAKEN: MF
TRANS: UPS
TYPE:
P.O. #:
INVOICE: under separate cover

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 Lee MW-1
02 Lee MW-2
03 Lee MW-3
04 Lee MW-4

TEST CODES and NAMES used on this report

COLI T Total coliform

4th Quarter
Lee 2/89

RADIAN CORPORATION

RAS - Austin REPORT
Results By Test

Work Order # 89-01-290

Received: 01/31/89

SAMPLE Sample Id		Test: COLI T colonies/100 mL
Lee MW-1	01	20
Lee MW-2	02	1100
Lee MW-3	03	70
Lee MW-4	04	<20

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 89-02-208

Received: 02/03/89 03/03/89 19:12:38

REPORT TO	Phillips Petroleum Radian Bl. 1 Austin	PREPARED BY	Radian Analytical Services 8501 Mo-pac Bl. PO Box 201088 Austin, TX 78720-1088
ATTEN	Linda Bendele	ATTEN	
		PHONE	512-454-4797
CLIENT	PHILLIPS P SAMPLES 8		
COMPANY	Phillips Petroleum		
FACILITY	Odessa, TX		

CERTIFIED BY

CONTACT BENDELE

WORK ID	Lee and Eunice radiochemistry
TAKEN	MF
TRANS	UPS
TYPE	
P.O. #	
INVOICE	under separate cover

Footnotes and Comments

---

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 Lee MW-1
02 Lee MW-2
03 Lee MW-3
04 Lee MW-4
05 Eunice MW-1
06 Eunice MW-2
07 Eunice MW-3
08 Eunice MW-4

TEST CODES and NAMES used on this report

ALPHA	Gross alpha radiation
BETA	Gross beta radiation
RA 226	Radium 226

4th Quarter
Lee 2/89

RADIAN CORPORATION

Received: 02/03/89

RAS - Austin REPORT

Results By Test

Work Order # 89-02-208

SAMPLE Sample Id		Test: ALPHA pCi/	Test: BETA pCi/	Test: RA 226 pCi/
Lee MW-1	01	25 (3) pCi/L	45 (4) pCi/L	0.93(.05) pCi/L
Lee MW-2	02	15 (2) pCi/L	28 (3) pCi/L	0.80(.05) pCi/L
Lee MW-3	03	11 (2) pCi/L	17 (2) pCi/L	0.45(.04) pCi/L
Lee MW-4	04	8.9 (1.2) pCi/L	12 (1) pCi/L	0.57(.04) pCi/L
Eunice MW-1	05	17 (3) pCi/L	19 (3) pCi/L	0.24(.03) pCi/L
Eunice MW-2	06	11 (2) pCi/L	29 (3) pCi/L	1.62(.07) pCi/L
Eunice MW-3	07	7 (2) pCi/L	15 (3) pCi/L	0.35(.03) pCi/L
Eunice MW-4	08	7 (2) pCi/L	24 (4) pCi/L	0.28(.03) pCi/L

RADIAN CORPORATION

Received: 02/03/89

Test Methodology

TEST CODE ALPHA NAME Gross alpha radiation

The value in parentheses is a + or - one sigma value. Results are thus expressed as: value (+ or [illegible] sigma). One sigma = one standard deviation, 68% confidence level.

TEST CODE BETA NAME Gross beta radiation

The value in parentheses is a + or - one sigma value. Results are thus expressed as: value (+ or - 1 sigma). One sigma = one standard deviation, 68% confidence level.

TEST CODE RA 226 NAME Radium 226

The value in parentheses is a + or - one sigma value. Results are thus expressed as: value (+ or - one sigma). One sigma = one standard deviation, 68% confidence level.

RADIAN
CORPORATION

01B LEE MW-1
02B LEE MW-2
03B LEE MW-3
04B LEE MW-4

Client: Radian
Bl.1
Austin

EPA METHOD 8080

Lab No: 89-02-028

RESULTS IN ug/L

CAS #	COMPOUND	01B	02B	03B	04B
58-89-9	gamma-BHC,(Lindane)	<0.002	<0.038	<0.002	<0.019
72-20-8	Endrin	<0.002	<0.038	<0.002	<0.019
8001-35-2	Toxaphene	<0.10	<1.9	<0.10	<0.95
72-43-5	Methoxychlor	<0.010	<0.19	<0.010	<0.095

SURROGATE RECOVERIES (results in % recovery)

Dibutylchlorendate	65	95	99	100
2,4,5,6-Tetrachloro-m-xylene	53	104	79	96

NOTES AND DEFINITIONS FOR THIS REPORT.
QC = OUTSIDE CONTROL LIMITS.
* = LESS THAN 5 TIMES THE DETECTION LIMIT.
B = DETECTED IN REAGENT BLANK; BACKGROUND SUBTRACTION NOT PERFORMED.
ND = NOT DETECTED AT DETECTION LIMIT.
NA = NOT ANALYZED.
N\A = NOT AVAILABLE.
NS = NOT SPIKED.
J = DETECTED AT LESS THAN THE SPECIFIED DETECTION LIMIT.

4th Quarter
2/89

RADIAN
CORPORATION

06A REAGENT BLANK

Client: Radian
Bl.1
Austin

EPA METHOD 8080

Lab No: 89-02-028

RESULTS IN ug/L

CAS #	COMPOUND	06A
58-89-9	gamma-BHC,(Lindane)	<0.002
72-20-8	Endrin	<0.002
8001-35-2	Toxaphene	<0.10
72-43-5	Methoxychlor	<0.010

SURROGATE RECOVERIES	(results in % recovery)
Dibutylchlorendate	103
2,4,5,6-Tetrachloro-m-xylene	89

NOTES AND DEFINITIONS FOR THIS REPORT.
QC = OUTSIDE CONTROL LIMITS.
* = LESS THAN 5 TIMES THE DETECTION LIMIT.
B = DETECTED IN REAGENT BLANK; BACKGROUND SUBTRACTION NOT PERFORMED.
ND = NOT DETECTED AT DETECTION LIMIT.
NA = NOT ANALYZED.
N\A = NOT AVAILABLE.
NS = NOT SPIKED.
J = DETECTED AT LESS THAN THE SPECIFIED DETECTION LIMIT.

RADIAN CORPORATION

Client: Radian
Bl.1
Austin

01A LEE MW-1
02A LEE MW-2
03A LEE MW-3
04A LEE MW-4

EPA METHOD 8150

Lab No: 89-02-028

RESULTS IN ug/L

CAS #	COMPOUND	01A	02A	03A	04A
94-75-7	2,4-D	<0.47	<2.4	<0.48	<0.48
93-72-1	2,4,5-TP (Silvex)	<0.14	<0.71	<0.14	<0.14

SURROGATE RECOVERIES (results in % recovery)

	01A	02A	03A	04A
2,4-Dichlorophenyl acetic acid	103	133	100	116

NOTES AND DEFINITIONS FOR THIS REPORT.
QC = OUTSIDE CONTROL LIMITS.
* = LESS THAN 5 TIMES THE DETECTION LIMIT.
C = RESULT CONFIRMED BY SECOND COLUMN ANALYSIS.
ND = NOT DETECTED AT DETECTION LIMIT.
NA = NOT ANALYZED.
N\A = NOT AVAILABLE.
NS = NOT SPIKED.

RADIAN CORPORATION

05A REAGENT BLANK

Client: Radian
B1.1
Austin

EPA METHOD 8150

Lab No: 89-02-028

RESULTS IN ug/L

CAS #	COMPOUND	05A
94-75-7	2,4-D	<0.50
93-72-1	2,4,5-TP (Silvex)	<0.15

SURROGATE RECOVERIES (results in % recovery)

2,4-Dichlorophenyl acetic acid	102

NOTES AND DEFINITIONS FOR THIS REPORT.
QC = OUTSIDE CONTROL LIMITS.
* = LESS THAN 5 TIMES THE DETECTION LIMIT.
C = RESULT CONFIRMED BY SECOND COLUMN ANALYSIS.
ND = NOT DETECTED AT DETECTION LIMIT.
NA = NOT ANALYZED.
N\A = NOT AVAILABLE.
NS = NOT SPIKED.

PHILLIPS 66 NATURAL GAS COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY

ODESSA, TEXAS 79762
4001 PENBROOK

January 19, 1989

Quarterly Groundwater Monitoring Analyses
Artesia, Eunice, Lee and Lusk Plants

Mr. Dave Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Boyer:

Per your request, attached please find copies of the third quarter groundwater monitoring analyses for the above referenced plants.

If you should have any questions regarding this information, please contact me at (915) 367-1316.

Very truly yours,

Michael D. Ford

Michael D. Ford
Environmental Analyst

RECEIVED
JAN 24 1989
OIL CONSERVATION DIVISION
SANTA FE

MDF

Attachments

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-11-014

Received: 11/03/88 12/12/88 12:06:17

REPORT TO: Radian, B1.1, Austin
ATTEN: Linda Bendele
CLIENT: PHILLIPS P SAMPLES: 4
COMPANY: Phillips Petroleum
FACILITY: Odessa, TX

WORK ID: Lee
TAKEN: MF
TRANS: UPS
TYPE:
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services, 8501 Mo-pac Bl., PO Box 201088, Austin, TX 78720-1088
ATTEN:
PHONE: 512-454-4797

CERTIFIED BY

CONTACT: BENDELE

Unknown compounds present in Lee MW-2 and Lee MW-2 dup for 602 + xylene.

Footnotes and Comments

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* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	Lee MW-1
02	Lee MW-2
03	Lee MW-2 dup
04	reagent blank

3rd Qtr-11/88

TEST CODES and NAMES used on this report

AG E	Silver, ICPES
ALPHA	Gross alpha radiation
AS G	Arsenic, graphite AA
BA E	Barium, ICPES
BETA	Gross beta radiation
CD E	Cadmium, ICPES
CL IC	Chloride, IC
CR E	Chromium, ICPES
DG3020	Digestion, method 3020
DG6010	Digestion, method 6010
EPA602	EPA method 602
FE E	Iron, ICPES
F IC	Fluoride, IC
HG C	Mercury, cold vapor
MHO	Specific conductance
MN E	Manganese, ICPES
NA E	Sodium, ICPES
NO3	Nitrate, colorimetric
PB G	Lead, graphite AA
PH	pH
PHEN	Total phenolics
RA 226	Radium 226
SE G	Selenium, graphite AA
SO4 IC	Sulfate, IC
TOC	Total organic carbon
TURB	Turbidity
XYLENE	Xylenes, EPA 602

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results By Test

Work Order # 88-11-014

SAMPLE / Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee MW-1	<0.03	6 (1) pCi/L	<0.002	0.19	13 (2) pCi/L
02 Lee MW-2	<0.03	2.6 (0.9) pCi/L	0.007*	0.57	14 (2) pCi/L

SAMPLE / Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete
01 Lee MW-1	<0.005	27	<0.03	11/14/88	11/11/88
02 Lee MW-2	<0.005	480	<0.03	11/14/88	11/11/88

SAMPLE / Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
01 Lee MW-1	0.14*	0.4*	540	0.12	19
			540		
			550		
			540		
02 Lee MW-2	<0.04	1.1*	2300	0.93	84
			2300		

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results By Test

Work Order # 88-11-014
Continued From Above

SAMPLE Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
			2200		
			2200		

SAMPLE Sample Id	Test: NO3 mg/L as N	Test: PB G ug/ml	Test: PH pH units	Test: PHEN mg/L as phenol	Test: RA 226 pCi/
01 Lee MW-1	2.3	<0.002	7.28	<0.005	1.7 (0.1) pCi/L
			7.24		
			7.20		
			7.24		
02 Lee MW-2	0.15	<0.002	6.92	<0.005	0.95(.08) pCi/L
			7.80		
			6.81		
			6.86		

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT

Results By Test

Work Order # 88-11-014

SAMPLE Sample Id	Test: SE G ug/ml	Test: SO4 IC mg/L as SO4	Test: TOC mg/L
01 Lee MW-1	<0.004	34	4*
			2*
			2*
			3*
02 Lee MW-2	<0.004	22	25
			28@
			24
			28

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID Lee MW-1

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 11/07/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	98% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT

Results by Sample

Work Order # 88-11-014

Continued From Above

SAMPLE ID Lee MW-1 FRACTION 01J TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 11/01/88 Category ______

A-Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

SAMPLE ID Lee MW-1 FRACTION 01I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 11/01/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403 ANALYZED 11/16/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

VERIFIED LM

ANALYST TAM
INSTRMT HACH ANALYZED 11/03/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	27	1.0

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014
Continued From Above

SAMPLE ID Lee MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 11/07/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 98% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

Q = daily EPA standard recovery outside
95% confidence interval.
Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID Lee MW-2

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 11/07/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	1.5	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 110% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-2 FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category ________

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID Lee MW-2 FRACTION 02I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 11/01/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403 ANALYZED 11/16/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-2 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

VERIFIED LM

ANALYST TAM
INSTRMT HACH ANALYZED 11/03/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	10	1.0

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014
Continued From Above

SAMPLE ID Lee MW-2 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-2 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 11/07/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 110% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-2 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

Q = daily EPA standard recovery outside
95% confidence interval.
Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID Lee MW-2 dup

FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category ____

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 11/07/88

FILE # ____

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	1.6	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	113% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-2 dup FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category ______

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID Lee MW-2 dup

FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 11/07/88

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	113% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID reagent blank

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 11/07/88

FILE # ______

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	N\A% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014
Continued From Above

SAMPLE ID reagent blank FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID reagent blank

FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 11/07/88

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene N\A% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

Received: 11/03/88 NonReported Work

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

01K : SPR602
02K : SPR602

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-11-015

Received: 11/03/88 12/12/88 11:53:03

REPORT TO	Radian B1.1 Austin	PREPARED BY	Radian Analytical Services 8501 Mo-pac Bl. PO Box 201088 Austin, TX 78720-1088
ATTEN	Linda Bendele	ATTEN	
		PHONE	512-454-4797
CLIENT	PHILLIPS P SAMPLES 5		
COMPANY	Phillips Petroleum		
FACILITY	Odessa, TX		

CERTIFIED BY

CONTACT BENDELE

Phenolic samples diluted due to colorimetry interference.

WORK ID	Lee
TAKEN	MF
TRANS	UPS
TYPE	
P.O. #	
INVOICE	under separate cover

Footnotes and Comments

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* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	Lee MW-3
02	Lee MW-4
03	Lee MW-4 dup
04	trip blank
05	~~reagent blank~~

3rd QTR - 11/88

TEST CODES and NAMES used on this report

AG E	Silver, ICPES
ALPHA	Gross alpha radiation
AS G	Arsenic, graphite AA
BA E	Barium, ICPES
BETA	Gross beta radiation
CD E	Cadmium, ICPES
CL IC	Chloride, IC
CR E	Chromium, ICPES
DG3020	Digestion, method 3020
DG6010	Digestion, method 6010
EPA602	EPA method 602
FE E	Iron, ICPES
F IC	Fluoride, IC
HG C	Mercury, cold vapor
MHO	Specific conductance
MN E	Manganese, ICPES
NA E	Sodium, ICPES
NO3	Nitrate, colorimetric
PB G	Lead, graphite AA
PH	pH
PHEN	Total phenolics
RA 226	Radium 226
SE G	Selenium, graphite AA
SO4 IC	Sulfate, IC
TOC	Total organic carbon
TURB	Turbidity
XYLENE	Xylenes, EPA 602

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT Work Order # 88-11-015

Results By Test

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee MW-3	<0.03	3.5 (0.8) pCi/L	0.31	0.072	5 (1) pCi/L
02 Lee MW-4	<0.03	4 (1) pCi/L	0.14	0.50	8 (2) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete
01 Lee MW-3	<0.005	180	<0.03	11/14/88	11/11/88
02 Lee MW-4	<0.005	28	<0.03	11/14/88	11/11/88
03 Lee MW-4 dup			<0.03		11/11/88

SAMPLE Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
01 Lee MW-3	0.10*	0.6*	1300	0.024*	130
			690		
			680		
			700		
02 Lee MW-4	2.2	0.5*	730	0.79	130

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results By Test

Work Order # 88-11-015
Continued From Above

SAMPLE Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
			1200		
			1300		
			1300		

SAMPLE Sample Id	Test: NO3 mg/L as N	Test: PB G ug/ml	Test: PH pH units	Test: PHEN mg/L as phenol	Test: RA 226 pCi/
01 Lee MW-3	0.13	<0.002	7.06	0.09	0.36(.06) pCi/L
			7.59		
			7.66		
			7.48		
02 Lee MW-4	0.07*	<0.002	7.41	0.06	0.65(.06) pCi/L
			7.18		
			7.12		
			7.13		

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-11-015

Received: 11/03/88

Results By Test

SAMPLE / Sample Id	Test: SE G ug/ml	Test: SO4 IC mg/L as SO4	Test: TOC mg/L
01 Lee MW-3	<0.004	34	17
			10
			8
			9
02 Lee MW-4	<0.004	44	9
			12
			12
			10

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-11-015

Received: 11/03/88 Results by Sample

SAMPLE ID Lee MW-3 FRACTION 01J TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL FILE #

INSTRMT D INJECTED 11/07/88 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	5.5	0.20
108-88-3	Toluene	1.0	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	99% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-3 FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

Received: 11/03/88 Results by Sample

SAMPLE ID Lee MW-3 FRACTION 01I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 11/01/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403 ANALYZED 11/16/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.

- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available

SAMPLE ID Lee MW-3 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

VERIFIED LM

ANALYST TAM
INSTRMT HACH ANALYZED 11/03/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	8	1.0

SAMPLE ID Lee MW-3 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category ______

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-3 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL FILE # ______
INSTRMT D INJECTD 11/07/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 99% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015
Continued From Above

SAMPLE ID Lee MW-3 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015

SAMPLE ID Lee MW-4

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 11/07/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	7800	100
108-88-3	Toluene	ND	100
100-41-4	Ethylbenzene	530*	150
108-90-7	Chlorobenzene-A	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
541-73-1	1,3-Dichlorobenzene	ND	200
95-50-1	1,2-Dichlorobenzene	ND	200

SURROGATES

CAS#	COMPOUND	RESULT
98-08-8	a,a,a-Trifluorotoluene	101% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-4 FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015

SAMPLE ID Lee MW-4

FRACTION 02I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 11/01/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403

ANALYZED 11/16/88

UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.0002

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-4

FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

VERIFIED LM

ANALYST TAM
INSTRMT HACH

ANALYZED 11/03/88

UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	22	1.0

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015
Continued From Above

SAMPLE ID Lee MW-4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 11/07/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	100
108-38-3	m-Xylene	ND	100
95-47-6	o-Xylene	ND	50

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 101% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

Q = daily EPA standard recovery outside
  95% confidence interval.
Chlorobenzene and p-xylene co-elute.
  Quantitated as chlorobenzene unless
  otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015

Received: 11/03/88

SAMPLE ID trip blank

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 11/07/88

FILE # ______

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	100% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015
Continued From Above

Received: 11/03/88

SAMPLE ID trip blank

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015

SAMPLE ID trip blank

FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 11/07/88

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	100% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-11-015

Received: 11/03/88 Results by Sample

SAMPLE ID reagent blank FRACTION 05A TEST CODE EPA602 NAME EPA method 602

Date & Time Collected not specified Category ______

VERIFIED CL

ANALYST CL FILE # ______

INSTRMT D INJECTED 11/07/88 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

CAS#	COMPOUND	RESULT	
98-08-8	a,a,a-Trifluorotoluene	N\A% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

SAMPLE ID reagent blank FRACTION 05A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015

SAMPLE ID reagent blank

FRACTION 05A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 11/07/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene N\A% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

Received: 11/03/88 NonReported Work

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

01K : SPR602
02K : SPR602

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-11-008

11/22/88 11:10:05

REPORT TO: Radian
B1.1
Austin

ATTEN: Linda Bendele

CLIENT: PHILLIPS P SAMPLES 4
COMPANY: Phillips Petroleum
FACILITY: Odessa, TX

WORK ID: Lee
TAKEN: MF
TRANS: UPS
TYPE:
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
8501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088

ATTEN:
PHONE: 512-454-4797

Barbara Hayes
CERTIFIED BY

CONTACT: BENDELE

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 Lee MW-1
02 Lee MW-2
03 Lee MW-3
04 Lee MW-4

3rd QTR - 11/88

TEST CODES and NAMES used on this report

COLI T Total coliform

RADIAN CORPORATION

RAS - Austin REPORT
Results By Test

Work Order # 88-11-008

SAMPLE / Sample Id	Test: COLI T colonies/100 mL
01 Lee MW-1	4100
02 Lee MW-2	2900
03 Lee MW-3	8700
04 Lee MW-4	88

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-12-002

Received: 11/30/88 12/07/88 14:43:11

REPORT TO Radian
Bl. 1
Austin

ATTEN Linda Bendele

CLIENT PHILLIPS P SAMPLES 4
COMPANY Phillips Petroleum
FACILITY Odessa, TX

WORK ID Lee, coliform
TAKEN MF
TRANS UPS
TYPE
P.O. #
INVOICE under separate cover

PREPARED BY Radian Analytical Services
8501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088
ATTEN
PHONE 512-454-4797

Barbara Hayes
CERTIFIED BY

CONTACT BENDELE

Footnotes and Comments

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* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 Lee MW-1
02 Lee MW-2
03 Lee MW-3
04 Lee MW-4

3rd QTR - 11/88

TEST CODES and NAMES used on this report

COLI T Total coliform

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-12-002

Received: 11/30/88

Results By Test

SAMPLE Sample Id	Test: COLI T colonies/100 mL
01 Lee MW-1	2700
02 Lee MW-2	800
03 Lee MW-3	200
04 Lee MW-4	100

RADIAN CORPORATION

RAS - Austin REPORT **Work Order # 88-12-146**

Received: 12/21/88 12/22/88 09:36:04

REPORT TO: Radian
Bl. 1
Austin

ATTEN: Linda Bendele

CLIENT: PHILLIPS P SAMPLES 8
COMPANY: Phillips Petroleum
FACILITY: Odessa, TX

WORK ID: Lee & Eunice, TOX
TAKEN:
TRANS:
TYPE:
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
3501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088

ATTEN:
PHONE: 512-454-4797

Larry K. Mutschler
CERTIFIED BY

CONTACT: BENDELE

Analyses performed by Gascoyne Laboratories.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 Lee MW-1
02 Lee MW-2
03 Lee MW-3
04 Lee MW-4
05 Eunice MW-1
06 Eunice MW-2
07 Eunice MW-3
08 Eunice MW-4

TEST CODES and NAMES used on this report

TOX Total organic halides

3rd QTR - 12/88

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-12-146

Received: 12/21/88 Results By Test

SAMPLE Sample Id	Test: IOX mg/L
01	0.49
Lee MW-1	0.05
	0.03*
	0.07
02	0.13
Lee MW-2	0.21
	0.24
	0.10
03	0.12
Lee MW-3	0.03*
	0.01*
	0.03*
04	0.08
Lee MW-4	0.02*

RADIAN CORPORATION

Received: 12/21/88

RAS - Austin REPORT
Results By Test

Work Order # 88-12-146
Continued From Above

Sample Id	SAMPLE	Test: IDX mg/L
		0.07
		0.01*
Eunice MW-1	05	0 39
		0.04*
		0.06
		0.11
Eunice MW-2	06	0.19
		0.14
		0.05
		0.07
Eunice MW-3	07	0 47
		0.54
		0.34
		0 68

RADIAN CORPORATION

Pesticides/Herbicides
3rd Qtr, Lee

Notes and Definitions

Data Flags:

TERMS USED IN THIS REPORT:
Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Note, the detection limit may vary from that specified by EPA by the concentration factor. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - The concentration or dilution factor by which the sample extract or digestate differs from that specified by a given EPA method. A sample prepared to the specifications of the method will have a factor of 1. A sample diluted 10 times to bring the analytes within the instrument calibration range will have a factor of 10. Conversely, a sample which is concentrated 10 times more than specified will have a factor of 0.1.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units -

ug/L	micrograms per liter (parts per billion);liquids/water
ug/Kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million);liquids/water
mg/Kg	milligrams per kilogram (parts per million);soils/solids
%	percent; usually used for percent recovery of QC standards
umhos	conductance unit; microohms/centimeter
ml/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit

Notes and Definitions

Data Flags:

- ***** The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.
- **A** This flag indicates that a spike is an analytical and/or post-digestion spike. These spikes have not been subjected to the extraction or digestion step.

- **B** This flag indicates that the analyte was detected in the reagent blank Since traces of the background contaminant will vary from sample to sample, the sample results are not corrected from the amount in the blank.

- **C** Most methods of gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. This flag indicates that the analyte has been confirmed on a second column.

- **D** This flag identifies analytes identified in analysis at a secondary dilution factor. In an analysis some compounds can exceed the calibration range of the instrument. Therefore two analyses are performed, one at the concentration of some of the analytes, and a second with the sample diluted so that higher levels fall into calibration range.
- **E** The reported value is estimated because of the presence of interference. The potential source of the interference is included in the report narrative.

Notes and Definitions

Data Flags:

G This flag identifies a GC/MS result whose concentration exceeds the calibration range for that specific analysis. Usually if one or more compounds have a response greater than full scale, the sample or extract is diluted and re-analyzed.

J Indicates an estimated value for GC/MS data. This flag is used either when estimating a concentration for tentatively identified compounds where a response factor of 1 is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit.

N/A A result or value is not available for this parameter, usually a detection limit.

NA This analyte was not analyzed.

NC Applies to RPD and spike recovery results. The relative percent differ ence (RPD) is not calculated when a result is less than five times the detection limit. A spike recovery is not calculated when the result is greater than four times the spike added concentration because the spike added concentration is considered insignificant.

ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.

Notes and Definitions

Data Flags:

NR This analyte was not requested by the client.

NS This analyte or surrogate was not added (spiked) to the sample for this analysis.

P Most methods of gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. This flag indicates that the analyte has been confirmed previously. This flag is applicable for samples from a regular sampling program.

Q This quality control standard is outside method or laboratory specified control limits. This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

S This flag indicates that a specific result from a metals analysis has been obtained using the Method of Standard Addition.

U Most methods of gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. This flag indicates that second column was not requested.

RADIAN CORPORATION

Client: PHILLIPS 66
PHILLIPS 66
ODESSA, TEXAS 77480

Lee

01A 8811291016 MW-1
02A 8811291137 MW-2
03A 8811291231 MW-3
03B 8811291231 MW-3 DUPL

EPA METHOD 8080

Lab No: A8-12-001

RESULTS IN ug/L

CAS #	COMPOUND	01A	02A	03A	03B
58-89-9	gamma-BHC,(Lindane)	<0.009	0.43*	<0.009	<0.009
72-20-8	Endrin	<0.009	<0.19	<0.009	<0.009
8001-35-2	Toxaphene	<0.047	<0.94	<0.047	<0.047
72-43-5	Methoxychlor	<0.47	<9.4	<0.47	<0.47

SURROGATE RECOVERIES (results in % recovery)

Dibutylchlorendate	93	87	104	106
2,4,5,6-Tetrachloro-m-xylene	81	96	80	81

NOTES AND DEFINITIONS FOR THIS REPORT.
QC = OUTSIDE CONTROL LIMITS.
* = LESS THAN 5 TIMES THE DETECTION LIMIT.
B = DETECTED IN REAGENT BLANK; BACKGROUND SUBTRACTION NOT PERFORMED.
ND = NOT DETECTED AT DETECTION LIMIT.
NA = NOT ANALYZED.
N\A = NOT AVAILABLE.
NS = NOT SPIKED.
J = DETECTED AT LESS THAN THE SPECIFIED DETECTION LIMIT.

RADIAN CORPORATION

Client: PHILLIPS 66
PHILLIPS 66
ODESSA, TEXAS 77480

04A 881129151 MW-4
05A REAGENT BLANK

EPA METHOD 8080

Lab No: A8-12-001

RESULTS IN ug/L

CAS #	COMPOUND	04A	05A
58-89-9	gamma-BHC,(Lindane)	0.02 J	<0.010
72-20-8	Endrin	<0.047	<0.010
8001-35-2	Toxaphene	<0.24	<0.050
72-43-5	Methoxychlor	<2.4	<0.50

SURROGATE RECOVERIES	(results in % recovery)	
Dibutylchlorendate	114	95
2,4,5,6-Tetrachloro-m-xylene	93	72

NOTES AND DEFINITIONS FOR THIS REPORT.
QC = OUTSIDE CONTROL LIMITS.
* = LESS THAN 5 TIMES THE DETECTION LIMIT.
B = DETECTED IN REAGENT BLANK; BACKGROUND SUBTRACTION NOT PERFORMED.
ND = NOT DETECTED AT DETECTION LIMIT.
NA = NOT ANALYZED.
N\A = NOT AVAILABLE.
NS = NOT SPIKED.
J = DETECTED AT LESS THAN THE SPECIFIED DETECTION LIMIT.

RADIAN CORPORATION

06A RECOVERY CHECK

Client: PHILLIPS 66
PHILLIPS 66
ODESSA, TEXAS 77480

EPA METHOD 8080

100

Lab No: A8-12-001

RESULTS IN %

CAS #	COMPOUND	06A
58-89-9	gamma-BHC,(Lindane)	105
72-20-8	Endrin	NS
8001-35-2	Toxaphene	NS
72-43-5	Methoxychlor	110

SURROGATE RECOVERIES	(results in % recovery)
Dibutylchlorendate	104
2,4,5,6-Tetrachloro-m-xylene	75

NOTES AND DEFINITIONS FOR THIS REPORT.
QC = OUTSIDE CONTROL LIMITS.
* = LESS THAN 5 TIMES THE DETECTION LIMIT.
B = DETECTED IN REAGENT BLANK; BACKGROUND SUBTRACTION NOT PERFORMED.
ND = NOT DETECTED AT DETECTION LIMIT.
NA = NOT ANALYZED.
N\A = NOT AVAILABLE.
NS = NOT SPIKED.
J = DETECTED AT LESS THAN THE SPECIFIED DETECTION LIMIT.

RADIAN CORPORATION

ANALYTICAL DATA SUMMARY

PHILLIPS 66
Associate Laboratory Data for Radian Work Order: 8901039

Method: EPA 8150 Herbicides   Matrix: water

Results in: Sample ID:	ug/L Lee MW-1	ug/L Lee MW-2	ug/L Lee MW-3	ug/L Lee MW-4
2,4-D	<1.0	<1.0	<1.0	<1.0
2,4,5-TP (Silvex)	<0.2	<0.2	<0.2	<0.2

For a detailed description of flags and technical terms in this report refer to the glossary.

PHILLIPS 66 NATURAL GAS COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY

ODESSA, TEXAS 79762
4001 PENBROOK

December 8, 1988

Quarterly Groundwater Monitoring Analyses
Artesia, Eunice, Lee and Lusk Plants

Mr. Dave Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Boyer:

Per your request, attached please find copies of the second quarter groundwater monitoring analyses for the above referenced plants. I have also included additional information on the Lee Plant water supply wells for your reference.

If you should have any questions regarding this information, please contact me at (915) 367-1316.

Very truly yours,

Michael D. Ford

Michael D. Ford
Environmental Analyst

MDF

Attachments

RECEIVED
DEC 10 1988
OIL CONSERVATION DIVISION
SANTA FE

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-09-003

Received: 09/01/88 09/13/88 09:34:43

REPORT TO	Radian B1.1 Austin	PREPARED BY	Radian Analytical Services 8501 Mo-pac Bl. PO Box 201088 Austin, TX 78720-1088
ATTEN	Linda Bendele	ATTEN	
		PHONE	512-454-4797
CLIENT	PHILLIPS P SAMPLES 8	CERTIFIED BY	
COMPANY	Phillips Petroleum	CONTACT	BENDELE
FACILITY	Odessa, TX		
WORK ID	Lee, BTEX		
TAKEN	MF		
TRANS	UPS		
TYPE			
P.O. #			
INVOICE	under separate cover		

Unknown compounds present in sample Lee MW-4.
** Possible interference.

Footnotes and Comments

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* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 Lee MW-1
02 Lee MW-2
03 Lee MW-3
04 Lee MW-4
05 Lee MW-4 duplicate

trip blank
reagent blank

TEST CODES and NAMES used on this report

EPA602 EPA method 602
XYLENE Xylenes, EPA 602

2nd Qtr - 9/88

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-1

FRACTION 01A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/30/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 09/09/88

FILE # ______

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	10	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 97% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

SAMPLE ID Lee MW-1 FRACTION 01A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/30/88 Category .

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-1

FRACTION 01A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/30/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D
INJECTD 09/09/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND,Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 97% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-2

FRACTION 02A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/30/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 09/09/88 FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 137**% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003
Continued From Above

SAMPLE ID Lee MW-2 FRACTION 02A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/30/88 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

Received: 09/01/88

SAMPLE ID Lee MW-2

FRACTION 02A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/30/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 09/09/88

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND,Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	137**% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-3

FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/30/88 Category

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTED 09/09/88 FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	0.3*	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	98%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003
Continued From Above

SAMPLE ID Lee MW-3

FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/30/88 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-3

FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/30/88 Category

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTD 09/09/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND,Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 98% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

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- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-4

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/31/88 Category

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTED 09/09/88 FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	6800	200
108-88-3	Toluene	45	1.0
100-41-4	Ethylbenzene	370	1.5
108-90-7	Chlorobenzene-A	ND	1.5
106-46-7	1,4-Dichlorobenzene	ND	1.5
541-73-1	1,3-Dichlorobenzene	ND	2.0
95-50-1	1,2-Dichlorobenzene	ND	2.0

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	94%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID Lee MW-4 FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/31/88 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-09-003

Received: 09/01/88 Results by Sample

SAMPLE ID Lee MW-4 FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602

Date & Time Collected 08/31/88 Category

VERIFIED CL

ANALYST BM FILE #

INSTRMT D INJECTD 09/09/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	12Q	1.0
108-38-3	m-Xylene-A	10	1.0
95-47-6	o-Xylene	27	0.50

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 94% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

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* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-4 duplicate

FRACTION 05A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/31/88 Category

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTED 09/09/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	10,000	200
108-88-3	Toluene	ND	200
100-41-4	Ethylbenzene	ND	300
108-90-7	Chlorobenzene-A	ND	300
106-46-7	1,4-Dichlorobenzene	ND	300
541-73-1	1,3-Dichlorobenzene	ND	400
95-50-1	1,2-Dichlorobenzene	ND	400

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	93% recovery

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N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003
Continued From Above

SAMPLE ID Lee MW-4 duplicate FRACTION 05A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/31/88 Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-4 duplicate

FRACTION 05A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/31/88 Category

VERIFIED CL

ANALYST BM
INSTRMT D
INJECTD 09/09/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND,Q	200
108-38-3	m-Xylene-A	ND	200
95-47-6	o-Xylene	ND	100

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 93% recovery

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- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

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Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID trip blank

FRACTION 07A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category ____

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTED 09/09/88

FILE # ____

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	94% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
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NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003
Continued From Above

Received: 09/01/88

SAMPLE ID trip blank

FRACTION 07A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

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Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID trip blank

FRACTION 07A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST BM
INSTRMT D
INJECTD 09/09/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND, Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	94% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

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Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID reagent blank

FRACTION 08A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 09/09/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	N\A% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

SAMPLE ID reagent blank FRACTION 08A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and p-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

RADIAN CORPORATION

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Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID reagent blank

FRACTION 08A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 09/09/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND, Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8	a, a, a-Trifluorotoluene	N\A% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
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NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

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Received: 09/01/88

RAS - Austin REPORT
NonReported Work

Work Order # 88-09-003

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

01B	:	SPR602
02B	:	SPR602
03B	:	SPR602
04B	:	SPR602
06B	:	SPR602
07B	:	SPR602

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-09-002

Received: 09/01/88 11/28/88 15:06:43

REPORT TO	Radian B1.1 Austin	PREPARED BY	Radian Analytical Services 8501 Mo-pac Bl. PO Box 201088 Austin, TX 78720-1088
ATTEN	Linda Bendele	ATTEN	
		PHONE	512-454-4797

CERTIFIED BY

CONTACT BENDELE

CLIENT PHILLIPS P SAMPLES 5

COMPANY Phillips Petroleum

FACILITY Odessa, TX

WORK ID Lee

TAKEN MF

TRANS UPS

TYPE

P.O. #

INV. # 12363

^Indicates duplicate analysis not within control limits.

Previously Reported on 10/06/88.

Footnotes and Comments

---

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	Lee MW-1
02	Lee MW-2
03	Lee MW-3
04	Lee MW-4
05	Lee MW-3 duplicate

2nd QTR - 9/88

TEST CODES and NAMES used on this report

AG E	Silver, ICPES
AS G	Arsenic, graphite AA
BA E	Barium, ICPES
CD E	Cadmium, ICPES
CL IC	Chloride, IC
CR E	Chromium, ICPES
DG3020	Digestion, method 3020
DG6010	Digestion, method 6010
FE E	Iron, ICPES
F IC	Fluoride, IC
HG C	Mercury, cold vapor
MHO	Specific conductance
MN E	Manganese, ICPES
NA E	Sodium, ICPES
NO3	Nitrate, colorimetric
PB G	Lead, graphite AA
PH	pH
PHEN	Total phenolics
SE G	Selenium, graphite AA
SO4 IC	Sulfate, IC
TOC	Total organic carbon
TOX	Total organic halides
TURB	Turbidity

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 Lee MW-1	<0.03	0.004*	0.12	<0.005	27
02 Lee MW-2	<0.03	0.010	0.57	<0.005	580
03 Lee MW-3	<0.03	0.336	0.07	0.008*	83
04 Lee MW-4	<0.03	0.156	0.41	<0.005	190

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 Lee MW-1	<0.03	09/06/88	09/16/88	0.04*	0.26*
02 Lee MW-2	<0.03	09/09/88	09/16/88	<0.04	1.4
03 Lee MW-3	<0.03	09/09/88	09/16/88	<0.040	0.86*
04 Lee MW-4	<0.03	09/09/88	09/12/88	1.7	0.79*
05 Lee MW-3 duplic	<0.03		09/12/88		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 Lee MW-1	514	0.19	16	1.7	0.004*

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002
Continued From Above

SAMPLE Sample Id		Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
		510				
		502				
		504				
	02	2240	1.0	120	0.14	0.004*
Lee MW-2		2210				
		2270				
		2230				
	03	833	0.04*	160	0.10	0.003*
Lee MW-3		807				
		812				
		834				
	04	1270	0.62	150	0.12	0.003*
Lee MW-4		1280				
		1250				

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002
Continued From Above

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
	1240				

SAMPLE Sample Id	Test: PH pH units	Test: PHEN mg/L as phenol	Test: SE G ug/ml	Test: SO4 IC mg/L as SO4	Test: TOC mg/L
01 Lee MW-1	7.22	<0.005	<0.004	35	14^
	7.21				34
	7.19				39
	7.21				42
02 Lee MW-2	6.85	<0.005	<0.004	20	25
	6.80				27
	6.80				33^
	6.78				30
03 Lee MW-3	7.60	0.016*	<0.004	42	2*
	7.55				3*

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002
Continued From Above

SAMPLE Sample Id		Test: PH pH units	Test: PHEN mg/L as phenol	Test: SE G ug/ml	Test: SO4 IC mg/L as SO4	Test: TOC mg/L
		7.66				4*
		7.61				4*
Lee MW-4	04	7.06	<0.005	<0.004	28	6
		7.01				7
		7.00				8
		7.02				8

SAMPLE Sample Id		Test: TOX mg/L
Lee MW-1	01	<0.01
		<0.01
		<0.01
		<0.01
Lee MW-2	02	0.06

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002
Continued From Above

SAMPLE Sample Id		Test: TOX mg/L
		0.05
		0.05
		0.06
	03	0.01*
Lee MW-3		0.01*
		0.02*
		0.01*
	04	0.01*
Lee MW-4		0.01*
		0.01*
		0.01*

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-002

SAMPLE ID Lee MW-1 FRACTION 01I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 08/30/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403

ANALYZED 09/14/88

UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00018

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 08/30/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A

ANALYZED 09/01/88

UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	22	1.0

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-002
Continued From Above

SAMPLE ID Lee MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 08/30/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-2 FRACTION 02I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 08/30/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403 ANALYZED 09/14/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00018

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-002

SAMPLE ID Lee MW-2 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 08/30/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A ANALYZED 09/01/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	12	1.0

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-3 FRACTION 03I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 08/30/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403 ANALYZED 09/14/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00018

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-002
Continued From Above

SAMPLE ID Lee MW-3 FRACTION 03I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 08/30/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-3 FRACTION 03A TEST CODE TURB NAME Turbidity
Date & Time Collected 08/30/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A ANALYZED 09/01/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	46	1.0

NOTES AND DEFINITIONS FOR THIS REPORT.
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* = less than 5 times the detection limit
N\A = not available

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-002

SAMPLE ID Lee MW-4
FRACTION 04I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 08/31/88 Category

VERIFIED RHH

ANALYST KCP
INSTRMT 403
ANALYZED 09/14/88
UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00018

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-4
FRACTION 04A TEST CODE TURB NAME Turbidity
Date & Time Collected 08/31/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A
ANALYZED 09/01/88
UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	12	1.0

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-002
Continued From Above

SAMPLE ID Lee MW-4

FRACTION 04A TEST CODE TURB NAME Turbidity
Date & Time Collected 08/31/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

RADIAN CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-09-004

Received: 09/01/88 10/21/88 15:03:25

REPORT TO: Radian, Bl. 1, Austin

ATTEN: Linda Bendele

CLIENT: PHILLIPS P SAMPLES: 4

COMPANY: Phillips Petroleum

FACILITY: Odessa, TX

WORK ID: Lee, radiochemistry

TAKEN: MF

TRANS: UPS

TYPE:

P.O. #:

INVOICE: under separate cover

PREPARED BY: Radian Analytical Services, 8501 Mo-pac Bl., PO Box 201088, Austin, TX 78720-1088

ATTEN:

PHONE: 512-454-4797

CERTIFIED BY: [signature]

CONTACT: BENDELE

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	Lee MW-1
02	Lee MW-2
03	Lee MW-3
04	Lee MW-4

TEST CODES and NAMES used on this report

ALPHA	Gross alpha radiation
BETA	Gross beta radiation
RA 226	Radium 226

2nd Qtr - 9/88

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-004

SAMPLE Sample Id		Test: ALPHA pCi/	Test: BETA pCi/	Test: RA 226 pCi/
Lee MW-1	01	39 (11) pCi/L	162 (20) pCi/L	1.6 (0.1) pCi/L
Lee MW-2	02	17 (3) pCi/L	19 (3) pCi/L	0.7 (0.1) pCi/L
Lee MW-3	03	5 (1) pCi/L	11 (2) pCi/L	0.6 (0.1) pCi/L
Lee MW-4	04	17 (3) pCi/L	19 (5) pCi/L	0.5 (0.1) pCi/L

Received: 09/01/88

Test Methodology

TEST CODE ALPHA NAME Gross alpha radiation

The value in parentheses is a + or - one sigma value. Results are thus expressed as: value (+ or - 1 sigma). One sigma = one standard deviation, 68% confidence level.

TEST CODE BETA NAME Gross beta radiation

The value in parentheses is a + or - one sigma value. Results are thus expressed as: value (+ or - 1 sigma). One sigma = one standard deviation, 68% confidence level.

TEST CODE RA 226 NAME Radium 226

The value in parentheses is a + or - one sigma value. Results are thus expressed as: value (+ or - one sigma). One sigma = one standard deviation, 68% confidence level.

Pesticides/Herbicides
2nd Qtr., Lee

RADIAN CORPORATION

Notes and Definitions

Data Flags:

TERMS USED IN THIS REPORT:
Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Note, the detection limit may vary from that specified by EPA by the concentration factor. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - The concentration or dilution factor by which the sample extract or digestate differs from that specified by a given EPA method. A sample prepared to the specifications of the method will have a factor of 1. A sample diluted 10 times to bring the analytes within the instrument calibration range will have a factor of 10. Conversely, a sample which is concentrated 10 times more than specified will have a factor of 0.1.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units -

ug/L	micrograms per liter (parts per billion);liquids/water
ug/Kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million);liquids/water
mg/Kg	milligrams per kilogram (parts per million);soils/solids
%	percent; usually used for percent recovery of QC standards
umhos	conductance unit; microohms/centimeter
ml/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit

Notes and Definitions

Data Flags:

- * The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.
- A This flag indicates that a spike is an analytical and/or post-digestion spike. These spikes have not been subjected to the extraction or digestion step.
- B This flag indicates that the analyte was detected in the reagent blank Since traces of the background contaminant will vary from sample to sample, the sample results are not corrected from the amount in the blank.
- C Most methods of gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. This flag indicates that the analyte has been confirmed on a second column.
- D This flag identifies analytes identified in analysis at a secondary dilution factor. In an analysis some compounds can exceed the calibration range of the instrument. Therefore two analyses are performed, one at the concentration of some of the analytes, and a second with the sample diluted so that higher levels fall into calibration range.
- E The reported value is estimated because of the presence of interference. The potential source of the interference is included in the report narrative.

RADIAN CORPORATION

Notes and Definitions

Data Flags:

G This flag identifies a GC/MS result whose concentration exceeds the calibration range for that specific analysis. Usually if one or more compounds have a response greater than full scale, the sample or extract is diluted and re-analyzed.

J Indicates an estimated value for GC/MS data. This flag is used either when estimating a concentration for tentatively identified compounds where a response factor of 1 is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit.

N/A A result or value is not available for this parameter, usually a detection limit.

NA This analyte was not analyzed.

NC Applies to RPD and spike recovery results. The relative percent differ ence (RPD) is not calculated when a result is less than five times the detection limit. A spike recovery is not calculated when the result is greater than four times the spike added concentration because the spike added concentration is considered insignificant.

ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.

RADIAN CORPORATION

Notes and Definitions

Data Flags:

NR This analyte was not requested by the client.

NS This analyte or surrogate was not added (spiked) to the sample for this analysis.

P Most methods of gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. This flag indicates that the analyte has been confirmed previously. This flag is applicable for samples from a regular sampling program.

Q This quality control standard is outside method or laboratory specified control limits. This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

S This flag indicates that a specific result from a metals analysis has been obtained using the Method of Standard Addition.

U Most methods of gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. This flag indicates that second column was not requested.

RADIAN CORPORATION

ANALYTICAL DATA SUMMARY

Phillips 66
Associate Laboratory Data for Radian Work Order: 8811001

Method: EPA 608 Pesticides   Matrix: water

Factor:	1.0	1.0	1.0	1.0	1.0
Results in:	ug/L	ug/L	ug/L	ug/L	ug/L
Sample ID:	Method Blank	Lee MW-1	Lee MW-2	Lee MW-3	Lee MW-4
Lindane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toxaphene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

For a detailed description of flags and technical terms in this report refer to the glossary.

RADIAN CORPORATION

ANALYTICAL DATA SUMMARY

Phillips 66
Associate Laboratory Data for Radian Work Order: 8811001

Method: EPA 8150 Herbicides

Matrix: water

Factor:	1.0	1.0	1.0	1.0	1.0
Results in:	ug/L	ug/L	ug/L	ug/L	ug/L
Sample ID:	Method Blank	Lee MW-1	Lee MW-2	Lee MW-3	Lee MW-4
2,4-D	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-TP (Silvex)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

For a detailed description of flags and technical terms in this report refer to the glossary.

~~Work Copy~~

Lee

PHILLIPS 66 NATURAL GAS COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY

ODESSA, TEXAS 79762
4001 PENBROOK

August 11, 1988

Notification of Discharge
[redacted] Gasoline Plant

CERTIFIED MAIL
RETURN RECEIPT NO. P-512 089 614

Mr. Dave Boyer
Environmental Bureau Chief
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Boyer:

In compliance with Section 1-203 of the Water Quality Control Commission regulations, this is to notify you of a discharge of hydrocarbon material to the uppermost aquifer at our Lee Gasoline Plant.

As you are aware, we recently completed installation of new groundwater monitoring well systems at our four southeastern New Mexico plants (Artesia, Eunice, Lee and Lusk). The new systems were installed as a result of a Compliance Order issued by the New Mexico Environmental Improvement Division. The first set of samples from the new wells were taken during the month of May. Analysis results were recently received by this office (copies attached).

You will note from the analyses that water in the No. 4 well at Lee Plant shows some evidence of hydrocarbon contamination. Hydrocarbon contamination was also detected in the original upgradient well located approximately 250 feet north of the No. 4 well. We have requested our consultants on this project (Geoscience Consultants, Ltd. of Albuquerque) provide you with a copy of their document entitled "Report on the Installation of a Ground-Water Monitoring System at Phillips 66 Natural Gas Company Lee Plant" for additional detailed information.

Phillips has contracted GCL to perform a contamination assessment of the Lee Plant site. GCL plans to conduct a soil gas vapor survey as the first step in this project. We would like to schedule a meeting with you and your staff to further discuss our strategies for remediation of this problem. Please contact Mike Ford of this office to schedule a meeting date.

Questions regarding this information should be directed to Mike Ford of this office at (915) 367-1316.

Very truly yours,

L. L. Frantz

L. L. Frantz
Manager, Permian Basin Region

LLF:MDF

Attachments

RADIAN CORPORATION

Page 1 RAS Perimeter REPORT Work Order # P8-05-035

Received: 05/12/88 06/13/88 16:14:44

REPORT TO: Mike Selke, Geoscience Consultants, Ltd., Albequerque, NM 87102

ATTEN: Mike Selke

CLIENT: GEOSCIENCE SAMPLES 14

COMPANY: Geoscience Consultants, Ltd.

FACILITY: 500 Copper NW, Albequerque, NM 87102

WORK ID: PHILLIPS

TAKEN: W.S. Dubuk

TRANS: Fed Ex (see file for #'s)

TYPE: Aqueous

P.O. #: 88-0190-700

INVOICE: under separate cover

PREPARED BY: Radian Analytical Services, Bldg. 900 Perimeter Park, Morrisville, NC 27560

ATTEN:

PHONE: 919-481-0212

CERTIFIED BY

CONTACT: M DAY

* = Matrix interference

SAMPLE IDENTIFICATION

01	8805121239 ARTESIA MW-1
02	8805121041 ARTESIA MW-2
03	8805111655 ARTESIA MW-3
04	8805111811 ARTESIA MW-4
05	8805110955 LUSK MW-1
06	8805110851 LUSK MW-2
07	8805110920 LUSK MW-3
08	8805110936 LUSK MW-4
09	8805121843 LEE MW-3
10	8805130902 LEE MW-2
11	8805130948 LEE MW-4
12	8805131420 LEE MW-1
13	Trip Blank
16	Method Blank

TEST CODES and NAMES used on this report

8080	Pesticides/PCBs.
EXT GC	Extraction for GC

1ST QTR - 5/88

RADIAN CORPORATION

RAS Perimeter REPORT Work Order # P8-05-03[illegible]

Results by Sample

'eceived: 05/12/88

'AMPLE ID 8805121843 FRACTION 09A TEST CODE 8080 NAME Pesticides/PCBs.

Date & Time Collected 05/12/88 Category ______

ORGANICS ANALYSIS DATA SHEET
PESTICIDES by METHOD 8080

VERIFIED HK

ANALYST BLACKLEY EXTRCTD 05/16/88 FILE # ______
INSTRMT GC1 INJECTD 06/05/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
319-84-6	alpha-BHC	ND	0.010
58-89-9	gamma-BHC (lindane)	ND	0.010
319-85-7	beta-BHC	ND	0.010
76-44-8	heptachlor	ND	0.010
319-86-8	delta-BHC	ND	0.010
309-00-02	aldrin	ND	0.010
1024-57-3	heptachlor epoxide	ND	0.010
959-98-8	endosulfan I	ND	0.010
72-55-9	4,4'-DDE	ND	0.010
60-57-1	dieldrin	ND	0.010
72-20-8	endrin	ND	0.010
72-54-8	4,4'-DDD	ND	0.010
33213-65-9	endosulfan II	ND	0.030
50-29-3	4,4'-DDT	ND	0.020
7421-93-4	endrin aldehyde	ND	0.020
1031-07-8	endosulfan sulphate	ND	0.050
57-74-9	chlordane	ND	0.050
8001-35-2	toxaphene	ND	0.50
12674-11-2	PCB-1016	NR	0.10
11104-28-2	PCB-1221	NR	0.20
11141-16-5	PCB-1232	NR	0.20
53469-21-9	PCB-1242	NR	0.10
12672-29-6	PCB-1248	NR	0.10
11097-69-1	PCB-1254	NR	0.20
11096-82-5	PCB-1260	NR	0.20

RADIAN CORPORATION

RAS Perimeter REPORT
Results by Sample

Work Order # P8-05-035
Continued From Above

Received: 05/12/88

SAMPLE ID 8805121843 FRACTION 09A TEST CODE 8080 NAME Pesticides/PCBs.
Date & Time Collected 05/12/88 Category

SURROGATE RECOVERY

COMPOUND	RECOVERY
dibutyl chlorendate	136 %
tetrachlorometaxylene	130 %

NOTES AND DEFINITIONS FOR THIS REPORT:
DET LIMIT = detection limit
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

RADIAN CORPORATION

RAS Perimeter REPORT Work Order # P8-05-035

Received: 05/12/88

Results by Sample

SAMPLE ID 8805130902 FRACTION 10A TEST CODE 8080 NAME Pesticides/PCBs.

Date & Time Collected 05/13/88 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES by METHOD 8080

VERIFIED HK

ANALYST BLACKLEY EXTRCTD 05/16/88 FILE #

INSTRMT GC1 INJECTD 06/05/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
319-84-6	alpha-BHC	.71	0.010
58-89-9	gamma-BHC (lindane)	ND	0.010
319-85-7	beta-BHC	ND	0.010
76-44-8	heptachlor	.49	0.010
319-86-8	delta-BHC	1.9	0.010
309-00-02	aldrin	ND	0.010
1024-57-3	heptachlor epoxide	ND	0.010
959-98-8	endosulfan I	ND	0.010
72-55-9	4,4'-DDE	ND	0.010
60-57-1	dieldrin	ND	0.010
72-20-8	endrin	ND	0.010
72-54-8	4,4'-DDD	ND	0.010
33213-65-9	endosulfan II	ND	0.030
50-29-3	4,4'-DDT	ND	0.020
7421-93-4	endrin aldehyde	ND	0.020
1031-07-8	endosulfan sulphate	ND	0.050
57-74-9	chlordane	ND	0.050
8001-35-2	toxaphene	ND	0.50
12674-11-2	PCB-1016	NR	0.10
11104-28-2	PCB-1221	NR	0.20
11141-16-5	PCB-1232	NR	0.20
53469-21-9	PCB-1242	NR	0.10
12672-29-6	PCB-1248	NR	0.10
11097-69-1	PCB-1254	NR	0.20
11096-82-5	PCB-1260	NR	0.20

RADIAN CORPORATION

RAS Perimeter REPORT
Results by Sample

Work Order # P8-05-035
Continued From Above

Received: 05/12/88

SAMPLE ID 8805130902 FRACTION 10A TEST CODE 8080 NAME Pesticides/PCBs.
Date & Time Collected 05/13/88 Category

SURROGATE RECOVERY

COMPOUND	RECOVERY
dibutyl chlorendate	135 %
tetrachlorometaxylene	* %

NOTES AND DEFINITIONS FOR THIS REPORT:
- DET LIMIT = detection limit
- ND = not detected at specified detection limit.
- NR = not required for analysis.
- S = compound peak saturated.
- J = estimated value less than 3 x minimum detection limit.

RADIAN CORPORATION

RAS Perimeter REPORT Results by Sample

Work Order # P8-05-03J

Received: 05/12/88

SAMPLE ID 8805130948 FRACTION 11A TEST CODE 8080 NAME Pesticides/PCBs.
Date & Time Collected 05/13/88 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES by METHOD 8080

VERIFIED HK

ANALYST BLACKLEY EXTRCTD 05/16/88 FILE #
INSTRMT GC1 INJECTD 06/05/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
319-84-6	alpha-BHC	ND	0.010
58-89-9	gamma-BHC (lindane)	ND	0.010
319-85-7	beta-BHC	.31	0.010
76-44-8	heptachlor	ND	0.010
319-86-8	delta-BHC	ND	0.010
309-00-02	aldrin	ND	0.010
1024-57-3	heptachlor epoxide	ND	0.010
959-98-8	endosulfan I	ND	0.010
72-55-9	4,4'-DDE	ND	0.010
60-57-1	dieldrin	ND	0.010
72-20-8	endrin	ND	0.010
72-54-8	4,4'-DDD	ND	0.010
33213-65-9	endosulfan II	ND	0.030
50-29-3	4,4'-DDT	ND	0.020
7421-93-4	endrin aldehyde	ND	0.020
1031-07-8	endosulfan sulphate	ND	0.050
57-74-9	chlordane	ND	0.050
8001-35-2	toxaphene	ND	0.50
12674-11-2	PCB-1016	NR	0.10
11104-28-2	PCB-1221	NR	0.20
11141-16-5	PCB-1232	NR	0.20
53469-21-9	PCB-1242	NR	0.10
12672-29-6	PCB-1248	NR	0.10
11097-69-1	PCB-1254	NR	0.20
11096-82-5	PCB-1260	NR	0.20

RADIAN CORPORATION

RAS Perimeter REPORT
Results by Sample

Work Order # P8-05-03J
Continued From Above

Received: 05/12/88

SAMPLE ID 8805130948

FRACTION 11A TEST CODE 8080 NAME Pesticides/PCBs.
Date & Time Collected 05/13/88 Category

SURROGATE RECOVERY

COMPOUND	RECOVERY
dibutyl chlorendate	115 %
tetrachlorometaxylene	* %

NOTES AND DEFINITIONS FOR THIS REPORT:
DET LIMIT = detection limit
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

RADIAN CORPORATION

RAS Perimeter REPORT Work Order # P8-05

Received: 05/12/88

Results by Sample

SAMPLE ID 8805131420 FRACTION 12A TEST CODE 8080 NAME Pesticides/PCBs.

Date & Time Collected 05/13/88 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES by METHOD 8080

VERIFIED HK

ANALYST BLACKLEY EXTRCTD 05/16/88 FILE #

INSTRMT GC1 INJECTD 06/05/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
319-84-6	alpha-BHC	ND	0.010
58-89-9	gamma-BHC (lindane)	.12	0.010
319-85-7	beta-BHC	ND	0.010
76-44-8	heptachlor	ND	0.010
319-86-8	delta-BHC	.37	0.010
309-00-02	aldrin	ND	0.010
1024-57-3	heptachlor epoxide	ND	0.010
959-98-8	endosulfan I	ND	0.010
72-55-9	4,4'-DDE	ND	0.010
60-57-1	dieldrin	ND	0.010
72-20-8	endrin	ND	0.010
72-54-8	4,4'-DDD	ND	0.010
33213-65-9	endosulfan II	ND	0.030
50-29-3	4,4'-DDT	ND	0.020
7421-93-4	endrin aldehyde	ND	0.020
1031-07-8	endosulfan sulphate	ND	0.050
57-74-9	chlordane	ND	0.050
8001-35-2	toxaphene	ND	0.50
12674-11-2	PCB-1016	NR	0.10
11104-28-2	PCB-1221	NR	0.20
11141-16-5	PCB-1232	NR	0.20
53469-21-9	PCB-1242	NR	0.10
12672-29-6	PCB-1248	NR	0.10
11097-69-1	PCB-1254	NR	0.20
11096-82-5	PCB-1260	NR	0.20

RADIAN CORPORATION

RAS Perimeter REPORT Results by Sample

Work Order # P8-05
Continued From Above

'eceived: 05/12/88

SAMPLE ID 8805131420 FRACTION 12A TEST CODE 8080 NAME Pesticides/PCBs.
Date & Time Collected 05/13/88 Category

SURROGATE RECOVERY

COMPOUND	RECOVERY
dibutyl chlorendate	143 %
tetrachlorometaxylene	137 %

IOTES AND DEFINITIONS FOR THIS REPORT:
DET LIMIT = detection limit
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

RADIAN CORPORATION

Page 1 RAS Perimeter REPORT Work Order # P8-05-036

Received: 05/12/88 06/14/88 14:02:48

REPORT TO: Mike Selke, Geoscience Consultants, Ltd, Albequerque, NM 87102

ATTEN: W.S. Dubuk

CLIENT: GEOSCIENCE SAMPLES 15

COMPANY: Geoscience Consultants, Ltd.

FACILITY: 500 Copper NW, Albequerque, NM 87102

WORK ID: Geosciences

TAKEN: W.S. Dubuk

TRANS: Fed Ex (see file for #'s)

TYPE: Aqueous

P.O. #: 88-0190-700

INVOICE: under separate cover

PREPARED BY: Radian Analytical Services, Bldg. 900 Perimeter Park, Morrisville, NC 27560

ATTEN:

PHONE: 919-481-0212

CERTIFIED BY: [signature]

CONTACT: M DAY

Previously Reported on 06/13/88.

SAMPLE IDENTIFICATION

01	8805121240	ARTESIA	MW-1
02	8805121042	ARTESIA	MW-2
03	8805111656	ARTESIA	MW-3
04	8805111812	ARTESIA	MW-4
05	8805110958	LUSK	MW-1
06	8805110852	LUSK	MW-2
07	8805110922	LUSK	MW-3
08	8805110938	LUSK	MW-4
09	8805121844	LEE	MW-3
10	8805130903	LEE	MW-2
11	8805130949	LEE	MW-4
12	8805131420	LEE	MW-1
13	Method Blank #2		
15	Method Blank #1		
16	Trip Blank		

TEST CODES and NAMES used on this report

509B	GC of Herbicides
EXT GC	Extraction for GC

1ST QTR-5/88

Page 21 **RADIAN CORPORATION** RAS Perimeter REPORT Work Order # P8-05[illegible]36
Received: 05/12/88 Results by Sample

SAMPLE ID 8805121844 FRACTION 09A TEST CODE 509B NAME GC of Herbicides
Date & Time Collected 05/12/88 Category ____

ORGANICS ANALYSIS DATA SHEET
HERBICIDES

ANALYST BLACKLEY EXTRCTD 05/18/88 FILE # ____ VERIFIED HK
INSTRMT GC1 INJECTD 05/26/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET. LIMIT
94-75-7	2,4-D	1.1	0.50 ?
93-72-1	2,4,5-TP (Silvex)	ND	0.10
93-76-5	2,4,5-T	1.0	0.10 ?

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

RADIAN CORPORATION

RAS Perimeter REPORT
Results by Sample

Work Order # P8-05-[illegible]36

Received: 05/12/88

SAMPLE ID 8805130903

FRACTION 10A TEST CODE 509B NAME GC of Herbicides
Date & Time Collected 05/13/88 Category

ORGANICS ANALYSIS DATA SHEET
HERBICIDES

ANALYST BLACKLEY
INSTRMT GC1

EXTRCTD 05/20/88
INJECTD 05/26/88

FILE #

VERIFIED HK

UNITS ug/L

CAS #	COMPOUND	RESULT	DET. LIMIT
94-75-7	2,4-D	7.7	0.50 ?
93-72-1	2,4,5-TP (Silvex)	0.67	0.10 ?
93-76-5	2,4,5-T	ND	0.10

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

Page 25 **RADIAN CORPORATION** RAS Perimeter REPORT Work Order # P8-05[illegible]6

Received: 05/12/88 Results by Sample

SAMPLE ID 8805130949 FRACTION 11A TEST CODE 509B NAME GC of Herbicides

Date & Time Collected 05/13/88 Category

ORGANICS ANALYSIS DATA SHEET
HERBICIDES

ANALYST BLACKLEY EXTRCTD 05/20/88 FILE # VERIFIED HK
INSTRMT GC1 INJECTD 05/26/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET. LIMIT
94-75-7	2,4-D	ND	0.50
93-72-1	2,4,5-TP (Silvex)	ND	0.10
93-76-5	2,4,5-T	0.27 J	0.10

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

RADIAN CORPORATION

RAS Perimeter REPORT Work Order # P8-05-·36

Received: 05/12/88

Results by Sample

SAMPLE ID 8805131420

FRACTION 12A TEST CODE 509B NAME GC of Herbicides

Date & Time Collected 05/13/88 Category

ORGANICS ANALYSIS DATA SHEET
HERBICIDES

ANALYST BLACKLEY
INSTRMT GCI

EXTRCTD 05/20/88
INJECTD 05/26/88

FILE #

VERIFIED HK

UNITS ug/L

CAS #	COMPOUND	RESULT	DET. LIMIT
94-75-7	2,4-D	ND	0.50
93-72-1	2,4,5-TP (Silvex)	ND	0.10
93-76-5	2,4,5-T	ND	0.10

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-05-066

Received: 05/14/88 06/29/88 13:27:11

REPORT TO	Geoscience Consultants, Ltd. 500 Copper NW Suite 200 Albuquerque, NM 87102	PREPARED BY	Radian Analytical Services 8501 Mo-pac Bl. PO Box 201088 Austin, TX 78720-1088
ATTEN	Mike Selke	ATTEN	
		PHONE	512-454-4797
CLIENT	GEOSCIENCE SAMPLES 4		
COMPANY	Geoscience Consultants, Ltd.		
FACILITY			
WORK ID	Phillips		
TAKEN	WSD		
TRANS	Fed Ex		
TYPE			
P.O. #	88-0190-700		
INV. #	11833		

CERTIFIED BY

CONTACT GIBSON

Unknown compounds present in Lee #1 and Lee #4 in EPA602 analyses.

Duplicate of report of 06/27/88.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	Lee #1
02	Lee #4
03	trip blank
04	reagent blank

1st QTR - 5/88

TEST CODES and NAMES used on this report

AG E	Silver, ICPES	NA E	Sodium, ICPES
ALPHA	Gross alpha radiation	NO3	Nitrate, colorimetric
AS G	Arsenic, graphite AA	PB G	Lead, graphite AA
BA E	Barium, ICPES	PH	pH
BETA	Gross beta radiation	PHEN	Total phenolics
CD E	Cadmium, ICPES	SE G	Selenium, graphite AA
CL IC	Chloride, IC	SO4 IC	Sulfate, IC
COLI T	Total coliform	TOC	Total organic carbon
CR E	Chromium, ICPES	TOX	Total organic halides
DG3020	Digestion, method 3020	TURB	Turbidity
DG6010	Digestion, method 6010	XYLENE	Xylenes, EPA 602
EPA602	EPA method 602		
FE E	Iron, ICPES		
F IC	Fluoride, IC		
HG C	Mercury, cold vapor		
MHO	Specific conductance		
MN E	Manganese, ICPES		

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results By Test

Work Order # 88-[illegible]-066

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee #1	<0.003	<4.6 pCi/L	0.004	0.22	<9.6 pCi/L
02 Lee #4	<0.003	<1.9 pCi/L	0.130	0.38	7.1 (2.0) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: COLI T colonies/100 mL	Test: CR E ug/ml	Test: DG3020 date complete
01 Lee #1	0.007*	28	>24,000	0.004*	05/16/88
02 Lee #4	<0.003	180	2100	0.028	05/16/88

SAMPLE Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
01 Lee #1	05/23/88	0.037	0.68*	470	0.12
				470	
				470	
				470	
02 Lee #4	05/23/88	1.3	1.0*	1230	0.57
				1250	

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results By Test

Work Order # 88-VJ-066
Continued From Above

SAMPLE Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
				1240	
				1240	

SAMPLE Sample Id	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml	Test: PH pH units	Test: PHEN mg/L
01 Lee #1	16	2.1	<0.002	7.55	<0.005
				7.53	
				7.50	
				7.55	
02 Lee #4	161	<0.1	0.010	7.52	<0.005
				7.50	
				7.43	
				7.43	

CORPORATION

Received: 05/14/88

RAS - Austin REPORT

Results By Test

Work Order # 88-VJ-066

SAMPLE Sample Id	Test: SE G ug/ml	Test: SO4 IC mg/L	Test: TOC mg/L	Test: TOX mg/L
01 Lee #1	<0.003	35	<1	<0.02
			4*@	<0.02
			2*	<0.02
			<1@	0.02*
02 Lee #4	<0.003	34	<1	0.05*
			2*	<0.02
			2*	0.03*
			2*	<0.02

RAS - Austin REPORT
Results by Sample

Work Order # 88-[illegible]-066

Received: 05/14/88

SAMPLE ID Lee #1

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	220	2
108-88-3	Toluene	0.8*	0.2
100-41-4	Ethylbenzene	8.2	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	110%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un[illegible]s otherwise noted.

RAS - Austin REPORT
Results by Sample

Work Order # 88-05-066
Continued From Above

SAMPLE ID Lee #1

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-VJ-066

SAMPLE ID Lee #1

FRACTION 01I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 05/13/88 Category

VERIFIED DMC

ANALYST KCP
INSTRMT 403

ANALYZED 05/23/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00012

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #1

FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A

ANALYZED 05/14/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	8.8	1.0

SAMPLE ID Lee #1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	2.2	0.2
109-38-3	m-Xylene-A	0.9*	0.2
95-47-6	o-Xylene	1.1	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 110% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un is otherwise noted.

SAMPLE ID Lee #1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

Q = daily EPA standard recovery outside
95% confidence interval.
Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

Page 10 RAS - Austin REPORT Work Order # 88-[illegible]-066
Received: 05/14/88 Results by Sample

SAMPLE ID Lee #4 FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTED 05/17/88 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	6200	20
108-88-3	Toluene	50	1
100-41-4	Ethylbenzene	140	2
108-90-7	Chlorobenzene-A	ND	2
106-46-7	1,4-Dichlorobenzene	ND	2
541-73-1	1,3-Dichlorobenzene	ND	2
95-50-1	1,2-Dichlorobenzene	ND	2

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	115% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un[illegible]s otherwise noted.

SAMPLE ID Lee #4 FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

Received: 05/14/88
Results by Sample

SAMPLE ID Lee #4 FRACTION 02I TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 05/13/88 Category

VERIFIED DMC

ANALYST KCP
INSTRMT 403 ANALYZED 05/23/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00012

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A ANALYZED 05/14/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	18	1.0

SAMPLE ID Lee #4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	23	1
108-38-3	m-Xylene-A	31	1
95-47-6	o-Xylene	39	0.5

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 115% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un s otherwise noted.

SAMPLE ID Lee #4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

Q = daily EPA standard recovery outside
95% confidence interval.
Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-UJ-066

SAMPLE ID trip blank

FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	0.6*	0.2
108-88-3	Toluene	ND	0.2
100-41-4	Ethylbenzene	ND	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 102% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed un' s otherwise noted.

SAMPLE ID trip blank FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-05-066

SAMPLE ID trip blank

FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTD 05/17/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND	0.2
108-38-3	m-Xylene-A	ND	0.2
95-47-6	o-Xylene	ND	0.1

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	102% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-[illegible]-066

SAMPLE ID reagent blank

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	ND	0.2
100-41-4	Ethylbenzene	ND	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	N\A%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un[illegible]s otherwise noted.

SAMPLE ID reagent blank FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-[illegible]-066

SAMPLE ID reagent blank

FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 05/17/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND	0.2
108-38-3	m-Xylene-A	ND	0.2
95-47-6	o-Xylene	ND	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene N\A% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

01N	:	SPARE	01K	:	SPR602
02N	:	SPARE	02K	:	SPR602
03B	:	SPR602			

CORPORATION

Page 1 RAS - Austin REPORT Work Order # 88-vJ-067

Received: 05/14/88 06/30/88 12:48:30

REPORT TO: Geoscience Consultants, Ltd.
500 Copper NW
Suite 200
Albuquerque, NM 87102
ATTEN: Mike Selke

PREPARED BY: Radian Analytical Services
8501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088
ATTEN:
PHONE: 512-454-4797

CERTIFIED BY

CONTACT GIBSON

CLIENT: GEOSCIENCE SAMPLES 6
COMPANY: Geoscience Consultants, Ltd.
FACILITY:

WORK ID: Phillips
TAKEN: WSD
TRANS: Fed Ex
TYPE:
P.O. #: 88-0190-700
INVOICE: under separate cover

Unknown compounds present in Lee #2, Lee #3, and Lee #3 dup in EPA602 analyses.

Previously Reported on 06/29/88.

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

@ Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01 Lee #2
02 Lee #3
03 Lee #2 dup
04 Lee #3 dup
05 trip blank
06 reagent blank

1ST QTR - 5/88

TEST CODES and NAMES used on this report

AG E	Silver, ICPES	NA E	Sodium, ICPES
ALPHA	Gross alpha radiation	NO3	Nitrate, colorimetric
AS G	Arsenic, graphite AA	PB G	Lead, graphite AA
BA E	Barium, ICPES	PH	pH
BETA	Gross beta radiation	PHEN	Total phenolics
CD E	Cadmium, ICPES	SE G	Selenium, graphite AA
CL IC	Chloride, IC	SO4 IC	Sulfate, IC
COLI T	Total coliform	TOC	Total organic carbon
CR E	Chromium, ICPES	TOX	Total organic halides
DG3020	Digestion, method 3020	TURB	Turbidity
DG6010	Digestion, method 6010	XYLENE	Xylenes, EPA 602
EPA602	EPA method 602		
FE E	Iron, ICPES		
F IC	Fluoride, IC		
HG C	Mercury, cold vapor		
MHO	Specific conductance		
MN E	Manganese, ICPES		

CORPORATION

RAS - Austin REPORT Work Order # 88-vv-067

Received: 05/14/88

Results By Test

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee #2	<0.003	3.1 (1.1) pCi/L	0.013	0.26	8.8 (2.2) pCi/L
02 Lee #3	<0.003	<1.4 pCi/L	0.130	0.060	3.3 (1.3) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: COLI T colonies/100 mL	Test: CR E ug/ml	Test: DG3020 date complete
01 Lee #2	<0.003	190	930	0.005*	05/16/88
02 Lee #3	<0.003	60	240	0.012*	05/16/88
04 Lee #3 dup				0.007*	

SAMPLE Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
01 Lee #2	05/23/88	0.1	0.80*	1170	0.4
				1170	
				1180	
				1180	
02 Lee #3	05/23/88	0.046	1.7*	810	0.017

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results By Test

Work Order # 88-[illegible]-067
Continued From Above

SAMPLE Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
				810	
				810	
				810	
04 Lee #3 dup	05/16/88				

SAMPLE Sample Id	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml	Test: PH pH units	Test: PHEN mg/L
01 Lee #2	64	0.37	0.002*	7.26	<0.005
				7.19	
				7.18	
				7.19	
02 Lee #3	170	0.2	0.004*	8.13	<0.005
				8.08	
				8.06	

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results By Test

Work Order # 88-vJ-067
Continued From Above

SAMPLE Sample Id	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml	Test: PH pH units	Test: PHEN mg/L
				8.05	

SAMPLE Sample Id	Test: SE G ug/ml	Test: SO4 IC mg/L	Test: TOC mg/L	Test: TOX mg/L
01 Lee #2	<0.003	40	60R	0.02*
			65	0.02*
			60	0.03*
			70	<0.02
02 Lee #3	<0.003	46	160	<0.02
			115	<0.02
			120	0.03*
			135	<0.02

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-vJ-067

SAMPLE ID Lee #2

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.6*	0.2
100-41-4	Ethylbenzene	0.4*	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 113% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un s otherwise noted.

SAMPLE ID Lee #2 FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

SAMPLE ID Lee #2 FRACTION 011 TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 05/13/88 Category

VERIFIED DMC

ANALYST KCP
INSTRMT 403 ANALYZED 05/23/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00012

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #2 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A ANALYZED 05/14/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	2.3	1.0

SAMPLE ID Lee #2 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #2 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	0.3*	0.2
109-38-3	m-Xylene-A	0.4*	0.2
95-47-6	o-Xylene	0.4*	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 113% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un' 's otherwise noted.

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-ᴗᴊ-067
Continued From Above

SAMPLE ID Lee #2

FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

CORPORATION

RAS - Austin REPORT Results by Sample

Work Order # 88-[illegible]-067

Received: 05/14/88

SAMPLE ID Lee #3

FRACTION 02J TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW

INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.8*	0.2
100-41-4	Ethylbenzene	0.6*	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

CAS#	COMPOUND	RESULT
98-08-8	a,a,a-Trifluorotoluene	108% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un[illegible]ss otherwise noted.

SAMPLE ID Lee #3 FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/12/88 Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-ЏЈ-067

SAMPLE ID Lee #3 FRACTION 021 TEST CODE HG C NAME Mercury, cold vapor
Date & Time Collected 05/12/88 Category

VERIFIED DMC

ANALYST KCP
INSTRMT 403 ANALYZED 05/23/88 UNITS ug/ml

ANALYTE	RESULT	DET LIMIT
Mercury	ND	0.00012

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #3 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/12/88 Category

VERIFIED LM

ANALYST MJS
INSTRMT 2100A ANALYZED 05/14/88 UNITS NTU

ANALYTE	RESULT	DET LIMIT
Turbidity	5.2	1.0

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-[illegible]-067
Continued From Above

SAMPLE ID Lee #3

FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/12/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #3

FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D
INJECTD 05/17/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	0.7*	0.2
108-38-3	m-Xylene-A	1.00	0.2
95-47-6	o-Xylene	1.4	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 108% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un[illegible]s otherwise noted.

SAMPLE ID Lee #3 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/12/88 Category

Q = daily EPA standard recovery outside
95% confidence interval.
Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-[illegible]-067

SAMPLE ID Lee #2 dup

FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.2*	0.2
100-41-4	Ethylbenzene	ND	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	103% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un[illegible]ss otherwise noted.

SAMPLE ID Lee #2 dup FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

CORPORATION

Page 17 RAS - Austin REPORT Work Order # 88-VJ-067
Received: 05/14/88 Results by Sample

SAMPLE ID Lee #2 dup FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND	0.2
108-38-3	m-Xylene-A	ND	0.2
95-47-6	o-Xylene	ND	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 103% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RAS - Austin REPORT
Results by Sample

Work Order # 88-vJ-067

Received: 05/14/88

SAMPLE ID Lee #3 dup

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D
INJECTED 05/17/88
FILE #
UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.6*	0.2
100-41-4	Ethylbenzene	0.3*	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	107% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un' ~s otherwise noted.

SAMPLE ID Lee #3 dup FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/12/88 Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-0J-067

SAMPLE ID Lee #3 dup

FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTD 05/17/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	0.7*	0.2
108-38-3	m-Xylene-A	0.6*	0.2
95-47-6	o-Xylene	0.8*	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 107% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

CORPORATION

RAS - Austin REPORT Work Order # 88-05-067

Received: 05/14/88 Results by Sample

SAMPLE ID trip blank FRACTION 05A TEST CODE EPA602 NAME EPA method 602

Date & Time Collected not specified Category

VERIFIED CL

ANALYST RW FILE #

INSTRMT D INJECTED 05/17/88 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	ND	0.2
100-41-4	Ethylbenzene	ND	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	94% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
# = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un[illegible]ss otherwise noted.

SAMPLE ID trip blank FRACTION 05A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-05-067

SAMPLE ID trip blank

FRACTION 05A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTD 05/17/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND	0.2
108-38-3	m-Xylene-A	ND	0.2
95-47-6	o-Xylene	ND	0.1

SURROGATES

CAS #	COMPOUND	RESULT
98-08-8	a,a,a-Trifluorotoluene	94% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-uJ-067

SAMPLE ID reagent blank

FRACTION 06A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	ND	0.2
100-41-4	Ethylbenzene	ND	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

CAS#	COMPOUND	RESULT	
98-08-8	a,a,a-Trifluorotoluene	N\A%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un is otherwise noted.

SAMPLE ID reagent blank FRACTION 06A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected not specified Category

A-Chlorobenzene and m-xylene co-elute.
Quantitated as chlorobenzene unless
otherwise noted.

CORPORATION

Page 26 | RAS - Austin REPORT | Work Order # 88-UJ-067
Received: 05/14/88 | Results by Sample

SAMPLE ID reagent blank

FRACTION 06A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected not specified Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 05/17/88

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND	0.2
108-38-3	m-Xylene-A	ND	0.2
95-47-6	o-Xylene	ND	0.1

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	N\A% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

CORPORATION

RAS - Austin REPORT

NonReported Work

Work Order # 88-05-067

Received: 05/14/88

FRACTION AND TEST CODES FOR WORK NOT REPORTED ELSEWHERE

01N	!	SPARE	01K	!	SPR602
02N	!	SPARE	02K	!	SPR602
03B	!	SPR602			
04B	!	SPR602			
05B	!	SPR602			

RADIAN CORPORATION

Page 5 RAS - Austin REPORT Work Order # 89-02-026
Received: 02/02/89 Results by Sample

SAMPLE ID MW-1 FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM FILE #
INSTRMT G INJECTED 02/03/89 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	7.5	0.20
108-88-3	Toluene	0.6*	0.20
100-41-4	Ethylbenzene	0.7*	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	105% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

4th Quarter 2/89

RADIAN CORPORATION

 RAS - Austin REPORT Work Order # 89-02-026
Received: 02/02/89 Results by Sample Continued From Above

SAMPLE ID MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM FILE #
INSTRMT G INJECTD 02/03/89 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	0.5*	0.20
108-38-3	m-Xylene	0.9*	0.20
95-47-6	o-Xylene	0.7	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 105% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results By Test

Work Order # 89-02-026

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 MW-1	<0.03	0.057	0.22	<0.005	29
02 MW-2	<0.03	0.023	0.57	<0.005	450

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 MW-1	<0.03	02/06/89	02/06/89	0.10*	0.5*
02 MW-2	<0.03	02/06/89	02/06/89	<0.04	0.5*
03 MW-2 duplicate	<0.03		02/06/89		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 MW-1	600 620 600 590	0.061	23	1.6	<0.002
02 MW-2	2000	0.90	96	0.21	<0.002

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT Work Order # 88-11-014

Results by Sample

SAMPLE ID Lee MW-1 FRACTION 01J TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL FILE # ______

INSTRMT D INJECTED 11/07/88 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	98% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

3rd Qtr 11/88

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014
Continued From Above

SAMPLE ID Lee MW-1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D
INJECTD 11/07/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 98% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results By Test

Work Order # 88-11-014

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee MW-1	<0.03	6 (1) pCi/L	<0.002	0.19	13 (2) pCi/L
02 Lee MW-2	<0.03	2.6 (0.9) pCi/L	0.007*	0.57	14 (2) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete
01 Lee MW-1	<0.005	27	<0.03	11/14/88	11/11/88
02 Lee MW-2	<0.005	480	<0.03	11/14/88	11/11/88

SAMPLE Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
01 Lee MW-1	0.14*	0.4*	540	0.12	19
			540		
			550		
			540		
02 Lee MW-2	<0.04	1.1*	2300	0.93	84
			2300		

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 88-09-003

Received: 09/01/88 Results by Sample

SAMPLE ID Lee MW-1 FRACTION 01A TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 08/30/88 Category

VERIFIED CL

ANALYST CL FILE #

INSTRMT D INJECTED 09/09/88 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	10	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	97% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

2nd Quarter - 9/88

RADIAN CORPORATION

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

Received: 09/01/88

SAMPLE ID Lee MW-1

FRACTION 01A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/30/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D
INJECTD 09/09/88
FILE # ______
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND, Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 97% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 Lee MW-1	<0.03	0.004*	0.12	<0.005	27
02 Lee MW-2	<0.03	0.010	0.57	<0.005	580
03 Lee MW-3	<0.03	0.336	0.07	0.008*	83
04 Lee MW-4	<0.03	0.156	0.41	<0.005	190

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 Lee MW-1	<0.03	09/06/88	09/16/88	0.04*	0.26*
02 Lee MW-2	<0.03	09/09/88	09/16/88	<0.04	1.4
03 Lee MW-3	<0.03	09/09/88	09/16/88	<0.040	0.86*
04 Lee MW-4	<0.03	09/09/88	09/12/88	1.7	0.79*
05 Lee MW-3 duplic	<0.03		09/12/88		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 Lee MW-1	514	0.19	16	1.7	0.004*

CORPORATION

Received: 05/14/88

RAS - Austin REPORT

Results by Sample

Work Order # 88-vJ-066

SAMPLE ID Lee #1

FRACTION 01J TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL

INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	220	2
108-88-3	Toluene	0.8*	0.2
100-41-4	Ethylbenzene	8.2	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	110% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT

ND = not detected at detection limit

NA = not analyzed

* = less than 5 times the detection limit

N\A = not available

Second column confirmation NOT performed un[illegible]s otherwise noted.

1st Quarter 5/88

SAMPLE ID Lee #1 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #1 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	2.2	0.2
108-38-3	m-Xylene-A	0.9*	0.2
95-47-6	o-Xylene	1.1	0.1

SURROGATES
98-08-8 a,a,a-Trifluorotoluene 110% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un is otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT Work Order # 88-0?-066

Results By Test

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee #1	<0.003	<4.6 pCi/L	0.004	0.22	<9.6 pCi/L
02 Lee #4	<0.003	<1.9 pCi/L	0.130	0.38	7.1 (2.0) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: COLI T colonies/100 mL	Test: CR E ug/ml	Test: DG3020 date complete
01 Lee #1	0.007*	28	>24,000	0.004*	05/16/88
02 Lee #4	<0.003	180	2100	0.028	05/16/88

SAMPLE Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
01 Lee #1	05/23/88	0.037	0.68*	470	0.12
				470	
				470	
				470	
02 Lee #4	05/23/88	1.3	1.0*	1230	0.57
				1250	

1st Quarter 5/88

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-2

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89 FILE # UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	2.4	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	112% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

4th Quarter 2/89

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-2 duplicate

FRACTION 03B TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	2.4	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	111% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026
Continued From Above

SAMPLE ID MW-2 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-2 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM FILE #
INSTRMT G INJECTD 02/03/89 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	0.6*	0.20
95-47-6	o-Xylene	1.5	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 112% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otheruise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-026

SAMPLE ID MW-2 duplicate FRACTION 03B TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G INJECTD 02/03/89 FILE # UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	0.5*	0.20
95-47-6	o-Xylene	1.5	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	111% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.
- Q = daily EPA standard recovery outside 95% confidence interval.
- Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results By Test

Work Order # 89-02-026

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 MW-1	<0.03	0.057	0.22	<0.005	29
02 MW-2	<0.03	0.023	0.57	<0.005	450

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 MW-1	<0.03	02/06/89	02/06/89	0.10*	0.5*
02 MW-2	<0.03	02/06/89	02/06/89	<0.04	0.5*
03 MW-2 duplicate	<0.03		02/06/89		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 MW-1	600	0.061	23	1.6	<0.002
	620				
	600				
	590				
02 MW-2	2000	0.90	96	0.21	<0.002

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT Work Order # 88-11-014

Results by Sample

SAMPLE ID Lee MW-2 FRACTION 02J TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL FILE # ______

INSTRMT D INJECTED 11/07/88 UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	1.5	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	110% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

[illegible] 11/88

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID Lee MW-2 dup

FRACTION 03A TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL

INSTRMT D

INJECTED 11/07/88

FILE # ______

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	1.6	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 113% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

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NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014
Continued From Above

SAMPLE ID Lee MW-2 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-2 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D
INJECTD 11/07/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 110% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-014

SAMPLE ID Lee MW-2 dup

FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTD 11/07/88

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 113% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results By Test

Work Order # 88-11-014

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee MW-1	<0.03	6 (1) pCi/L	<0.002	0.19	13 (2) pCi/L
02 Lee MW-2	<0.03	2.6 (0.9) pCi/L	0.007*	0.57	14 (2) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete
01 Lee MW-1	<0.005	27	<0.03	11/14/88	11/11/88
02 Lee MW-2	<0.005	480	<0.03	11/14/88	11/11/88

SAMPLE Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
01 Lee MW-1	0.14*	0.4*	540 540 550 540	0.12	19
02 Lee MW-2	<0.04	1.1*	2300 2300	0.93	84

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-2

FRACTION 02A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/30/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D

FILE # ______

INJECTED 09/09/88

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	137**% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

2nd Quarter 9/88

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT Work Order # 88-09-003

Results by Sample

SAMPLE ID Lee MW-2 FRACTION 02A TEST CODE XYLENE NAME Xylenes, EPA 602

Date & Time Collected 08/30/88 Category ______

VERIFIED CL

ANALYST CL FILE # ______

INSTRMT D INJECTD 09/09/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND, Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 137**% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT Work Order # 88-09-002

Results By Test

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 Lee MW-1	<0.03	0.004*	0.12	<0.005	27
02 Lee MW-2	<0.03	0.010	0.57	<0.005	580
03 Lee MW-3	<0.03	0.336	0.07	0.008*	83
04 Lee MW-4	<0.03	0.156	0.41	<0.005	190

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 Lee MW-1	<0.03	09/06/88	09/16/88	0.04*	0.26*
02 Lee MW-2	<0.03	09/09/88	09/16/88	<0.04	1.4
03 Lee MW-3	<0.03	09/09/88	09/16/88	<0.040	0.86*
04 Lee MW-4	<0.03	09/09/88	09/12/88	1.7	0.79*
05 Lee MW-3 duplic	<0.03		09/12/88		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 Lee MW-1	514	0.19	16	1.7	0.004*

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-UJ-067

SAMPLE ID Lee #2

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.6*	0.2
100-41-4	Ethylbenzene	0.4*	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	113% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un [illegible]s otherwise noted.

1st Quarter 5/88

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-vJ-067

SAMPLE ID Lee #2 dup

FRACTION 03A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.2*	0.2
100-41-4	Ethylbenzene	ND	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	103%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed un ss otherwise noted.

SAMPLE ID Lee #2 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #2 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	0.3*	0.2
109-38-3	m-Xylene-A	0.4*	0.2
95-47-6	o-Xylene	0.4*	0.1

SURROGATES
98-08-8 a,a,a-Trifluorotoluene 113% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un' ss otherwise noted.

RAS - Austin REPORT
Results by Sample

Work Order # 88-vJ-067

Received: 05/14/88

SAMPLE ID Lee #2 dup

FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D
INJECTD 05/17/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND	0.2
108-38-3	m-Xylene-A	ND	0.2
95-47-6	o-Xylene	ND	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 103% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT Work Order # 88-VJ-067

Results By Test

SAMPLE / Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee #2	<0.003	3.1 (1.1) pCi/L	0.013	0.26	8.8 (2.2) pCi/L
02 Lee #3	<0.003	<1.4 pCi/L	0.130	0.060	3.3 (1.3) pCi/L

SAMPLE / Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: COLI T colonies/100 mL	Test: CR E ug/ml	Test: DG3020 date complete
01 Lee #2	<0.003	190	930	0.005*	05/16/88
02 Lee #3	<0.003	60	240	0.012*	05/16/88
04 Lee #3 dup				0.007*	

SAMPLE / Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
01 Lee #2	05/23/88	0.1	0.80*	1170	0.4
				1170	
				1180	
				1180	
02 Lee #3	05/23/88	0.046	1.7*	810	0.017

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027

SAMPLE ID MW-3

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89 FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	2.9	0.20
108-88-3	Toluene	0.4*	0.20
100-41-4	Ethylbenzene	1.9	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	123% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
- DET LIMIT = DETECTION LIMIT
- ND = not detected at detection limit
- NA = not analyzed
- * = less than 5 times the detection limit
- N\A = not available
- Second column confirmation NOT performed unless otherwise noted.

4th Quarter 2/89

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID MW-3 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID MW-3 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G
INJECTD 02/03/89
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	0.6*	0.20
95-47-6	o-Xylene	1.4	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	123% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
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* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 02/02/89 RAS - Austin REPORT Work Order # 89-02-027

Results By Test

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 MW-3	<0.03	0.24	0.14	<0.005	110
02 MW-4	<0.03	0.14	0.55	<0.005	240

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 MW-3	<0.03	02/06/89	02/06/89	0.073*	1.0*
02 MW-4	<0.03	02/06/89	02/06/89	2.6	1.2

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 MW-3	1100	0.061	240	0.31	0.002*
	1100				
	1100				
	1100				
02 MW-4	1400	1.1	140	0.22	0.002*
	1400				

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015

SAMPLE ID Lee MW-3

FRACTION 01J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category ______

VERIFIED CL

ANALYST CL
INSTRMT D
INJECTED 11/07/88
FILE # ______
UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	5.5	0.20
108-88-3	Toluene	1.0	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	99%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
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N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

3rd Quarter - 11/88

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015
Continued From Above

SAMPLE ID Lee MW-3 FRACTION 01A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-3 FRACTION 01J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D
INJECTD 11/07/88
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	0.20
108-38-3	m-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	99%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results By Test

Work Order # 88-11-015

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee MW-3	<0.03	3.5 (0.8) pCi/L	0.31	0.072	5 (1) pCi/L
02 Lee MW-4	<0.03	4 (1) pCi/L	0.14	0.50	8 (2) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete
01 Lee MW-3	<0.005	180	<0.03	11/14/88	11/11/88
02 Lee MW-4	<0.005	28	<0.03	11/14/88	11/11/88
03 Lee MW-4 dup			<0.03		11/11/88

SAMPLE Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
01 Lee MW-3	0.10*	0.6*	1300	0.024*	130
			690		
			680		
			700		
02 Lee MW-4	2.2	0.5*	730	0.79	130

RADIAN CORPORATION

RAS - Austin REPORT

Results by Sample

Work Order # 88-09-003

Received: 09/01/88

SAMPLE ID Lee MW-3

FRACTION 03A TEST CODE EPA602 NAME EPA method 602

Date & Time Collected 08/30/88 Category

VERIFIED CL

ANALYST BM

INSTRMT D

INJECTED 09/09/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	0.3*	0.20
108-88-3	Toluene	ND	0.20
100-41-4	Ethylbenzene	ND	0.30
108-90-7	Chlorobenzene-A	ND	0.30
106-46-7	1,4-Dichlorobenzene	ND	0.30
541-73-1	1,3-Dichlorobenzene	ND	0.40
95-50-1	1,2-Dichlorobenzene	ND	0.40

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	98% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
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N\A = not available
Second column confirmation NOT performed unless otherwise noted.

2nd Qtr 9/88

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-3

FRACTION 03A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/30/88 Category

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTD 09/09/88

FILE #

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND,Q	0.20
108-38-3	m-Xylene-A	ND	0.20
95-47-6	o-Xylene	ND	0.10

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	98% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

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ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 Lee MW-1	<0.03	0.004*	0.12	<0.005	27
02 Lee MW-2	<0.03	0.010	0.57	<0.005	580
03 Lee MW-3	<0.03	0.336	0.07	0.008*	83
04 Lee MW-4	<0.03	0.156	0.41	<0.005	190

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 Lee MW-1	<0.03	09/06/88	09/16/88	0.04*	0.26*
02 Lee MW-2	<0.03	09/09/88	09/16/88	<0.04	1.4
03 Lee MW-3	<0.03	09/09/88	09/16/88	<0.040	0.86*
04 Lee MW-4	<0.03	09/09/88	09/12/88	1.7	0.79*
05 Lee MW-3 duplic	<0.03		09/12/88		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 Lee MW-1	514	0.19	16	1.7	0.004*

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-vv-U67

SAMPLE ID Lee #3

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D
INJECTED 05/17/88
FILE #
UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.8*	0.2
100-41-4	Ethylbenzene	0.6*	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 108% recovery

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N\A = not available
Second column confirmation NOT performed
un' 's otherwise noted.

1st Quarter 5/88

CORPORATION

Received: 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-uJ-067

SAMPLE ID Lee #3 dup

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW
INSTRMT D

INJECTED 05/17/88

FILE #

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	ND	0.2
108-88-3	Toluene	0.6*	0.2
100-41-4	Ethylbenzene	0.3*	0.3
108-90-7	Chlorobenzene-A	ND	0.3
106-46-7	1,4-Dichlorobenzene	ND	0.3
541-73-1	1,3-Dichlorobenzene	ND	0.4
95-50-1	1,2-Dichlorobenzene	ND	0.4

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	107% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at detection limit
NA = not analyzed
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N\A = not available
Second column confirmation NOT performed
un' 3s otherwise noted.

SAMPLE ID Lee #3 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/12/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #3 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	0.7*	0.2
108-38-3	m-Xylene-A	1.00	0.2
95-47-6	o-Xylene	1.4	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 108% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un \s otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT Work Order # 88-05-067

Results by Sample

SAMPLE ID Lee #3 dup

FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602

Date & Time Collected 05/12/88 Category

VERIFIED CL

ANALYST RW FILE #

INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	0.7*	0.2
108-38-3	m-Xylene-A	0.6*	0.2
95-47-6	o-Xylene	0.8*	0.1

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 107% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

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ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and m-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee #2	<0.003	3.1 (1.1) pCi/L	0.013	0.26	8.8 (2.2) pCi/L
02 Lee #3	<0.003	<1.4 pCi/L	0.130	0.060	3.3 (1.3) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: COLI T colonies/100 mL	Test: CR E ug/ml	Test: DG3020 date complete
01 Lee #2	<0.003	190	930	0.005*	05/16/88
02 Lee #3	<0.003	60	240	0.012*	05/16/88
04 Lee #3 dup				0.007*	

SAMPLE Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
01 Lee #2	05/23/88	0.1	0.80*	1170	0.4
				1170	
				1180	
				1180	
02 Lee #3	05/23/88	0.046	1.7*	810	0.017

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027

SAMPLE ID MW-4

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G

INJECTED 02/03/89 FILE # UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	21000	100
108-88-3	Toluene	5900	100
100-41 4	Ethylbenzene	720*	150
108-90-7	Chlorobenzene-A	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
541-73-1	1,3-Dichlorobenzene	ND	200
95-50-1	1,2-Dichlorobenzene	ND	200

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	96% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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N\A = not available
Second column confirmation NOT performed
unless otherwise noted

4th Quarter 2/89

RADIAN CORPORATION

Received: 02/02/89

RAS - Austin REPORT
Results by Sample

Work Order # 89-02-027
Continued From Above

SAMPLE ID MW-4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 01/31/89 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
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N\A = not available

SAMPLE ID MW-4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 01/31/89 Category

VERIFIED CL

ANALYST BM
INSTRMT G
INJECTD 02/03/89
FILE #
UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	430*	100
108-38-3	m-Xylene	560	100
95-47-6	o-Xylene	560	50

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 96% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
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* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

RAS - Austin REPORT Work Order # 89-02-027

Received: 02/02/89 Results By Test

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 MW-3	<0.03	0.24	0.14	<0.005	110
02 MW-4	<0.03	0.14	0.55	<0.005	240

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 MW-3	<0.03	02/06/89	02/06/89	0.073*	1.0*
02 MW-4	<0.03	02/06/89	02/06/89	2.6	1.2

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 MW-3	1100	0.061	240	0.31	0.002*
	1100				
	1100				
	1100				
02 MW-4	1400	1.1	140	0.22	0.002*
	1400				

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015

SAMPLE ID Lee MW-4

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 11/01/88 Category ____

VERIFIED CL

ANALYST CL
INSTRMT D

INJECTED 11/07/88

FILE # ____

UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	7800	100
108-88-3	Toluene	ND	100
100-41-4	Ethylbenzene	530*	150
108-90-7	Chlorobenzene-A	ND	150
106-46-7	1,4-Dichlorobenzene	ND	150
541-73-1	1,3-Dichlorobenzene	ND	200
95-50-1	1,2-Dichlorobenzene	ND	200

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	101% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
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NA = not analyzed
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N\A = not available
Second column confirmation NOT performed unless otherwise noted.

3rd Quarter - 11/88

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-11-015
Continued From Above

SAMPLE ID Lee MW-4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 11/01/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee MW-4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 11/01/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 11/07/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene-A	ND	100
108-38-3	m-Xylene	ND	100
95-47-6	o-Xylene	ND	50

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 101% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

RADIAN CORPORATION

Received: 11/03/88

RAS - Austin REPORT Work Order # 88-11-015

Results By Test

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee MW-3	<0.03	3.5 (0.8) pCi/L	0.31	0.072	5 (1) pCi/L
02 Lee MW-4	<0.03	4 (1) pCi/L	0.14	0.50	8 (2) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete
01 Lee MW-3	<0.005	180	<0.03	11/14/88	11/11/88
02 Lee MW-4	<0.005	28	<0.03	11/14/88	11/11/88
03 Lee MW-4 dup			<0.03		11/11/88

SAMPLE Sample Id	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml
01 Lee MW-3	0.10*	0.6*	1300 690 680 700	0.024*	130
02 Lee MW-4	2.2	0.5*	730	0.79	130

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-4

FRACTION 04A TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 08/31/88 Category ____

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTED 09/09/88 FILE # ____ UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	6900	200
108-88-3	Toluene	45	1.0
100-41-4	Ethylbenzene	370	1.5
108-90-7	Chlorobenzene-A	ND	1.5
106-46-7	1,4-Dichlorobenzene	ND	1.5
541-73-1	1,3-Dichlorobenzene	ND	2.0
95-50-1	1,2-Dichlorobenzene	ND	2.0

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	94%	recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
unless otherwise noted.

2nd Qtr 9/88

RADIAN CORPORATION

Received: 09/01/88 — RAS - Austin REPORT — Results by Sample — Work Order # 88-09-003

SAMPLE ID Lee MW-4 duplicate — FRACTION 05A — TEST CODE EPA602 — NAME EPA method 602

Date & Time Collected 08/31/88 — Category

VERIFIED CL

ANALYST BM — FILE #

INSTRMT D — INJECTED 09/09/88 — UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	10,000	200
108-88-3	Toluene	ND	200
100-41-4	Ethylbenzene	ND	300
108-90-7	Chlorobenzene-A	ND	300
106-46-7	1,4-Dichlorobenzene	ND	300
541-73-1	1,3-Dichlorobenzene	ND	400
95-50-1	1,2-Dichlorobenzene	ND	400

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	93% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

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ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-4 duplicate FRACTION 05A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/31/88 Category

VERIFIED CL

ANALYST BM FILE #
INSTRMT D INJECTD 09/09/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	ND,Q	200
108-38-3	m-Xylene-A	ND	200
95-47-6	o-Xylene	ND	100

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 93% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-09-003

SAMPLE ID Lee MW-4

FRACTION 04A TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 08/31/88 Category ______

VERIFIED CL

ANALYST BM
INSTRMT D

INJECTD 09/09/88

FILE # ______

UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	12Q	1.0
108-38-3	m-Xylene-A	10	1.0
95-47-6	o-Xylene	27	0.50

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 94% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed unless otherwise noted.
Q = daily EPA standard recovery outside 95% confidence interval.
Chlorobenzene and p-xylene co-elute. Quantitated as chlorobenzene unless otherwise noted.

RADIAN CORPORATION

Received: 09/01/88

RAS - Austin REPORT
Results By Test

Work Order # 88-09-002

SAMPLE Sample Id	Test: AG E ug/ml	Test: AS G ug/ml	Test: BA E ug/ml	Test: CD E ug/ml	Test: CL IC mg/L
01 Lee MW-1	<0.03	0.004*	0.12	<0.005	27
02 Lee MW-2	<0.03	0.010	0.57	<0.005	580
03 Lee MW-3	<0.03	0.336	0.07	0.008*	83
04 Lee MW-4	<0.03	0.156	0.41	<0.005	190

SAMPLE Sample Id	Test: CR E ug/ml	Test: DG3020 date complete	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L
01 Lee MW-1	<0.03	09/06/88	09/16/88	0.04*	0.26*
02 Lee MW-2	<0.03	09/09/88	09/16/88	<0.04	1.4
03 Lee MW-3	<0.03	09/09/88	09/16/88	<0.040	0.86*
04 Lee MW-4	<0.03	09/09/88	09/12/88	1.7	0.79*
05 Lee MW-3 duplic	<0.03		09/12/88		

SAMPLE Sample Id	Test: MHO umhos/cm	Test: MN E ug/ml	Test: NA E ug/ml	Test: NO3 mg/L as N	Test: PB G ug/ml
01 Lee MW-1	514	0.19	16	1.7	0.004*

CORPORATION

Received. 05/14/88

RAS - Austin REPORT
Results by Sample

Work Order # 88-vJ-066

SAMPLE ID Lee #4

FRACTION 02J TEST CODE EPA602 NAME EPA method 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL
INSTRMT D
INJECTED 05/17/88
FILE #
UNITS ug/L

CAS#	COMPOUND	RESULT	DET LIMIT
71-43-2	Benzene	6200	20
108-88-3	Toluene	50	1
100-41-4	Ethylbenzene	140	2
108-90-7	Chlorobenzene-A	ND	2
106-46-7	1,4-Dichlorobenzene	ND	2
541-73-1	1,3-Dichlorobenzene	ND	2
95-50-1	1,2-Dichlorobenzene	ND	2

SURROGATES

98-08-8	a,a,a-Trifluorotoluene	115% recovery	

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un s otherwise noted.

1st Quarter 5/88

SAMPLE ID Lee #4 FRACTION 02A TEST CODE TURB NAME Turbidity
Date & Time Collected 05/13/88 Category

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available

SAMPLE ID Lee #4 FRACTION 02J TEST CODE XYLENE NAME Xylenes, EPA 602
Date & Time Collected 05/13/88 Category

VERIFIED CL

ANALYST CL FILE #
INSTRMT D INJECTD 05/17/88 UNITS ug/L

CAS #	COMPOUND	RESULT	DET LIMIT
106-42-3	p-Xylene	23	1
108-38-3	m-Xylene-A	31	1
95-47-6	o-Xylene	39	0.5

SURROGATES

98-08-8 a,a,a-Trifluorotoluene 115% recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = DETECTION LIMIT
ND = not detected at detection limit
NA = not analyzed
* = less than 5 times the detection limit
N\A = not available
Second column confirmation NOT performed
un s otherwise noted.

CORPORATION

Received: 05/14/88

RAS - Austin REPORT

Results By Test

Work Order # 88-[illegible]-066

SAMPLE Sample Id	Test: AG E ug/ml	Test: ALPHA pCi/	Test: AS G ug/ml	Test: BA E ug/ml	Test: BETA pCi/
01 Lee #1	<0.003	<4.6 pCi/L	0.004	0.22	<9.6 pCi/L
02 Lee #4	<0.003	<1.9 pCi/L	0.130	0.38	7.1 (2.0) pCi/L

SAMPLE Sample Id	Test: CD E ug/ml	Test: CL IC mg/L	Test: COLI T colonies/100 mL	Test: CR E ug/ml	Test: DG3020 date complete
01 Lee #1	0.007*	28	>24,000	0.004*	05/16/88
02 Lee #4	<0.003	180	2100	0.028	05/16/88

SAMPLE Sample Id	Test: DG6010 date complete	Test: FE E ug/ml	Test: F IC mg/L	Test: MHO umhos/cm	Test: MN E ug/ml
01 Lee #1	05/23/88	0.037	0.68*	470	0.12
				470	
				470	
				470	
02 Lee #4	05/23/88	1.3	1.0*	1230	0.57
				1250	

1st Quarter 5/88

GCL

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REPORT ON THE INSTALLATION
OF A GROUND-WATER MONITORING SYSTEM
AT PHILLIPS' LEE PLANT

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
CERTIFICATE NUMBER
6777
AIPG
RANDALL T. HICKS
CERTIFIED PROFESSIONAL GEOLOGIST

SUBMITTED BY: DATE:

GCL Program Manager 6-6-88

GCL Project Director 6-6-88

FORM/REPTSIGN.FRM

REPORT ON THE INSTALLATION OF A GROUND-WATER MONITORING SYSTEM AT PHILLIPS 66 NATURAL GAS COMPANY LEE PLANT

June 6, 1988

Prepared for:

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SECTION 1.0

1.0 EXECUTIVE SUMMARY

In April of 1988, Phillips 66 Natural Gas Company was issued a Compliance Order/Schedule by the New Mexico Environmental Improvement Division (NMEID) to install and sample for water quality, four ground-water monitor wells at the Lee Plant in southeastern New Mexico. The monitor wells modify a former ground-water monitoring system which was previously installed around an abandoned wastewater evaporation pond.

The four new monitor wells were installed before May 2, 1988 by Larry's Drilling Company from Hobbs, New Mexico under the supervision of Geoscience Consultants, Ltd. (GCL). Air-rotary drilling techniques were employed. The four previously existing monitor wells were plugged with a cement/bentonite slurry and abandoned. Hydrogeologic information that was generated during the drilling and well installation has been evaluated and is included in this report.

The monitor wells were sampled on May 13, 1988 by GCL. Samples have been submitted to Radian Analytical Services in Austin, Texas and Morrisville, North Carolina. Results of the analyses are pending and will be reported to NMEID within 7 days after receipt.

SECTION 2.0

2.0 INTRODUCTION

In response to a Compliance Order issued by NMEID, Phillips 66 Natural Gas Company has modified the existing ground-water monitoring system at it's Lee Plant in southeastern New Mexico. Four new wells were constructed to replace the former monitoring system. The former monitor wells were plugged and abandoned.

A ground-water monitoring system was previously installed at the site around the wastewater evaporation ponds which are no longer in use. The system was designed so that one well was located upgradient and three wells were located downgradient from the wastewater management unit at the Lee Plant (Figure 2-1). The wells were composed entirely of 5-inch diameter PVC and had screen lengths of approximately 30 feet.

Monitor well locations for the new ground-water monitoring system were selected by Phillips after discussions with NMEID. The 2-inch combination stainless steel/PVC design is discussed in detail in Section 3.2. Rotary drilling was selected as the most effective method for penetrating the hard caliche zone that was known to exist near the surface at the site. At the Lee Plant, potable water was used as the drilling fluid for installation of the monitor wells.

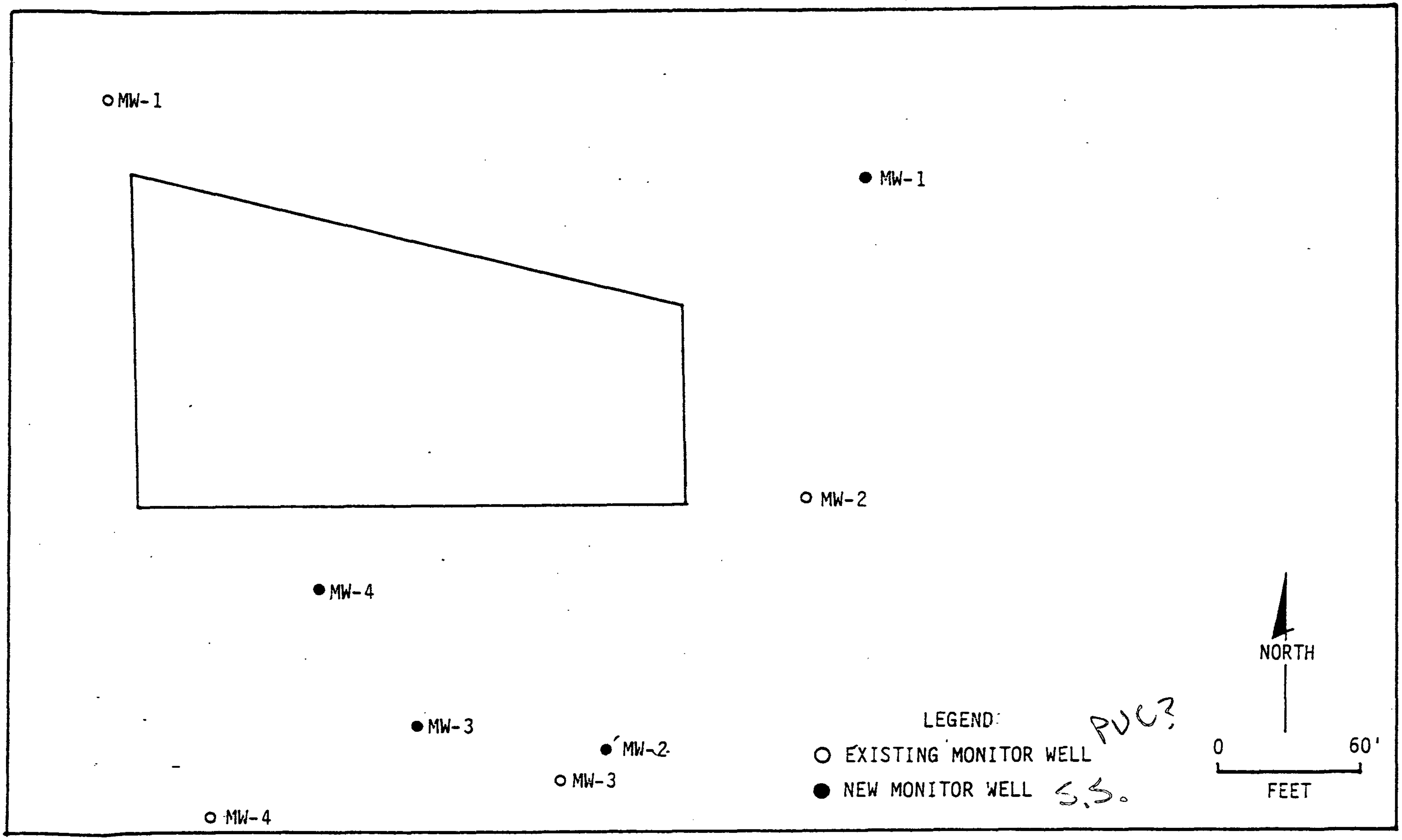


FIGURE 2-1

SITE MAP SHOWING EXISTING AND NEW GROUND-WATER MONITORING SYSTEMS

LEE GAS PLANT

SECTION 3.0

3.0 METHODS OF INVESTIGATION

3.1 ROTARY DRILLING

Boreholes for the ground-water monitor wells at Phillips 66 Lee Plant were drilled with an Ingersoll Rand TH-60 rotary drill rig. Prior to setting up on each of the four proposed borehole sites, the drill rig and all down-hole tools were thoroughly cleaned with a hot-water washer generating water temperatures of at least 180 degrees Fahrenheit. The boreholes were drilled using potable water as a drilling fluid. This method of drilling was selected over air rotary drilling methods because it greatly decreased the potential for borehole sloughing and caving that was known to have occurred on previously drilled wells in the area. Specifications for selected field equipment and material are presented in Appendix A.

Prior to moving the drill rig onto each borehole site a 3500 gallon portable mud pit was mobilized to the proposed location by HOMCO, an oil field service company located in Hobbs, New Mexico. Portable pits were necessary at this plant because all of the proposed borehole sites were located areas where frequent traffic by heavy equipment and tank trucks occurred. The portable pit was completely drained of fluids and solids by a vacuum truck and was thoroughly steam cleaned prior to use on each borehole. Water for drilling was acquired from the plant water supply system.

Drilling of surface casing was accomplished by advancing a 12-inch diameter rotary drill bit downward while drill cuttings were simultaneously blown upward and out of the borehole with compressed air. The initial, large diameter borehole was advanced to 15 feet below the surface and the drill rods retreived. Fifteen feet of 8-inch surface casing was then installed and cemented in place so that the rest of the borehole could be drilled with water as a drilling fluid. Cementing of the surface casing was necessary to prevent erosion of the site by circulating drilling fluid. Samples of the drill cuttings were collected at 5-foot intervals and the lithology logged by GCL's on-site geologist. Lithologic logs are presented in Appendix B.

After the cement around the surface casing had cured, the borehole was reentered using a 6.5-inch diameter drill bit. The borehole was drilled to the target depth using potable water to circulate cuttings out of the borehole and into the portable pit. The clays of the formation generated a "natural mud" during this process. Core drilling at this site was attempted but was unsuccessful in recovering any core. The fine-grained, unconsolidated sediments that were encountered at this site could not be retained in the core barrel.

After the target depth of each borehole was attained, the drill rods were retrieved and temporary PVC surface casing was installed in the borehole. Fluids and fine-grained sediments were then bailed from the cased hole. The rising water level within the borehole was monitored with an electronic water-level indicator until static conditions were reached. In several cases this required leaving the borehole overnight so that recovery of the water level was complete and the screen depth for the monitor well could be selected accurately.

3.2 MONITOR WELL DESIGN AND INSTALLATION

Monitor wells installed at the Lee Plant in 1988 are composed of 2-inch diameter PVC and stainless steel (Figure 3-1). Monitor well completion diagrams are located in Appendix C. In order to ensure that any seasonal fluctuations in the water table do not elevate the water in the monitor well above the screened interval, each 15-foot long stainless steel screen (.02-inch slots) was emplaced so that the upper 5 feet was above the static water level. A 2-foot long silt trap was also installed below the screen. A 10-foot long stainless-steel riser was installed above the screen to minimize the potential of ground water contacting PVC. The well head was secured by a cement-filled, 6-inch by 5-foot steel guard pipe with a locking cap installed on the top of the inner 2-inch well casing.

The monitor well was installed by inserting the pre-packaged, factory steam-cleaned well casing into the cased borehole one section at a time. When the entire column of well casing had been inserted into the borehole

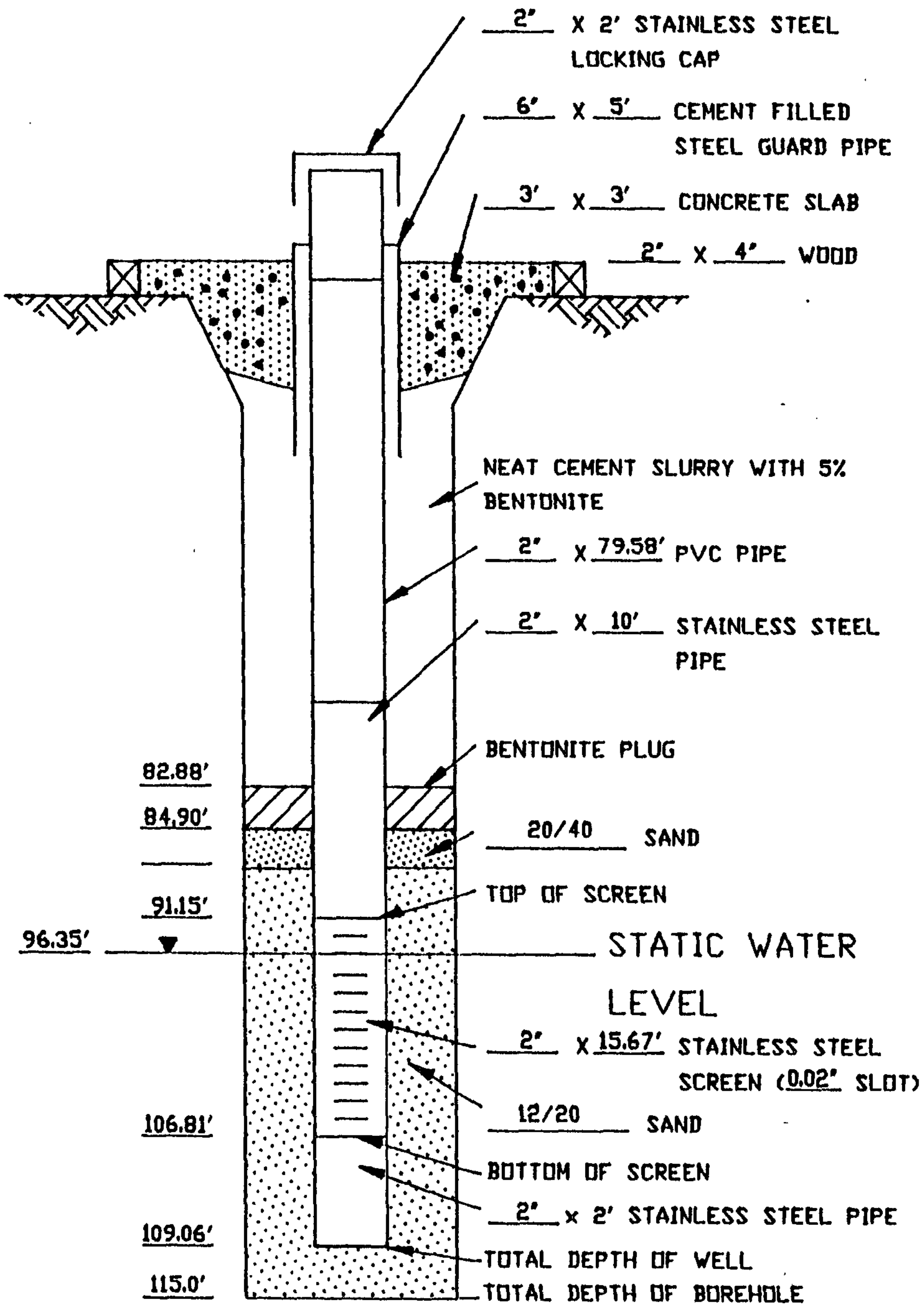


FIGURE 3-1
TYPICAL MONITOR WELL DESIGN
PHILLIPS LEE PLANT

and the temporary PVC casing was removed. With the 2-inch well casing suspended from the rotary table to ensure correct alignment, installation of the filter pack was initiated. The filter pack consisted of pre-packaged, graded silica sand (12-20) and was installed to a level 2 to 3 feet above the top of the screen through a tremie pipe. An additional 1 to 3 feet of 20-40 silica sand was installed above the filter pack to inhibit downward migration of bentonite and cement from the overlying annular seal. The seal was composed of bentonite pellets and was emplaced above the 20-40 sand by slowly pouring the pellets into the open borehole from the surface. About 1 foot of 20-40 sand was placed above the bentonite to ensure that the seal was not displaced when the borehole was grouted. The borehole was then backfilled with a neat cement slurry (containing 5 percent bentonite) into the borehole annulus through the tremie pipe. The lower end of the tremie pipe was always kept below the level of cement in the borehole to ensure that no voids were left in the grout. The well head for each well was completed as shown in Appendix C.

During well construction activities for the upgradient monitor well, explosive vapors were recorded and the work immediately ceased pursuant to the criteria set forth in the Health and Safety Plan developed for the project. The borehole (MW-1A), which had penetrated the zone of saturation, was abandoned according to the procedures for monitor well plugging outlined in Section 3.4. An alternate location for the upgradient monitor well was selected in the field. Hydrocarbon vapors were not detected during the drilling of this location, but vapors were recorded during completion activities. Because the levels did not exceed criteria set forth in the Health and Safety Plan, the well (MW-1B) was completed as a monitor well.

3.3 WELL DEVELOPMENT

The monitor wells at the Lee Plant were developed by the overpumping method using a GCL 1.5-inch, stainless steel, air-lift development pump (Figure 3-2). The pump was inserted into the well with the bottom of the pump positioned at various intervals within the screen in order to

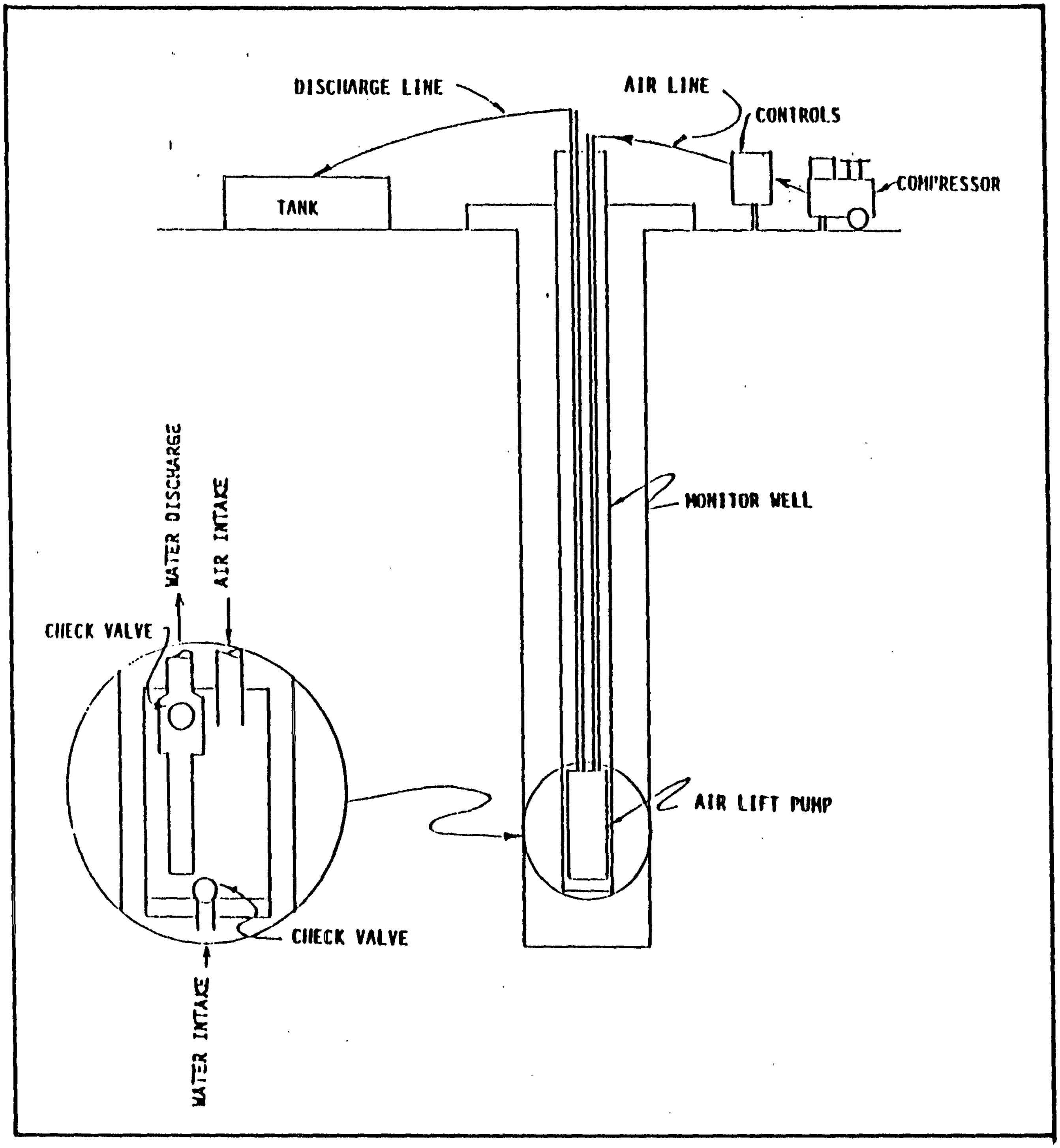


FIGURE 3-2
AIR LIFT PUMPING SYSTEM

achieve uniform development. A check valve at the bottom of the pump allowed water and silt to enter the pump when the compressed air system was relaxed. When the system was pressurized, all fluids and material that were in the pump chamber were discharged to the surface and placed in the mud pit that was used for drilling each hole.

The presence of very fine sand and silt in the uppermost water-bearing unit, combined with a well yield of less than one-quart per minute, made development time-consuming and difficult. In order to enhance the development of the wells, surging was occasionally used while pumping the wells. Periodically, several gallons of either distilled water or relatively clear water that had already been purged from the well was poured down the well. The surging dislodged fines in the surrounding formation sediments for removal by pumping.

Water developed from several of the wells was still slightly turbid when development was terminated. It is possible that an extended period (weeks or months) of pumping would produce water with low or no turbidity. However, it is also possible that no amount of pumping would result in the production of clear, silt-free water from the fine-grained saturated unit.

3.4 WELL PLUGGING

Four 5-inch monitor wells at the Lee Plant were abandoned. The wells were plugged by pumping a neat cement slurry containing 5 percent bentonite into the well casing through a tremie pipe. The tremie pipe was placed in the well so that the discharge end was at or near the bottom of the well casing. The slurry was mixed at the surface in a 55-gallon drum and pumped through the tremie pipe with a diaphragm pump. Cement was then circulated to the surface from the bottom of the tremie pipe to ensure that a proper seal was attained with the slurry. All four wells required more cement than volumetric calculations predicted. This suggests that the slurry extends beyond the well casing and screen into the filter pack and formation, thus forming a very effective seal.

Figure 3-3 shows a typical abandoned well. Boring MW-1A was plugged in the same manner as described above.

3.5 SAMPLING

On May 13, 1988, all four wells were sampled according to protocol outlined in the June 2, 1988 Sampling and Analysis Plan for Phillips 66 Natural Gas Company Artesia, Eunice, Lee and Lusk Gasoline Plants. Results of analyses being conducted by Radian Analytical Services are pending.

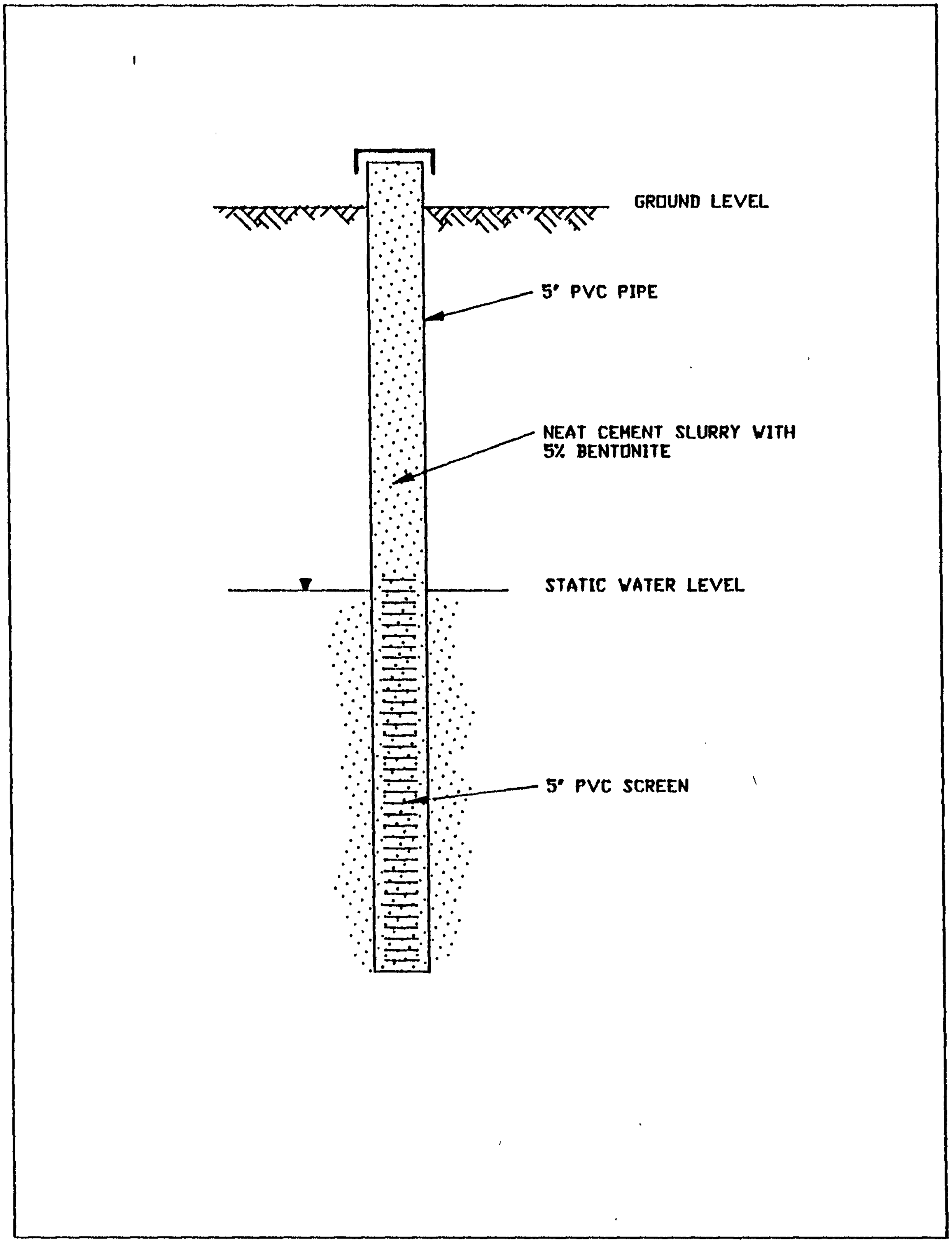


FIGURE 3-3

TYPICAL PLUGGED AND ABANDONED MONITOR WELL

SECTION 4.0

4.0 REGIONAL GEOLOGY AND HYDROLOGY

4.1 REGIONAL GEOLOGY

The Lee Plant is located in southern Lea County, New Mexico in the Llano Estacado (Staked Plains) part of the High Plains section (Figure 4-1) of the Great Plains physiographic province (Fenneman, 1931). Shallow depressions and small sand dunes are the only significant topographic features in an otherwise flat, treeless plain. The depositional surface of the Llano Estacado exhibits low relief, sloping uniformly to the southeast at a topographic gradient of about .003. Total relief in Lea County is about 1300 feet with an altitude ranging from 2900 to 4200 feet above sea level (Nicholson and Clebsch, 1961). Drainage patterns are poorly defined.

Rock exposures in the area are poor and range in age from Triassic to Quaternary (Figure 4-2). The region is covered by Quaternary-Age eolian deposits ranging in thickness from 1 to 5 feet. Beneath these windblown deposits, a layer of dense, well developed caliche forms a cap over the Ogallala Formation. The caliche can range from several feet up to 60 feet in thickness, and decreases in induration with depth (Nicholson and Clebsch, 1961).

The Tertiary Ogallala Formation underlies the Llano Estacado in southeast New Mexico. It is composed of terrestrial sediments which unconformably overly the Triassic section. Outcrops of the Ogallala occur along the face of Mescalero Ridge to the south of the Lee Plant. The Ogallala ranges in thickness from several inches up to 300 feet and is composed primarily of unconsolidated, calcareous sand, clay, silt and gravel.

Jurassic-Age rocks have not been observed in the area and rocks of Cretaceous Age have been almost completely removed by erosion (Nicholson and Clebsch, 1961). Rocks of the Triassic Dockum Group are the oldest rocks that crop out in the region. The Dockum Group may be divided into the Chinle Formation and the Santa Rosa Sandstone. The Chinle Formation ranges in thickness from zero to 1270 feet and is composed primarily of red and green claystone with minor siltstone and fine-grained sandstone.

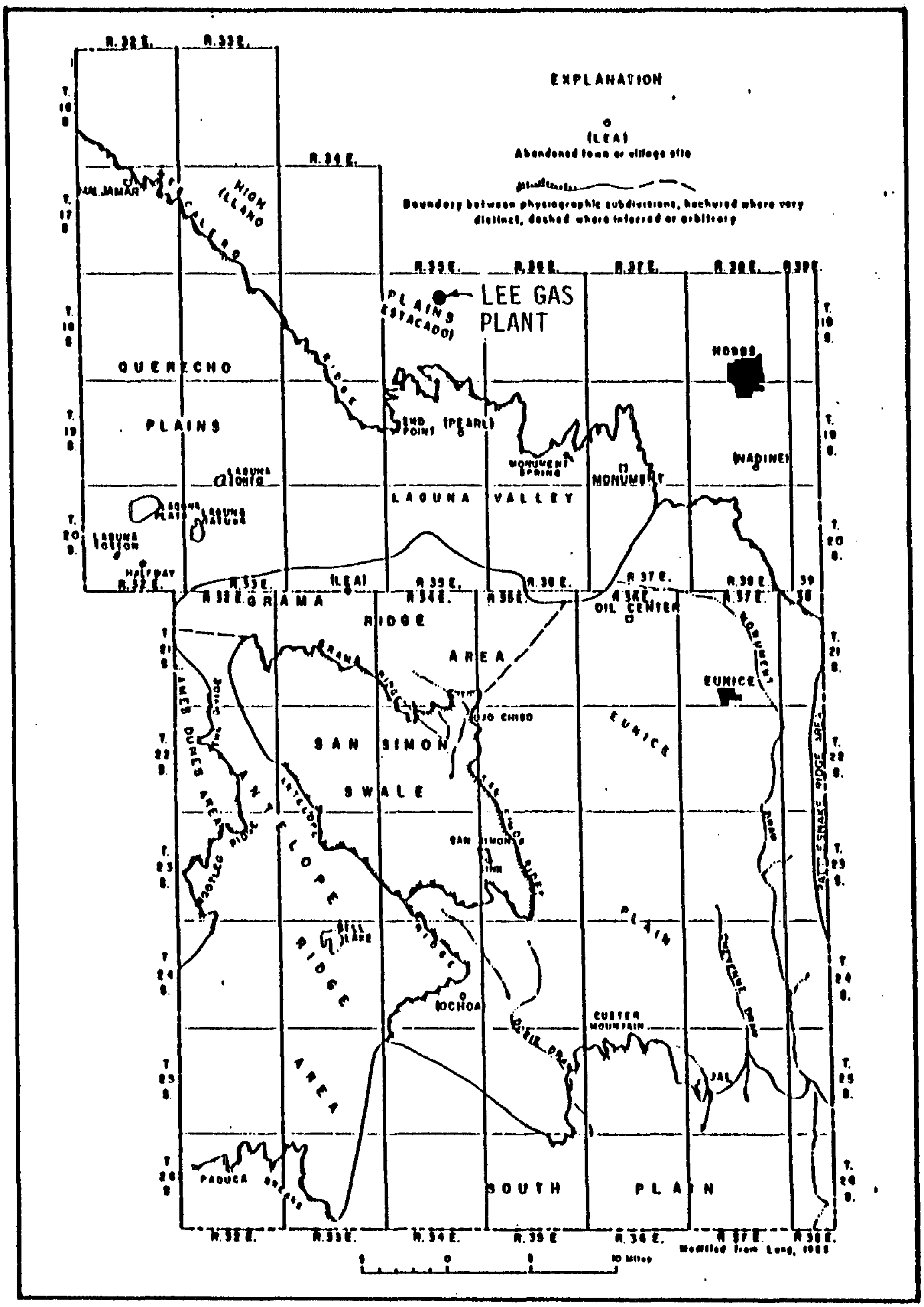
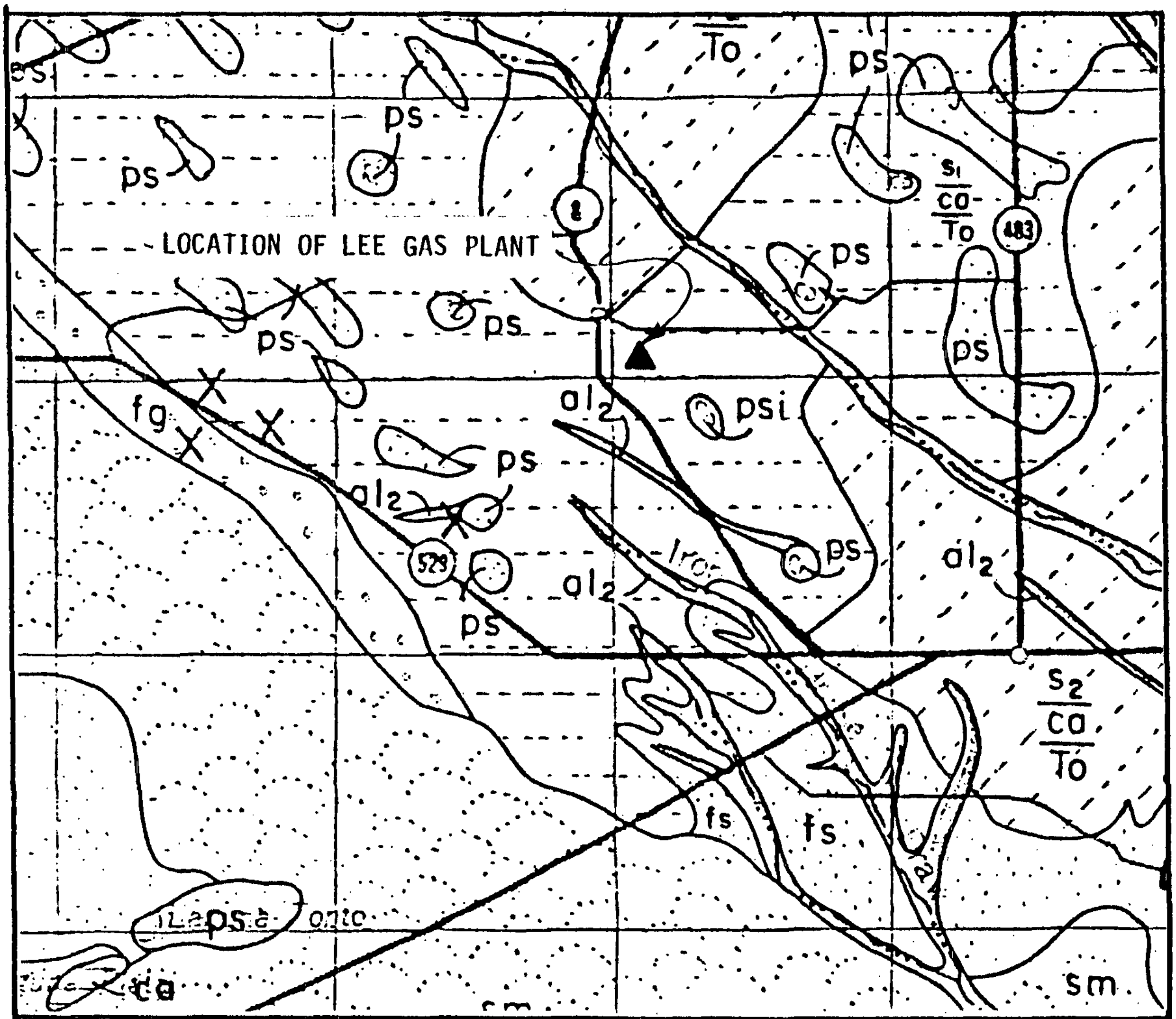


FIGURE 4-1

PHYSIOGRAPHIC SUBDIVISIONS OF SOUTHERN LEA COUNTY,NEW MEXICO

(FROM NICHOLSON AND CLEBSCH,1961)



TRANSPORTED DEPOSITS

al_2 - FLOODPLAIN AND CHANNEL DEPOSITS ALONG GENERALLY DRY ARROYOS AND WASHES

fs - SAND FACIES

S_2/Ca/To - MODERATELY THICK SAND ON CALICHE ON OGALLALA FORMATION

ps - SANDY LAKE OR PLAYA DEPOSITS

NORTH

0 6 MILES

SCALE: 1"= 6 MILES

FIGURE 4-2

SURFICIAL GEOLOGY OF SOUTH EAST NEW MEXICO

(FROM HUNT, 1977)

The Santa Rosa Sandstone is typically reddish in color, fine- to coarse-grained, and contains minor shale lenses. Thickness ranges from 140 feet to more than 300 feet.

Southeastern New Mexico and west Texas are underlain by large subsurface structural basins with highly complex geology. Southern Lea County includes parts of the Delaware Basin and the Central Basin Platform (Figure 4-3). The northwestern edge of the Delaware Basin is coincident with the position of the reef-edge as it existed throughout Permian time. The Artesia-Vacuum arch reflects this ancient reef trend; the Lee site is located at the eastern limit of this trend. Triassic rocks in the area exhibit a regional dip of less than one degree to the southeast (Nicholson and Clebsch, 1961). Variations in this regional trend occur in the collapse structures and unconformities which are common to the area.

4.2 REGIONAL HYDROLOGY

Recharge in the region occurs primarily as a result of infiltration from short drainages and temporary lakes that form as a result of heavy rainfall events (Nicholson and Clebsch, 1961). Discharge takes place principally in the form of evapo-transpiration and pumping from wells; very small volumes of ground water discharge at springs.

Potable water supplies in the Llano Estacado region are derived primarily from aquifers hosted by Quaternary alluvium and the Tertiary Ogallala Formation. Ground water occurring in Triassic sediments is potable, but has a poorer quality and is hosted on lithologic units which produce lower well yields than younger formations in the area. The Ogallala Formation mantles the High Plains in the Lee Plant area and has a saturated thickness ranging from 25 to 175 feet (Nicholson and Clebsch, 1961). Ground water in these shallow aquifers flows to the southeast at a low hydraulic gradient.

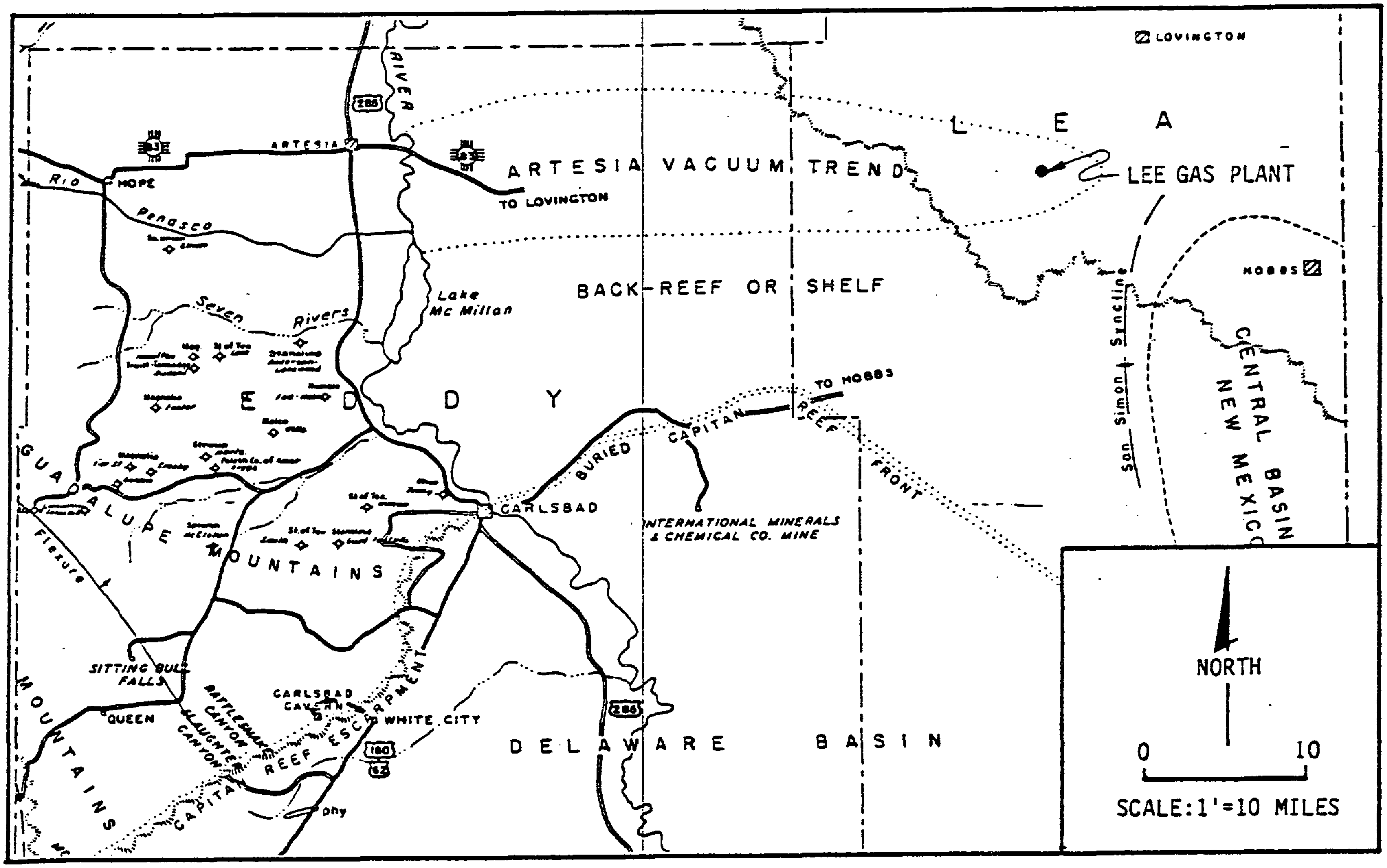


FIGURE 4-3

MAP OF SOUTHEASTERN NEW MEXICO SHOWING STRUCTURAL FEATURES

(FROM NEW MEXICO GEOLOGICAL SOCIETY,1954)

SECTION 5.0

5.0 SITE GEOLOGY AND HYDROLOGY

5.1 SITE GEOLOGY

Two primary lithologic sequences were encountered at Phillips Lee Plant: an upper, caliche-cemented fine-grained silty sand and sandy silt and an underlying coarser sand. A "topsoil", probably backfill material used during facility construction or modification, was also identified during drilling.

Surficial lithologies at the Lee Plant are both natural and anthropogenic. Aeolian sheet sands consisting of poorly-sorted fine sand are present and typically less than 5 feet thick. Backfill material consisting of poorly sorted fine sand to fine pebble-sized sediment was present at the locations of monitor wells MW-2, MW-3, and MW-4.

Beneath the thin surficial deposits, sediments characterized by highly variable clast size and poor sorting are present. Although the dominant sediment consists of fine-grained, poorly sorted sand, clay-, silt-, and gravel-rich sands are present which have very limited lateral continuity. Caliche in this sedimentary sequence ranged from highly-developed stage IV in the upper horizon to stage I at approximately 20 to 35 feet below the ground surface. Consolidation of the sediments in this sequence was related to the presence and degree of development of interstitial caliche and, to a lesser degree, the presence of interstitial clay. With few local exceptions, the degree of consolidation decreased with depth.

The lower coarser-grained sand unit, in which each of the new monitor wells at the Lee Plant was completed, comprised the second primary lithology. The coarser sand lacked notable silt and clay particle fractions. The contact between the two lithologies was sharp and occurred at a depth of 35-65 feet. As much as 80 feet of the lower unconsolidated sand was penetrated during drilling at the site (MW-4). The yellowish-brown to brown color, higher percentage of medium-grained sand, and the relative vertical homogeneity distinguished it from the overlying sediments.

Hunt (1977) and Nicholson and Clebsch (1961) identified the outcrop in the Lee Plant area as Tertiary Ogallala Formation. The description provided by Hunt (1977) correlates particularly well with observations recorded by GCL personnel during the investigation.

5.2 SITE HYDROLOGY

Shallow ground water at the Lee Plant occurs under water table conditions. Based on May, 1988 data, ground water flows to the south with a hydraulic gradient of 0.003 (Figure 5-1). The uppermost saturated zone beneath the site is a water-bearing fine-grained unit within the Ogallala Formation. The water table occurs at depths below the land surface ranging from 96.40 feet in MW-2 to 94.08 feet in MW-1.

During development of the monitor wells, low well yields were observed. Wells may yield a sustainable pumping rate of up to 2 gallons per minute. This pumping rate is consistent for the fine-grained sediments that occur beneath the site, which typically exhibit hydraulic conductivities of 10^{-2} to 10^{2} gallons per day per square foot (Figure 5-2).

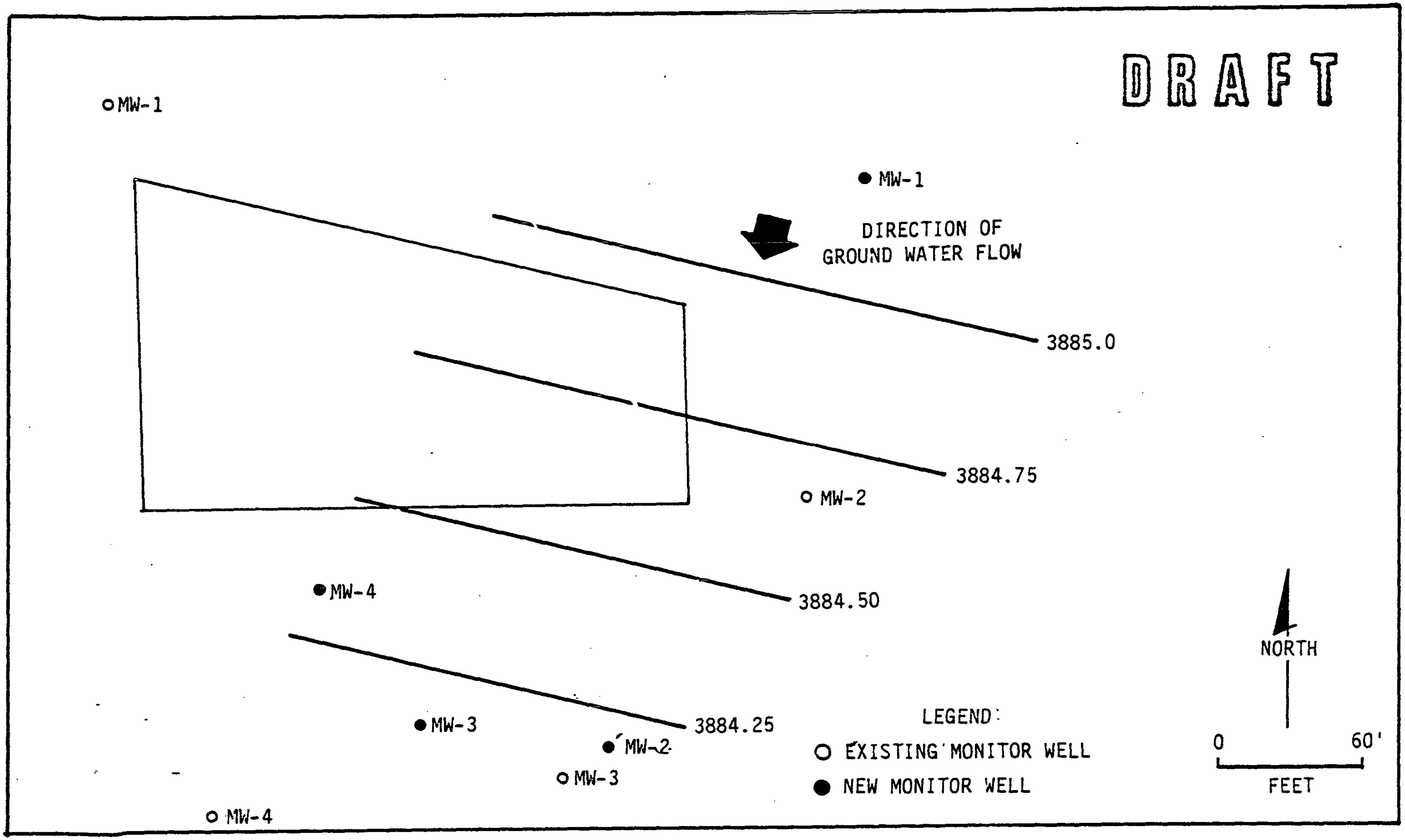


FIGURE 5-1

CONTOUR MAP OF WATER TABLE BENEATH LEE GAS PLANT

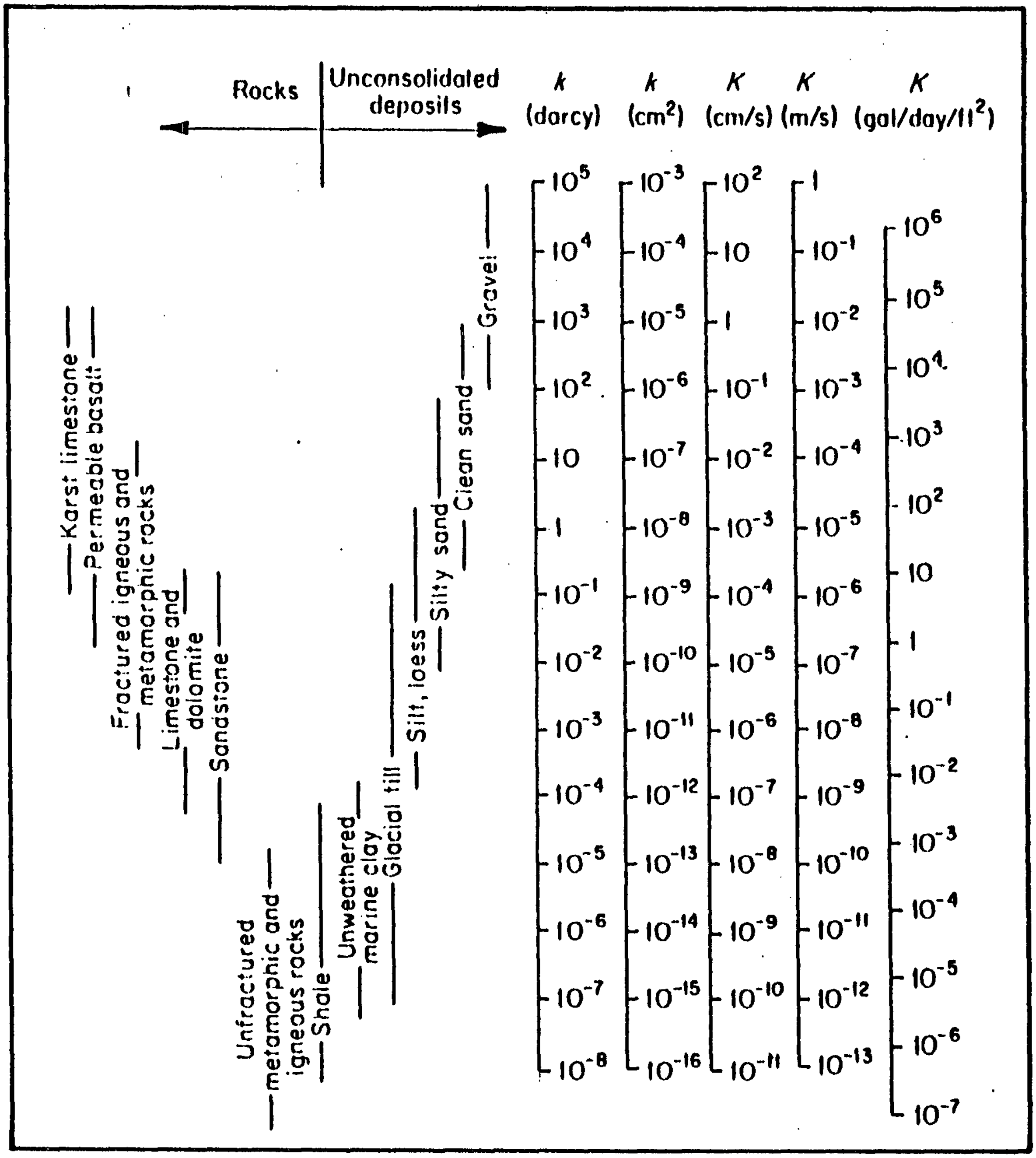


FIGURE 5-2

RANGE OF VALUES OF HYDRAULIC CONDUCTIVITY AND PERMEABILITY

(FROM FREEZE AND CHERRY, 1979)

SECTION 6.0

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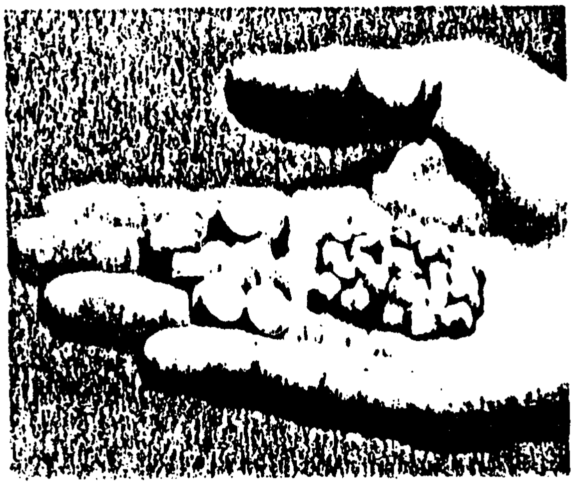
APPENDIX A

GCL

APPENDIX A

SPECIFICATIONS OF SELECTED FIELD EQUIPMENT AND MATERIALS

VOLCLAY TABLETS



GENERAL DESCRIPTION: A pre-formed compressed tablet made of high swelling sodium bentonite. Falls through standing water. Forms a flexible, permanent, non-toxic seal where water flows and hydrostatic pressures are involved.

PROPERTIES OF VOLCLAY TABLETS:
- Increased hardness and density provides better settling characteristics. Can be placed in a dry or wet borehole with the same ease as pea gravel.
- Will swell up to 15 times its dry volume when hydrated by fresh water.
- Will provide in-place expansive seal.
- Will not shrink or crack with time.

FUNCTIONS OF VOLCLAY TABLETS:
- Seal all types of piezometers.
- Seal surface casing for water wells and well pits.
- Provide an intermediate seal preventing interaquifer transfer.
- Seal at the uppermost aquifer and prevent entrance of surface water into aquifer.
- Seal abandoned wells maintaining aquifer yield and artesian head.

PHYSICAL PROPERTIES:
- Density: 2.3-2.5
- Composition: Bentonite - a hydrous silicate of alumina comprised essentially of the clay mineral montmorillonite.
- Purity: Montmorillonite content about 90% minimum. Contains small portions of feldspar, biotite, selenite, etc.
- pH: 8.5 to 10.5
- Dry bulk density: 82 lbs./ft.^{3}

DISCOUNT SCHEDULE 30%
F.O.B. Albuquerque

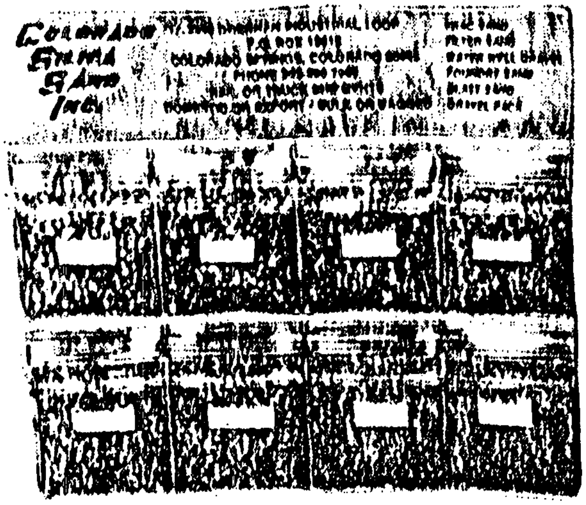
PART NO.	TABLET SIZE	PACKAGE	WEIGHT	LIST PRICE
VC50	½"	5 gal. pail	50 lb.	$39.53
VC25	¼"	5 gal. pail	50 lb.	55.46

VOLCLAY TABLETS REFERENCE TABLE

HOLE DIA. IN.	CASING SIZE	WEIGHT OF PELLETS (LBS./FT.)
4	None	7
5	None	11
6	None	16
7	None	22
8	None	28
6	4	7
6	4½	5
6	5	2½
8	5	15
8	6	9¼
10	6	25
10	8	12
12	8	34
12	10	32

COLORADO SILICA SAND

MONITORING WELL GRAVEL PACK



Less screen plugging
Less infiltration of formation fines
More uniform flow through gravel pack
Better well development

DISCOUNT SCHEDULE 30%
F.O.B. Albuquerque

PRODUCT NO.	SAND SIZE	LIST PRICE
SS812	8/12	$9.74
SS1020	10/20	9.34
SS1640	16/40	9.56

Packaging - 100 lb., 3-ply bag

GRAVEL PACK SELECTION TO SCREEN SIZE

10 SLOT	20 SLOT	30 SLOT	40 SLOT
16/40	10/20	10/20	8/12

1. It's pure and inert (contains no phosphorus).

2. It's organic-free.

3. Its roundness and sphericity means easy handling and uniform placement in the well. This gravel pack will not bridge or plug the screen slots. This insures a uniform representative sample of water for the total depth of the formation.

4. Controlled gradation assures representative infiltration to the well.

5. Colorado's monitoring well gravel pack does not absorb nor release chemicals that could distort the actual existing conditions of the monitoring results.

Colorado Silica Sand, Inc.

3250 Drennan Industrial Loop
P.O. Box 15615
Colorado Springs, Colorado 80935
Phone (303) 390-7969
TWX: 910-920-4992

CONVERSION CHART

OPENINGS		U.S.	TYLER
Millimeters	Inches	STANDARD	MESH
5.66	0.223	3-1/2	3-1/2
4.76	0.187	4	4
4.00	0.157	5	5
3.36	0.132	6	6
2.83	0.111	7	7
2.38	0.0937	8	8
2.00	0.0787	10	9
1.68	0.0661	12	10
1.41	0.0555	14	12
1.19	0.0469	16	14
1.00	0.0394	18	16
.841	0.0331	20	20
.707	0.0278	25	24
.595	0.0234	30	28
.500	0.0197	35	32
.420	0.0165	40	35
.354	0.0139	45	42
.297	0.0117	50	48
.250	0.0098	60	60
.210	0.0083	70	65
.177	0.0070	80	80
.149	0.0059	100	100
.125	0.0049	120	115
.105	0.0041	140	150
.088	0.0035	170	170
.074	0.0029	200	200

THE MAINSTAY OF OUR BUSINESS
Standard Products

We have two distinctly different types of deposits to serve a complete spectrum of industries. Our Colorado Springs deposits are unique in that the sand sizes range from 4 mesh to 100 mesh. Our Gove Canyon Sand is better suited to serve the finer size applications and exotic specialty sands.

COLORADO SPRINGS SAND

Chemical Determination Description	Sample Size Designation Mesh −4 +8	−8 +12	−10 +20	−20 +40	−40
SiO_2, % (Coffeen Method)	97.3	98.2	97.8	94.5	83.9
Al_2O, %	0.45	0.49	1.20	3.20	7.08
MgO, %	0.01	0.01	0.01	0.01	0.03
CaO, %	0.02	0.02	0.03	0.03	0.07
K_2O, %	0.17	0.21	0.60	2.12	4.96
Na_2O, %	0.05	0.06	0.17	0.34	0.58
Fe_2O_3, %	0.15	0.14	0.12	0.17	0.79
TiO_2, %	0.02	0.02	0.02	0.02	0.14
LOI, %	0.26	0.40	0.33	0.21	0.43
Feldspar	1.50	1.80	5.10	15.60	34.60
Acid Soluble, 15% HCl, %	0.28	0.07	0.34	0.32	0.98
Mud Acid Solubility (3HF:12HCl)	1.10	1.41	2.26	4.44	6.21
Acid Demand at Ph 3	2.80	0.31	0.31	3.80	5.60
at Ph 5	0.80	0.90	1.00	1.60	2.80
at Ph 7	0.40	0.50	0.60	1.10	1.80
Specific Gravity	2.63	2.64	2.62	2.63	2.61
AWWA Porosity	45.20	45.20	45.60	47.10	48.20

GOVE CANYON SAND

Chemical Determination Description	Sample Size Designation Mesh −20 +40	−40 +140M
Fe_2O_3	0.040	0.053
CaO	0.025	0.055
Al_2O_3	0.12	0.37
MgO	0.013	0.022
Na_2O	0.010	0.013
K_2O	0.048	0.19
TiO_2	0.013	0.012
LOI (1000°C)	0.30	0.18
SiO_2 (by difference)	99.43	99.10
Acid Solubility (15% HCL)	0.15	0.22
Mud Acid Solubility (3HF:12HCl)	2.2	5.1
Acid Demand at pH 3	6.3	6.5
at pH 5	5.5	4.9
at pH 7	4.3	3.8
Specific Gravity	2.62	2.58
Bulk Density—uncompacted #/ft³	89.6	93.3
compacted	97.0	98.7
AWWA Porosity	44.7	
Krumbein Roundness	.6 - .8	
Sphericity	.6 - .8	
No apparent fusion at 2810°F		

OUR TOP OF THE LINE
Specialty Sands

Modern filtration and gravel pack methods require a filter medium that is 98% within specifications. This type of screening efficiency was virtually unheard of several years ago. Today, we produce these exotic materials on a daily basis. In fact, if you order a specialty sand, we'll screen it to a 99% spec to further assure satisfaction after shipping and handling.

Additional Exotic Sand Tests

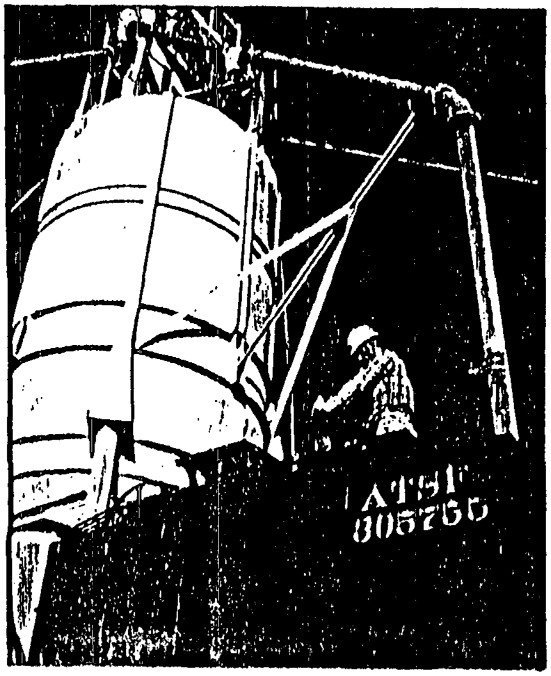
Test	Sample Designation 10-14	10-16	Specification Limit
Mud-Acid Soluble, Wt. %:			
Frac Sand	1.74	1.96	2.00 Max.
Gravel Pack Sand	0.91	0.89	1.00 Max.
Gravel Pack Crush Strength			
Gove Canyon 20-40 %	3.20		4.00 Max.

Size	98-100% Passing	98-100% Retained
6-9	#6 sieve	#10 sieve
8-12	#8	#12
10-14	#10	#14
10-16	#10	#16
16-20	#16	#20
20-30	#20	#30
20-40	#20	#40
40-60	#40	#60

Note: Materials processed to your Uniformity Coefficient and Effective Size, by separate quotation.

A Word of Caution—Since test results do vary, it is recommended that you confirm with your own lab your specification requirements and the physical and chemical characteristics of this product. We give no warranty for our products either expressed or implied.

Warning: This material contains free silica—do not breathe dust. May cause delayed lung injury. Wear government approved respirators and follow OSHA Safety and Health Standards for Silica.



Common Applications of CSSI Products:

- Water Well Gravel Pack
- Waste Water Treatment Filtration
- Water Filtration
- Hydro-fracturing Sand
- Oil and Gas Well Gravel Pack
- Industrial Grout
- Sandblasting Sand
- Foundry Sand
- Glass Sand

Colorado Silica Sand, Inc.
3250 Drennan Industrial Loop
P.O. Box 15615
Colorado Springs, CO 80935
Telephone (303) 390-7969
TWX 910-920-4992

STAINLESS STEEL PRODUCTS

- Stainless steel provides high strength, long life and minimum interference with sample analyses.
- The material of choice when organic contaminants are present.
- Continuous slot construction produces high per cent open area. Greater volume of water can enter a shorter length of screen which allows more representative sampling.
- Flush joints between screen and casing mean sampling devices won't hang up inside. Filter pack and backfill won't bridge outside.
- Patented locking cap available for protection of the well.
- Coarse thread minimizes make-up time and reduces chance of cross-threading.
- Chemically inert O-ring creates a stronger, tighter seal for leak-proof screen and casing joints.
- Readily available in type 304 stainless steel. 316 stainless steel and other metals available upon request.
- Drive points available in 1¼ in. and 2 in. diameter.
- Screen and casing individually wrapped for sanitary protection during shipment. Special cleaning procedures are used on each screen and length of casing prior to packaging.

SCREENS

SCREEN SIZE	DIAMETER (IN.)		SHIP WT (LB/FT)	OPEN AREA (IN.²)	
	O.D.	I.D.		10-SLOT (.010")	20-SLOT (.020")
1¼ INCH	1.660	1.130	3.0	9.7	17.0
2 INCH	2.375	1.900	4.0	13.2	23.1
4 INCH	4.500	4.000	6.0	25.8	44.9
5 INCH	5.563	5.000	7.5	31.3	54.6
6 INCH	6.625	6.065	9.0	29.5	52.9

CASING

CASING SIZE	CASING O.D. (IN.)	FITTING I.D. (IN.)	SHIP WT (LB/FT)
1¼ INCH	1.660	1.380	1.2
2 INCH	2.375	2.067	1.7
4 INCH	4.500	4.026	4.0
5 INCH	5.563	5.047	6.5
6 INCH	6.625	6.065	7.7

■ Casing is Schedule 5S and meets ASTM spec A312 or A778.

MATERIALS STRENGTH DATA

NOMINAL SIZE	O.D. (IN.)	I.D. (IN.)	WT LB/FT	STRENGTH			
				COLLAPSE (PSI)	TENSILE (LB)	COLUMN (LB)¹	JOINT TENSILE (LB)
2" sched. 40 casing	2.375	2.067	3.653	3,526	85,900	6,350	15,900
2" sched. 5 casing	2.375	2.245	1.604	896	37,760	3,000	15,900
2" wire wound screen	2.375	1.900	4.0	1,665	10,880	810	15,900
4" sched. 40 casing	4,500	4.026	10.790	2,672	254,400	69,000	81,750
4" sched. 5 casing	4,500	4.334	3.915	315	92,000	26,800	81,750
4" wire wound screen	4.500	4.000	6.0	249	16,320	4,500	81,750
5" sched. 40 casing	5.563	5.047	14.6	2,231	343,200	145,490	91,500
5" sched. 5 casing	5.563	5.345	6.4	350	148,800	66,660	91,500
5" wire wound screen	5.560	5.030	4.8	134	38,600	13,040	91,500
6" sched. 40 casing	6.625	6.065	19.0	1,942	444,800	270,000	94,500
6" sched. 5 casing	6.625	6.407	7.6	129	178,400	113,660	94,500
6" wire wound screen	6.620	6.090	5.5	176	54,000	19,170	94,500

1. For all column calculations: span = 20 ft, hinged one end, fixed other end.
2. For stainless steel: Tensile strength = 80,000 psi

PVC PLASTIC PRODUCTS

- Sonic welded wires and rods produce a high-strength PVC screen with continuous slots.
- More open area per given slot size than any other non-metallic screen available.
- Resists corrosion from salts and gases commonly found in either fresh or salt waters.
- The only continuous slot non-metallic screen available without a restricting pipe base.
- Coarse threads reduce make up time and lessen chances of cross-threading.
- Chemically inert O-ring produces tight, leak-proof joints.
- Thermally attached fittings avoid need for field solvent welding which can jeopardize sample accuracy.
- PVC product threads are compatible with stainless steel product threads.
- Stainess steel locking cap can be used with PVC casing.
- Screen and casing individually wrapped for sanitary protection during shipment. Special cleaning procedures are used on each piece prior to packaging.

SCREENS

SCREEN SIZE	DIAMETER (IN.)		SHIP WT (LB/FT)	OPEN AREA	
	O.D.	I.D.		10-SLOT (.010")	20-SLOT (.020")
2 INCH	2.375	1.875	0.8	6.8	12.8
4 INCH	4.620	4.000	1.7	11.9	22.2
5 INCH	5.563	4.810	2.5	13.1	24.7
6 INCH	6.625	5.690	3.2	13.2	25.0

CASING

CASING SIZE	CASING O.D. (IN.)	FITTING I.D. (IN.)	SHIP WT (LB/FT)
2 INCH	2.375	2.067	0.7
4 INCH	4.500	4.026	2.0
5 INCH	5.563	5.033	2.7
6 INCH	6.625	5.993	3.5

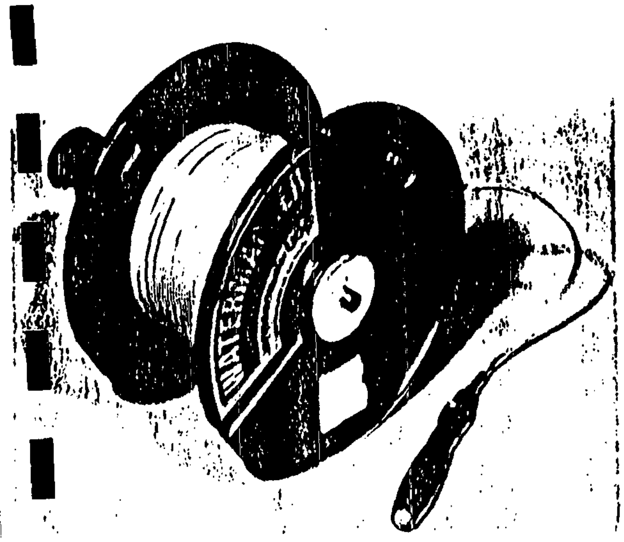
- 2 and 4 inch casing are Schedule 40; 5 and 6 inch sizes are SDR21.
- All casing meets ASTM F480 81 specifications.

MATERIALS STRENGTH DATA

NOMINAL SIZE	O.D. (IN.)	I.D. (IN.)	WT LB/FT	STRENGTH			
				COLLAPSE (PSI)	TENSILE (LB)	COLUMN (LB)[1]	JOINT TENSILE (LB)
2" sched. 40 casing	2.375	2.067	.64	307	7,500	90	1,800
2" sched. 80 casing	2.375	1.939	.88	947	9,875	125	1,800
2" wire wound screen	2.375	1.875	.8	99	1,800	25	1,800
4" sched. 40 casing	4.500	4.026	1.9	158	22,200	1,030	6,050
4" sched. 80 casing	4.500	3.826	2.6	494	30,850	1,375	6,050
4" wire wound screen	4.620	4.000	1.7	79	2,250	150	6,050
5" sdr-21 casing	5.563	5.033	2.8	110	30,870	2,200	6,050
5" sched. 80 casing	5.563	4.813	3.9	324	42,780	2,940	6,050
5" wire wound screen	5.560	4.810	2.5	79	4,610	307	6,050
6" sdr-21 casing	6.625	5.993	4.0	110	43,840	4,440	4,000
6" sched. 80 casing	6.625	5.761	5.4	292	58,830	5,760	4,000
6" wire wound screen	6.620	5.680	3.7	87	5,770	552	4,000

For all column calculations: span = 20 ft, hinged one end, fixed other end.

2. For PVC, Y_p = 7,000psi, E = 415,000psi, μ = .5.



WATER LEVEL INDICATOR

- Electronic indicator operates with two AA cell batteries.
- Insulated wire is marked every 5 ft. for easy reading. Also available in metric markings, marked every meter.
- Probe's contact surfaces are sized and spaced to provide accurate, instant response when the water level is located. On contact, the bright red light in the housing flashes on, goes off when contact is broken.
- Probe is ⅝-inch diameter to fit smallest monitoring well.

Recommended specifications format

STAINLESS STEEL WELL SCREENS AND CASING

1. General: The well screen shall be of the continuous slot, wire-wound design. It shall be fabricated by circumferentially wrapping a triangularly shaped wire around a circular array of internal rods. The wire configuration must produce inlet slots with sharp outer edges, widening inwardly so as to minimize clogging. For maximum collapse strength, each juncture between the horizontal wire and the vertical rods will be fusion welded under water by the electrical resistance method. End fittings will be welded in the screen body. The well screen shall be manufactured by Johnson Division, St. Paul, Minnesota or an equal approved by the engineer.
2. Material and Fittings: The well screen and attached end fittings shall be fabricated from a corrosion-resistant Type 304 stainless steel. End fittings provided with the screen shall be double entry Stub ACME flush screw threads with Viton O-ring on male end fitting.
3. Slot size: The screen slot size will be selected on the basis of a mechanical size analysis of either the natural water-bearing sediments or the artificially introduced filter pack material.
4. Casing: The well casing shall be Type 304 stainless steel pipe. End fittings shall be double entry Stub ACME flush screw threads. The pipe must meet ASTM A312 or A778 Specification.
5. Cleaning: Screens shall be cleaned in the following manner prior to packaging:
   A. Immerse for 5 minutes in static bath of Troy 2108 acid mix.
   B. Pressure rinse/wash with a prescribed mixture of Troy 2702 detergent and cool water.
   C. Rinse with warm water.
   D. Allow to air dry.
6. Casing shall be steam cleaned and allowed to air dry prior to packaging.
7. Packaging: Screen(s) and Casing shall be individually and separately wrapped in 4-mil protective polyethylene prior to shipment.

PVC WELL SCREENS AND CASING

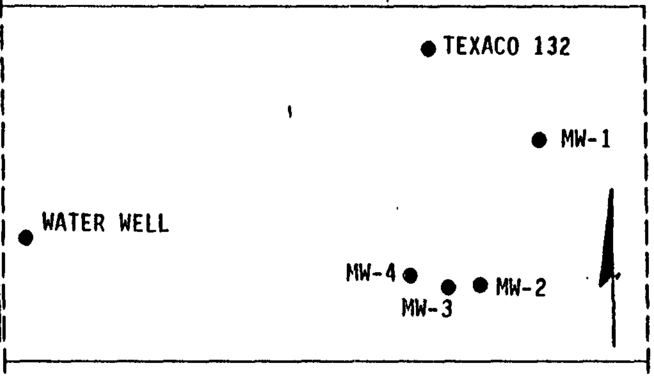
1. General: The well screen shall be of the continuous slot, wire-wound design. It shall be fabricated by circumferentially wrapping a trapezoidal wire around a circular array of internal rods. The wire configuration must produce inlet slots with sharp outer edges, widening inwardly so as to minimize clogging. For maximum collapse strength, each juncture between the horizontal wire and the vertical rods will be made by sonic welding. The well screen shall be manufactured by Johnson Division, St. Paul, Minnesota, or an equal approved by the engineer.
2. Material and Fittings: The well screen and attached end fittings shall be completely fabricated of PVC material. End fittings provided with the screen shall be double entry Stub ACME flush screw threads with Viton O-ring on male end fitting. End fittings shall be attached by thermal welding to screen.
3. Slot size: The screen slot size will be selected on the basis of a mechanical size analysis of either the natural water-bearing sediments or the artificially introduced gravel pack material.
4. Casing: The well casing shall be Type 1, grade 1, 1120 PVC pipe and meet ASTM F480-81 specifications. The minimum wall thickness must be Schedule 40 or SDR 21, whichever is greater. End fittings provided with the pipe shall be double entry Stub ACME flush screw threads.
5. Cleaning: Casing shall be cleaned in following manner prior to packaging:
   A. Scrub casing while it is soaking in Troy 2702 detergent.
   B. Rinse with warm water.
   C. Allow to air dry.
6. Packaging: Screen(s) and casing shall be individually and separately wrapped in 4-mil protective polyethylene prior to shipment.

APPENDIX B

APPENDIX B

LITHOLOGIC LOGS OF BOREHOLES

LITHOLOGIC LOG



____1/4 ____1/4 ____1/4 ____1/4 S 30 T 17S R 35E

SITE ID: Lee (Buckeye) LOCATION ID: MW-1B
SITE COORDINATES (ft.): 280.98 FSL & 1390.02 FEL
N ________ E ________
GROUND ELEVATION (ft. MSL): 3977.51'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/28/88 DATE COMPLETED: 4/29/88
FIELD REP.: Linley
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
0				0' - 5'	Caliche; white (N9) to v pale orng (10 YR 8/2) consolidated, sbang to sbrndd. Fn sand to pebble size clasts.
5				5' - 10'	Caliche; v pale orng (10 YR 8/2) to lt brn (5 YR 5/6) consolidate, ang to sbrndd, fn sand to pebble size clasts. Poorly sorted, clasts up to 3/4" in diameter.
10				10' - 15'	Caliche; as above but clasts up to 1/4" in diameter.
15				15' - 20'	Caliche; as above.
20				20' - 25'	Caliche; as above.
25				25' - 30'	Sandy Silt; lt brn (5 YR 6/4) to mod ylsh brn (10 YR 5/4) uncons, sbrndd to rndd, well sorted, silt to fn sand size grains.
30				30' - 35'	Sandy Silt/Sandstone; lt brn (5 YR 6/4) to mod ylsh brn (10 YR 5/4) to grsh red (5 R 4/2) silty sand, uncons, sandstone cons. Rndd to ang, well sorted clasts up to 1" in diameter. Sandstone contact @ 31'.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-1B
SITE COORDINATES (ft.): 280.98 FSL & 1390.02 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.51
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/28/88 DATE COMPLETED: 4/29/88
FIELD REP.: Linley/Selke
COMMENTS:

___1/4 ___1/4 ___1/4 ___1/4 S 30 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
35				35' - 40'	Sandstone; grsh red (5 R 4/2) cons, ang to sbang clasts. V fn to fn grain, mod sorted. Clasts up to 1/4" in diameter.
40				40' - 45'	Sandy Silt/Sandstone; grsh orng pnk (5 YR 7/2) uncons, sbang to sbrndd. Silt to fn grain size sand. Mod sorted. Sandstone contact at 43-44: Clasts up to 1/8" in diameter.
45				45' - 50'	Sandy Silt; grsh orng pnk (5 YR 7/2) uncons, sbrndd to rndd. Silt to fn sand, well sorted. Minor uphole contamination w/sandstone; sand fraction 40%.
50				50' - 55'	Silty Sand; grsh orng pnk (5 YR 7/2) uncons, sbrndd to rndd, well sorted, silt to fn grain sand; silt fraction 40%.
55				55' - 60'	Silty Sand; grsh orng pnk (5 YR 7/2) uncons to semicons, sbrndd to sbang. Mod sorted, silt to med fn grain sand; silt fraction ~30-35%.
60				60' - 65'	Sand; mod ylsh (10 YR 5/4) uncons, sbrndd to rndd, well sorted, v fn to med sand.
65				65' - 70'	Sand; as above.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-1B
SITE COORDINATES (ft.): 280.98 FSL & 1390.02 FEL
N ____ E ____
GROUND ELEVATION (ft. MSL): 3977.51'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/28/88 DATE COMPLETED: 4/29/88
FIELD REP.: Linley
COMMENTS:

____1/4 ____1/4 ____1/4 ____1/4 S 30 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
70				70' - 75'	Sand; as above.
75				75' - 80'	Sand; as above.
80				80' - 85'	Sand; as above.
85				85' - 90'	Sand; as above.
90				90' - 95'	Sand; as above.
95				95' - 100'	Sand; as above.
100				100' - 105'	Sand; mod ylsh brn (10 YR 5/4) uncons, sbrndd to rndd, well sorted, fn to med sand.

LITHOLOGIC LOG

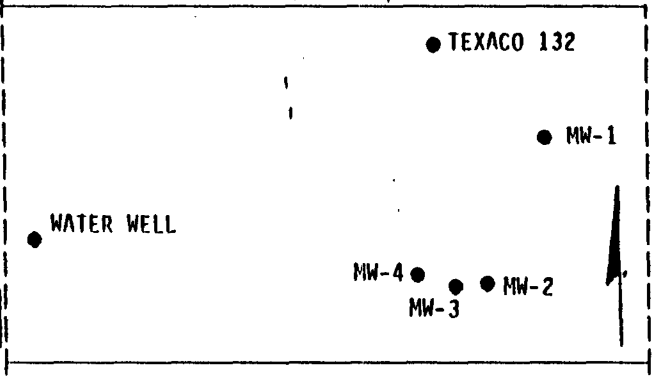
SITE ID: Lee (Buckeye) LOCATION ID: MW-18
SITE COORDINATES (ft.): 280.98 FSL & 1390.02 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.51'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/28/88 DATE COMPLETED: 4/29/88
FIELD REP.: Linley
COMMENTS:

___1/4 ___1/4 ___1/4 ___1/4 S 30 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
105				105' - 110'	Sand; as above.
110				110' - 115'	Sand; as above.
115					
120					
125					
130					
135					

LITHOLOGIC LOG



___1/4 ___1/4 ___1/4 ___1/4 S 31 T 17S R 35E

SITE ID: Lee (Buckeye) LOCATION ID: MW-2

SITE COORDINATES (ft.): 11.82 FNL & 1531.66 FEL

N ______ E ______

GROUND ELEVATION (ft. MSL): 3977.63

STATE: New Mexico COUNTY: Lea

DRILLING METHOD: Rotary/Water

DRILLING CONTR.: Larry Felkins Drilling

DATE STARTED: 4/21/88 DATE COMPLETED: ______

FIELD REP.: Linley/Selke

COMMENTS: ______

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
0				0' - 5'	Top Soil (Oil Stained) 1-3' Caliche 3-5; dusky ylsh brn (10 YR 2/2) to v pale orng (10 YR 8/2) semicons to cons, sbang to sbrndd; top soil has hydrocarbon staining from oil trucks and flair stacks. Poorly sorted; clasts from fn sand to pebbles; clasts up to 3/4" in diameter
5				5' - 10'	Caliche; v pale orng (10 YR 8/2) to mod brn (5 YR 4/4) cons, sbang to sbrndd. Poorly sorted, fn sand to pebble size clasts. Clasts up to 3/4" in diameter.
10				10' - 15'	Caliche; as above.
15				15' - 20'	Caliche; as above.
20				20' - 25'	Caliche/Clay (Top Soil); dusky brn (5 YR 2/2) to v pale orng (10 YR 8/2) semicons, sbang to sbrndd, poorly sorted. Clay to pebble size clasts; clasts up to 1/2" in diameter. Clay fraction 35-40%.
25				25' - 30'	Caliche/Clay (Top Soil); as above. Clay fraction ~40%.
30				30' - 35'	Caliche/Clay (Top Soil); as above. Clay fraction ~25-30%.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-2
SITE COORDINATES (ft.): 11.82 FNL & 1531.66 FEL
N ____ E ____
GROUND ELEVATION (ft. MSL): 3977.63
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/21/88 DATE COMPLETED: ____
FIELD REP.: Linley
COMMENTS: ____

____1/4 ____1/4 ____1/4 ____1/4 S 31 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
35				35' - 40'	Sandy Silt; mod ylsh brn (10 YR 5/4) uncons, sbrndd to sbang. Poorly sorted, silt to gravel size clasts. Clasts up to 1/4" in diameter. Minor sandstone clasts.
40				40' - 45'	Sandy Silt; grysh orng pnk (5 YR 7/2) uncons, mod well sorted, sbrndd to rndd, silt to fn sand size grains.
45				45' - 50'	Sandy Silt; as above.
50				50' - 55'	Sandy Silt; as above.
55				55' - 60'	Sandy Silt/Caliche; grsh orng pnk (5 YR 7/2) to mod brn (5 YR 4/4) uncons to cons. Poorly sorted, silt to pebble size clasts. Clast up to 1/2". Caliche cons contact at 57'.
60				60' - 65'	Silty Sand; mod brn (5 YR 4/4) to grsh orng (10 YR 7/4) semicons, poorly sorted silt to fn gravel size clasts. Minor claiche and sandstone clasts.
65				65' - 70'	Sand; mod brn (5 YR 4/4) uncons., well sorted, v fn to med sand, sbrndd to rndd.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-2
SITE COORDINATES (ft.): 11.82 FNL & 1531.66 FEL
N ____ E ____
GROUND ELEVATION (ft. MSL): 3977.63'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/21/88 DATE COMPLETED: ____
FIELD REP.: Linley
COMMENTS: ____

____1/4 ____1/4 ____1/4 ____1/4 S 31 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
70				70' - 75'	Sand/Caliche; mod brn (5 YR 4/4) to v fn orng (10 YR 8/2) uncons, mod sorted, v fn to med fn gravel. Caliche clast up to 1/2". Caliche contact at 72'.
75				75' - 80'	Sand; mod brn (5 YR 4/4) uncons, well sorted, v fn to med sand. Minor caliche clast from 78-79.5': Sbrndd to ang.
80				80' - 85'	Sand; mod brn (5 YR 4/4) uncons, well sorted, v fn to med sand, sbrndd to rndd.
85				85' - 90'	Sand; as above.
90				90' - 95'	Sand; as above.
95				95' - 100'	Sand; as above.
100				100' - 105'	Sand; mod brn (5 YR 4/4) uncons, well sorted, fn to med sand, sbrndd to rndd.

LITHOLOGIC LOG

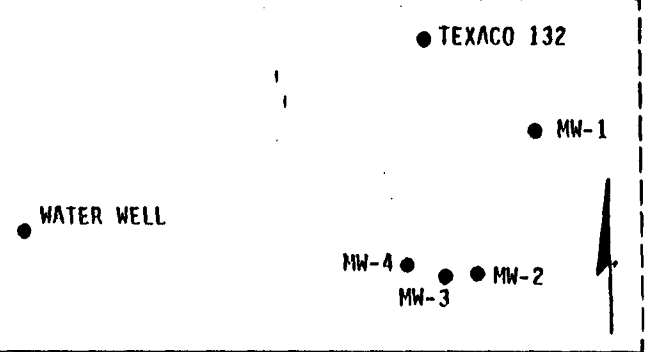
SITE ID: Lee (Buckeye) LOCATION ID: MW-2
SITE COORDINATES (ft.): 11.82 FNL & 1531.66 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.63'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/21/88 DATE COMPLETED: ______
FIELD REP.: Linley
COMMENTS: ______

____1/4 ____1/4 ____1/4 ____1/4 S 31 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
105				105' - 110'	Sand; as above.
110				110' - 115'	Sand; as above.
115					
120					
125					
130					
135					

LITHOLOGIC LOG



___1/4 ___1/4 ___1/4 ___1/4 S 31 T 17S R 35E

SITE ID: Lee (Buckeye) LOCATION ID: MW-3
SITE COORDINATES (ft.): 9.09 FNL & 1597.74 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.88'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: 4/27/88
FIELD REP.: Linley
COMMENTS:

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
0				0' - 5'	Top Soil/Caliche; grysh brn (5 YR 3/2) to v pale orng (10 YR 8/2) cons to semicons, sbrndd to ang, poorly sorted, fn sand to fn pebbles. Clasts up to 1/2" in diameter. Top soil stained with hydrocarbons.
5				5' - 10'	Caliche; v pale orng (10 YR 8/2) cons, sbrndd to sbang, poorly sorted. V fn to pebble size clasts. Clasts up to 1/2".
10				10' - 15'	Caliche; as above.
15				15' - 20'	Caliche/Clay; v pale orng (10 YR 8/2) to grysh brn (5 YR 3/2) to mod brn (5 YR 4/4) semi to cons, poorly sorted, fn sand to med gravel clast. Clasts up to 1/8", sbrndd to ang.
20				20' - 25'	Caliche/Silty Sand; mod ylsh brn (10 YR 5/4) to pale ylsh brn (10 YR 6/2) semi to uncons, sbrndd to sbang. Poorly sorted, silt to fn pebble size grains. Clasts up to 1/4". Caliche gravel fraction ~40%.
25				25' - 30'	Silty Sand; mod ylsh brn (10 YR 5/4) uncons, sbrndd to rndd, well sorted, silt to fn sand.
30				30' - 35'	Silty Sand; as above.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-3
SITE COORDINATES (ft.): 9.09 FNL & 1597.74 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.88
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: 4/27/88
FIELD REP.: Linley
COMMENTS:

___1/4 ___1/4 ___1/4 ___1/4 S 31 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
35				35' - 40'	Silty Sand/Sandstone; mod ylsh brn (10 YR 5/4) uncons to cons. Poorly sorted, rndd to ang, silt to fn pebble size clasts. Sandstone contact at 38'.
40				40' - 45'	Silty Sand/Sandstone; as above.
45				45' - 50'	Silty Sand; mod ylsh brn (10 YR 5/4) uncons sbrndd to rndd, silt to fn sand.
50				50' - 55'	Silty Sand; grsh orng pnk (5 YR 7/2) uncons, well sorted, sbrndd to rndd, silt to v fn sand.
55				55' - 60'	Silty Sand/Sandstone; grsh orng pnk (5 YR 7/2) uncons to cons., silt to med gravel size clasts sand contact at 57'.
60				60' - 65'	Sand; mod brn (5 Y 4/4) uncons, well sorted, v fn to med sand, sbrndd to rndd grains.
65				65' - 70'	Sand; as above.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-3
SITE COORDINATES (ft.): 9.09 FNL & 1597.74 FEL
N ____ E ____
GROUND ELEVATION (ft. MSL): 3977.88
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: 4/27/88
FIELD REP.: Linley
COMMENTS:

____1/4 ____1/4 ____1/4 ____1/4 S 31 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
70				70' - 75'	Sand; as above.
75				75' - 80'	Sand; as above.
80				80' - 85'	Sand; as above.
85				85' - 90'	Sand; as above.
90				90' - 95'	Sand; as above.
95				95' - 100'	Sand; as above.
100				100' - 105'	Sand; mod brn (5 YR 4/4) uncons, well sorted, fn to med sand, rndd to sbrndd.

LITHOLOGIC LOG

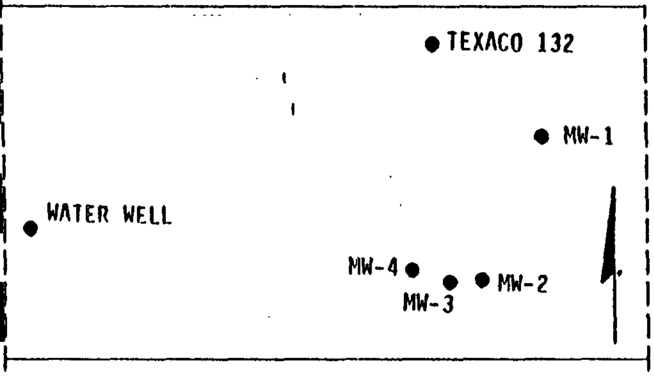
SITE ID: Lee (Buckeye) LOCATION ID: MW-3
SITE COORDINATES (ft.): 9.09 FNL & 1597.74 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.88
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: 4/27/88
FIELD REP.: Linley
COMMENTS:

____1/4 ____1/4 ____1/4 ____1/4 S 31 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
105				105' - 110'	Sand; as above.
110				110' - 115'	Sand; as above.
115					
120					
125					
130					
135					

LITHOLOGIC LOG



___1/4 ___1/4 ___1/4 ___1/4 S 30 T 17S R 35E

SITE ID: Lee (Buckeye) LOCATION ID: MW-4
SITE COORDINATES (ft.): 5.10 FSL & 1671.23 FEL
N ________ E ________
GROUND ELEVATION (ft. MSL): 3977.86'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: ________
FIELD REP.: Linley
COMMENTS: Hydrocarbon odor ~68-85'

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
0				0' - 5'	Caliche/Top Soil; grsh brn (5 YR 8/2) to v pale orng (10 YR 8/2) cons, to semicons, sbrndd to ang, poorly sorted, fn sand to fn pebbles. Clasts up to 1/4". Top soil stained w/hydrocarbons (waste oil).
5				5' - 10'	Caliche; v pale orng (10 YR 7/2) cons, sbrndd to sbang, poorly sorted, v fn grain to med gravel clasts. Clasts up to 1/4".
10				10' - 15'	Caliche; as above.
15				15' - 20'	Caliche/Sand; v pale orng (10 YR 7/2) to mod ylsh brn (10 YR 6/2) uncons silt to medium sand. Caliche/sand contact at 15-16'.
20				20' - 25'	Silty Sand; mod ylsh brn (10 YR 5/4) uncons, well sorted, sbrndd to rndd, silt to fn sand.
25				25' - 30'	Silty Sand/Sandstone; pale ylsh orng (10 YR 6/2) uncons, well sorted, sbrndd to sbang, silt to fn sand. Sandstone contact at 29' very thin.
30				30' - 35'	Silty Sand; pale ylsh orng (10 YR 6/2) uncons, well sorted, sbrndd to rndd. Silt to fn sand.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-4
SITE COORDINATES (ft.): 5.10 FSL & 1671.23 FEL
N ____ E ____
GROUND ELEVATION (ft. MSL): 3977.86'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: ____
FIELD REP.: Linley
COMMENTS: Hydrocarbon odor ~68-85'

____1/4 ____1/4 ____1/4 ____1/4 S 30 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
35				35' - 40'	Sand; mod ylsh brn (10 YR 5/4) uncons, sbrndd to rndd, well sorted, v fn to med sand.
40				40' - 45'	Sand; as above.
45				45' - 50'	Sand; as above.
50				50' - 55'	Sand/Sandstone; mod ylsh brn (10 YR 5/4) uncons, to semicons, mod sorted. V fn to med sand, sandstone at 54'; clasts up to 1/4".
55				55' - 60'	Sand; mod brn (5 YR 4/4) uncons, well sorted, fn to med sand; sbrndd to rndd.
60				60' - 65'	Sand; as above.
65				65' - 70'	Sand; as above.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-4
SITE COORDINATES (ft.): 5.10 FSL & 1671.23 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.86'
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: ______
FIELD REP.: Linley
COMMENTS: ______

____1/4 ____1/4 ____1/4 ____1/4 S 30 T 17S R 35E

LOCATION DESCRIPTION:

DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
70				70' - 75'	Sand; as above.
75				75' - 80'	Sand; as above.
80				80' - 85'	Sand; as above.
85				85' - 90'	Sand; as above.
90				90' - 95'	Sand; as above.
95				95' - 100'	Sand; as above.
100				100' - 105'	Sand; mod brn (5 YR 4/4) uncons, well sorted, fn to med sand, rndd to sbrndd.

LITHOLOGIC LOG

SITE ID: Lee (Buckeye) LOCATION ID: MW-4
SITE COORDINATES (ft.): 5.10 FSL & 1671.23 FEL
N ______ E ______
GROUND ELEVATION (ft. MSL): 3977.86
STATE: New Mexico COUNTY: Lea
DRILLING METHOD: Rotary/Water
DRILLING CONTR.: Larry Felkins Drilling
DATE STARTED: 4/22/88 DATE COMPLETED: ______
FIELD REP.: Linley
COMMENTS: ______

____1/4 ____1/4 ____1/4 ____1/4 S 30 T 17S R 35E

LOCATION DESCRIPTION:

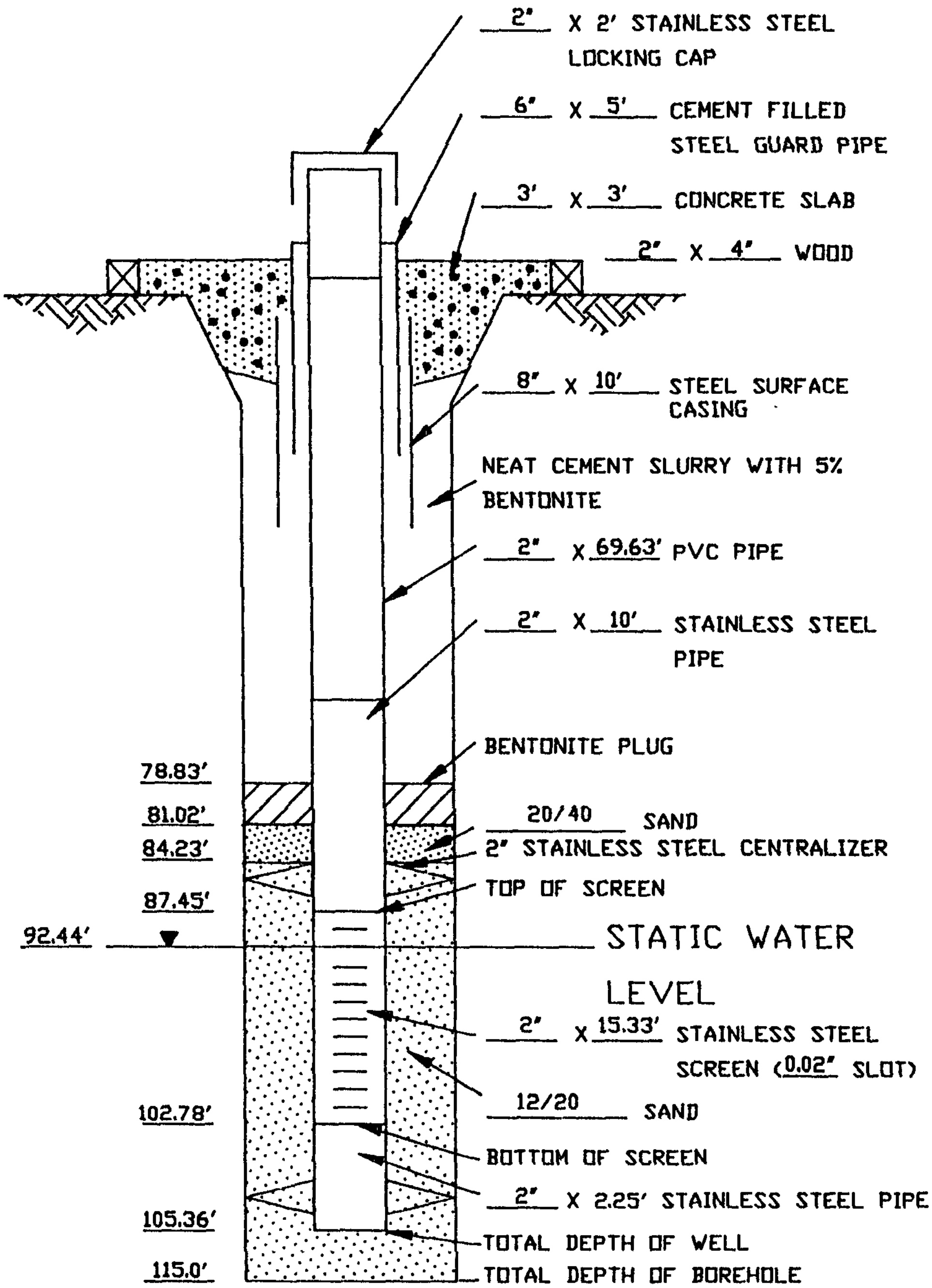
DEPTH	VISUAL %	LITH	DRILLING TIME SCALE:	SAMPLE TYPE AND INTERVAL	LITHOLOGIC DESCRIPTION
105				105' - 110'	Sand; as above.
110				110' - 115'	Sand; as above.
115					
120					
125					
130					
135					

APPENDIX C

GCL

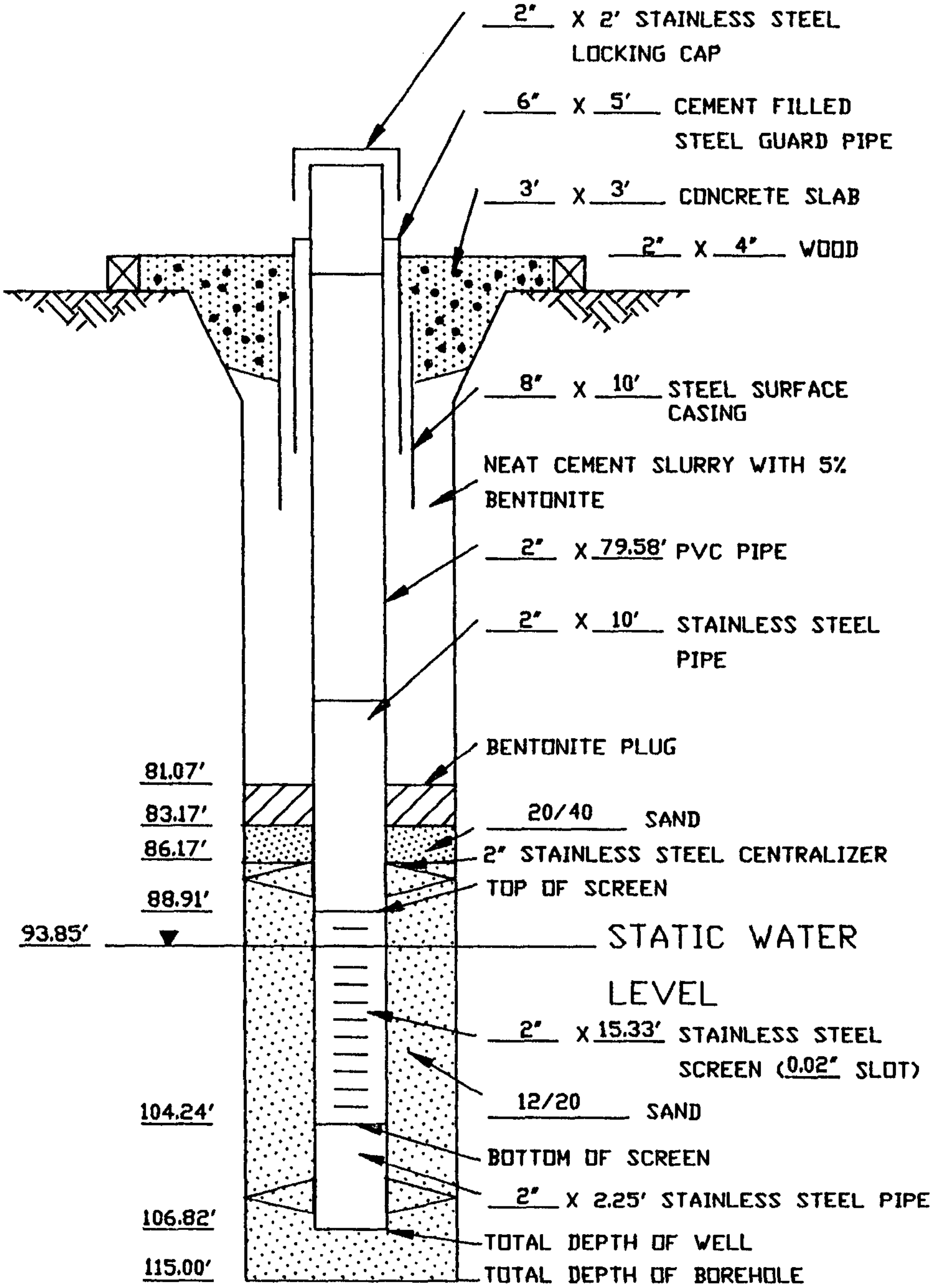
APPENDIX C

WELL COMPLETION DIAGRAMS



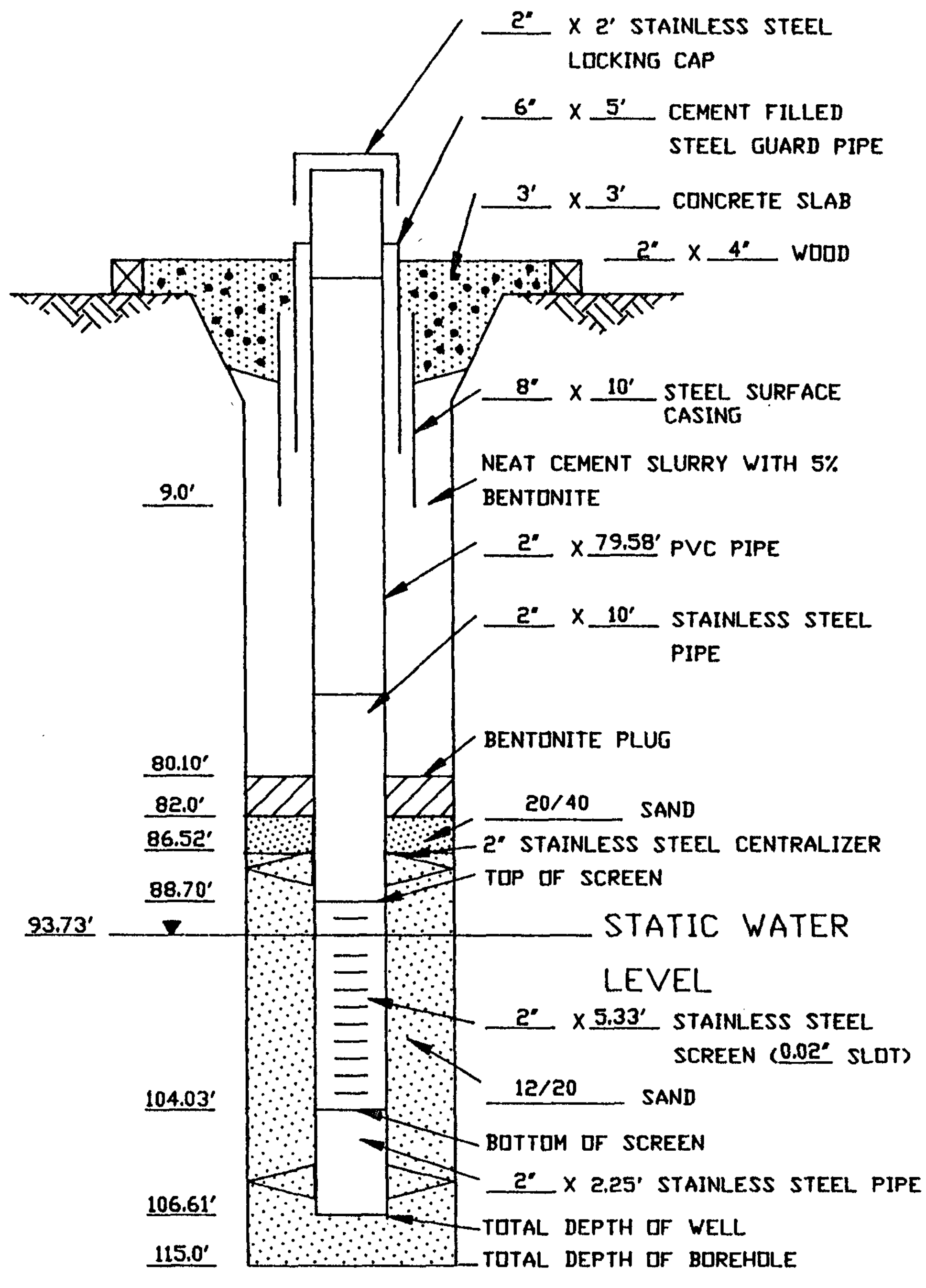
GROUND WATER MONITOR WELL COMPLETION DIAGRAM

MONITOR WELL MW-1B
PHILLIPS LEE PLANT



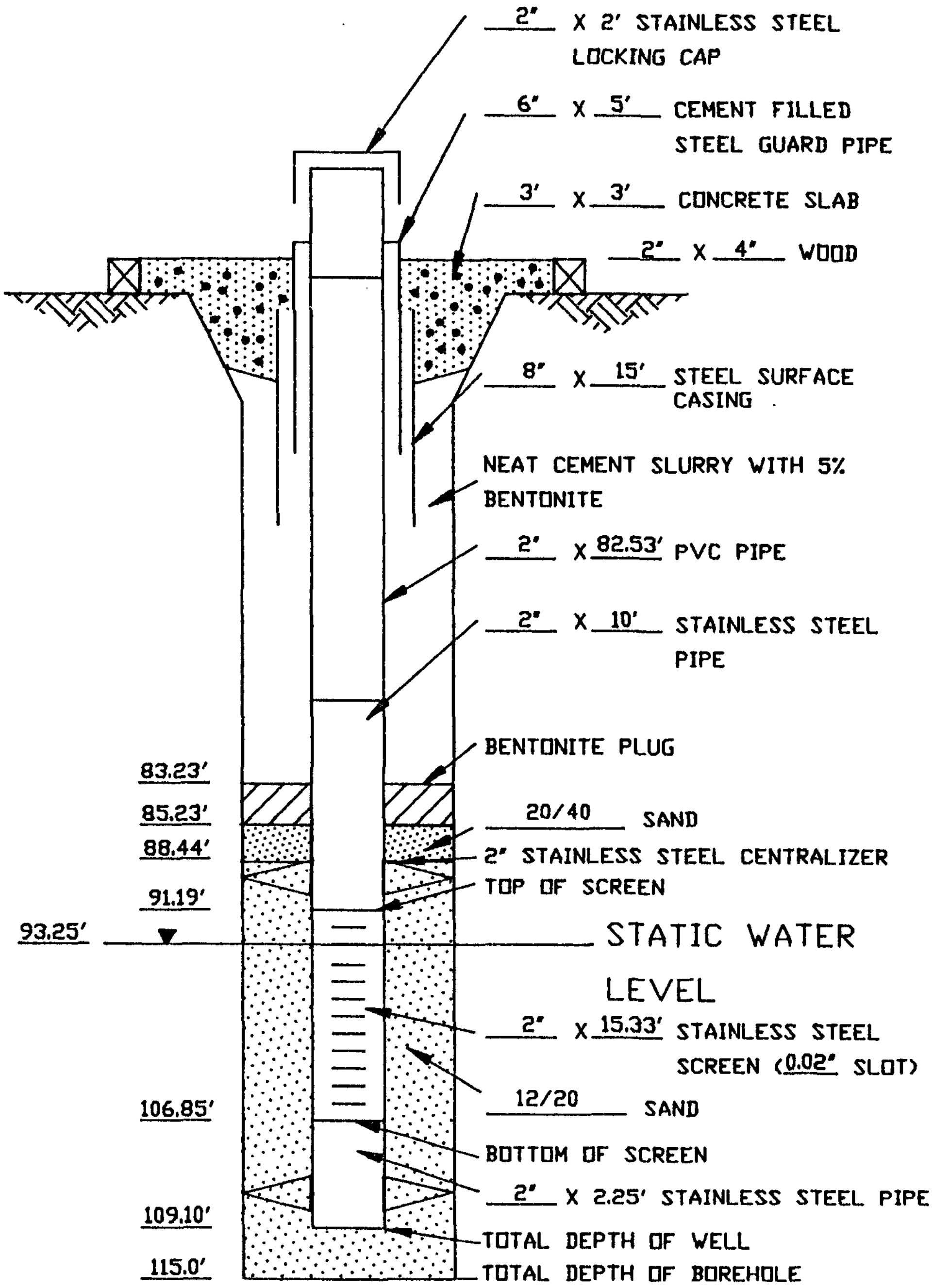
GROUND WATER MONITOR WELL COMPLETION DIAGRAM

MONITOR WELL MW-4
PHILLIPS LEE PLANT



GROUND WATER MONITOR WELL COMPLETION DIAGRAM

MONITOR WELL MW-3
PHILLIPS LEE PLANT



GROUND WATER MONITOR WELL COMPLETION DIAGRAM

MONITOR WELL MW-2

PHILLIPS LEE PLANT

PHILLIPS 66
PHILLIPS 66 NATURAL GAS COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY
ODESSA, TEXAS 79762
4001 PENBROOK

MAY 12 1986
OIL CONSERVATION DIVISION

May 8, 1986

Monitor Well Analyses
Lee and Lusk Gasoline Plants

Mr. Roger C. Anderson
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Roger:

Attached please find copies of the chemical analyses performed on water samples from the monitoring wells at Lee and Lusk Gasoline Plants.

If you have any questions regarding these results, please contact me at (915) 367-1316.

Yours truly,

Michael D. Ford

Michael D. Ford
Environmental Analyst

MDF:ggp

Attachments

4-15-86
copied for:
R.D. Skinner
W.C. Stoltz
R.B. Copeland
M.D. Ford
Files 218, 320, 388, 391
FPC

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

HEALTH
ENVIRONMENT department

STATE OF NEW MEXICO

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

ENVIRONMENT
CONTROL
APR 10 1986
B. F. Ballard
DGF	MEM	

8 April 1986

B.F. Ballard
Director, Environmental Control
10 D4 Phillips Building
Phillips Petroleum Company
Bartlesville, Oklahoma 74004

Dear Mr. Ballard:

Enclosed please find the results of analyses on the samples EID split with Phillips at your plants in Artesia, Eunice, Lee and Lusk, New Mexico.

If you have any questions regarding these results, please contact me at (505) 827-2931.

Sincerely,

Ann Claassen

Ann Claassen
Water Resource Specialist
Hazardous Waste Section

RESULTS OF SAMPLING

PHILLIPS PETROLEUM GAS REFINERIES

ARTESIA, EUNICE, LEE AND LUSK

Attached are the results for the New Mexico Environmental Improvement Division's samples taken at the Philllips plants in August 1986. At each plant, samples were taken from each of the RCRA wells (4 wells per plant). At Lusk and Artesia, samples were also taken from surface impoundments. Table 1 identifies each sample.

All samples were collectd by Alice Barr with the assistance of Kelley Crossman. The samples were appropriately preserved and shipped under chain-of-custody to the State Laboratory in Albuquerque for analysis. Table 2 gives the analytical procedure for each parameter. Note that calcium and magnesium are reported under both General Chemistry and Metals. The Gen. Chem results were obtained by the Water Chemistry Section using wet analytical techniques; the Metals results were obtained by the Metals Section using ICAP.

All results are in milligrams per liter (mg/l), except as follows:

pH	pH units
conductivity	micromhos/cm (lab cond. at 25 °C)
temperature	degrees Celcius
organics	parts per billion

Abbreviations and symbols used to report the results are as follows:

Cond.	conductivity
GEN. CHEM.	general chemistry
ND	not detected (see below)
NR	not reported
PPB	parts per billion
Temp.	temperature (in Celcius)
TDS	total dissolved solids (total filterable residue)
TOC	total organic carbon
<	less than
>	greater than
~	approximately
[ ]	tentative identification

The value of many metals is reported as ND (none detected). The detection limits, in mg/l, were as follows:

Arsenic	0.005
Mercury	0.0005
Selenium	0.005
Manganese	0.05
All others	0.1

TABLE 1. SAMPLE IDENTIFICATION, PHILLIPS PETROLEUM PLANTS

NOTE: The designation of a well as upgradient or downgradient is Phillip's designation.

Phillips Petroleum -- Artesia

MW-1	monitoring well 1, downgradient
MW-3	monitoring well 3, upgradient
MW-6	monitoring well 6, downgradient
PND-1,w	first RCRA pond, surface water
PND-4,s	first RCRA pond, sediment
PND-2,s	second pond (middle), sediment
PND-3,,w	third pond, surface water
Blank	Field blank using deionized water

Phillips Petroleum -- Eunice

MW-1	monitoring well 1, upgradient
MW-2	monitoring well 2, downgradient
MW-3	monitoring well 3, downgradient
MW-4	monitoring well 4, downgradient

Phillips Petroleum -- Lee

MW-1	monitoring well 1, upgradient
MW-2	monitoring well 2, downgradient
MW-3	monitoring well 3, downgradient
MW-4	monitoring well 4, downgradient
Blank	Field blank using deionized water

Phillips Petroleum -- Lusk

MW-1	monitoring well 1, upgradient
MW-2	monitoring well 2, downgradient
MW-3	monitoring well 3, downgradient
MW-4	monitoring well 4, downgradient
R-PND,w	RCRA pond, surface water
R-PND,s	RCRA pond, sediment
O-PND,s	Oily pond next to RCRA pond, sludge

TABLE 2. ANALYTICAL METHODS

PARAMETER	PRESERVATION	ANALYTICAL METHOD
Gen. Chem.		
Field pH	none	Hach Mini pH Meter
Field Cond.	none	Yellow Springs S-C-T Meter
Calcium	ice	EPA Method 215.2
Magnesium	ice	EPA Methods 130.2 and 215.2
Sodium	ice	Std. Methods 325(b)
Potassium	ice	Std. Methods 325(b)
Bicarbonate	ice	EPA Method 310.1
Chloride	ice	EPA Method 325.2
Sulfate	ice	EPA Method 375.2
TDS	ice	EPA Method 160.1
Fluoride	ice	EPA Method 340.2
Nitrate-N	ice, H_2SO_4	EPA Method 352.2
TOC	ice, H_2SO_4	EPA Method 415.1
Metals		
Arsenic	HNO_3	EPA Method 206.2
Mercury	HNO_3	EPA Method 245.1
Selenium	HNO_3	EPA Method 270.2
All others (ICAP Scan)	HNO_3	EPA Method 207
Organics		
GC/MS Purgeables	Ice	EPA Method 624

PHILLIPS PETROLEUM -- LEE

	MW-1	MW-2	MW-3	MW-4	Blank*
GEN CHEM..					
Field pH	7.9	7.3	7.4	7.5	-
Field Cond.	345	475	490	468	-
Field Temp.	23	25	25	23	-
Lab pH	8.1	8.21	7.96	7.97	7.25
Lab Cond.	385	453	487	415	34
Calcium	24.0	41.6	60.0	60.0	4.0
Magnesium	12.2	16.6	19.5	12.0	4.9
Sodium	32.2	36.8	25.3	16.1	0
Potassium	0.82	1.56	1.17	0.78	0
Bicarbonate	120.9	199	157.4	156	7
Chloride	32.5	32.3	41.9	34.2	1.6
Sulfate	43.8	43.4	41.7	39.2	4.3
TDS	233	323	328	310	20
Fluoride	1.78	0.79	0.63	0.56	0.10
Nitrate-N	0.63	0.96	1.91	2.45	1.70
TOC	44.9	8.13	1.4	2.51	<1
METALS					
Arsenic	0.008	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND
Aluminum	1.5	0.4	0.4	0.2	ND
Barium	0.1	0.1	0.1	0.2	ND
Beryllium	ND	ND	ND	ND	ND
Boron	0.1	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND
Calcium	33	70	53	67	3.3
Chromium	ND	ND	ND	ND	ND
Cobalt	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND
Iron	0.9	0.4	0.7	0.3	ND
Lead	ND	ND	ND	ND	ND
Magnesium	5.7	11	8.1	11	0.4
Manganese	0.5	0.4	0.14	0.4	ND
Molybdenum	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND
Silicon	12	14	13	13	2.0
Silver	ND	ND	ND	ND	ND
Strontium	0.3	0.6	0.5	0.6	ND
Tin	ND	ND	ND	ND	ND
Vanadium	ND	ND	ND	ND	ND
Ytrrium	ND	ND	ND	ND	ND
Zinc	ND	ND	ND	ND	ND

* Sample containers filled in the field from NMEID deionized water container.

PHILLIPS PETROLEUM -- LEE

Gas Chromatograph/Mass Spectrometer Purgeable Screen

Results in [brackets] are tentative (unconfirmed) results.

SAMPLE	ORGANICS DETECTED	PPB
MW-1	Benzene	47
	Toluene	17
	m-Xylene	1
	o-Xylene	6
	[Tetrahydrofuran]	[>500]
	[Butanone]	[>500]
MW-2	Tetrahydrofuran	[>20]
	Butanone	[>20]
	[Pentene]	[5]
	[Cyclohexane]	[40]
MW-3	[Tetrahydrofuran]	[>50]
MW-4	[Tetrahydrofuran]	[>200]
Blank*	Trichloromethane	25
	Bromodichloromethane	7
	Bibromochloromethane	5
	Bromoform	4

* Sample containers filled in the field from NMEID deionized water container.

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1703 W. Industrial Avenue [915-683-3348] • P.O. Box 2150 • Midland, Texas 79701

Client No. 3355796

File No. C-1950-W

Report No. 36762

Report Date 9-23-85

Date Received 8-28-85

Delivered By A. Hubble

Report of tests on: Water

Client: Phillips Petroleum Company

Identification: Lee Plant, Well No. 1

		mg/L
Arsenic	Less than	0.05
Barium	Less than	1
Cadmium	Less than	0.01
Chromium	Less than	0.05
Lead		0.05
Mercury	Less than	0.002
Selenium	Less than	0.01
Silver	Less than	0.05
Nickel	Less than	0.2
Cyanide		0.003

Technician: JDN, GMB, LT, MT

Copies 3cc Phillips Petroleum Co.
Attn: Mike Ford

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Client No. 3355796

File No. C-1950-W

Report No. 36763

Report Date 9-23-85

Report of tests on: Water

Date Received 8-28-85

Client: Phillips Petroleum Company

Delivered By A. Hubble

Identification: Lee Plant, Well No. 2

		mg/L
Arsenic----------------------------------	Less than	0.05
Barium-----------------------------------	Less than	1
Cadmium----------------------------------	Less than	0.01
Chromium---------------------------------	Less than	0.05
Lead-------------------------------------	Less than	0.05
Mercury----------------------------------	Less than	0.002
Selenium---------------------------------	Less than	0.01
Silver-----------------------------------	Less than	0.05
Nickel-----------------------------------	Less than	0.2
Cyanide----------------------------------	Less than	0.001

Technician: JDN, GMB, LT, MT

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Attn: Mike Ford

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Client No. 3355796

File No. C-1950-W

Report No. 36764

Report Date 9-23-85

Date Received 8-28-85

Delivered By A. Hubble

Report of tests on: Water

Client: Phillips Petroleum Company

Identification: Lee Plant, Well No. 3

		mg/L
Arsenic	Less than	0.05
Barium	Less than	1
Cadmium	Less than	0.01
Chromium	Less than	0.05
Lead	Less than	0.05
Mercury	Less than	0.002
Selenium	Less than	0.01
Silver	Less than	0.05
Nickel	Less than	0.2
Cyanide	Less than	0.001

Technician: JDN, GMB, LT, MT

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Client No. 3355796

File No. C-1950-W

Report No. 36765

Report Date 9-23-85

Date Received 8-28-85

Delivered By A. Hubble

Report of tests on: Water

Client: Phillips Petroleum Company

Identification: Lee Plant, Well No. 4

		mg/L
Arsenic	Less than	0.05
Barium	Less than	1
Cadmium	Less than	0.01
Chromium	Less than	0.05
Lead	Less than	0.05
Mercury	Less than	0.002
Selenium	Less than	0.01
Silver	Less than	0.05
Nickel	Less than	0.2
Cyanide	Less than	0.001

Technician: JDN, GMB, LT, MT

Copies 3cc Phillips Petroleum Co.
Attn: Mike Ford

SOUTHWESTERN LABORATORIES
Gary M Burch

Attachment to Olb-1-86

TABLE I

VOLATILE ORGANIC ANALYSIS OF LEE MONITORING WELL WATERS

Sample received: August 28, 1985

Analysis	Concentration, ppb			
	M.W. #1	M.W. #2	M.W. #3	M.W. #4
Chloromethane	2.6	2.5	2.9	4.5
Vinyl Chloride	<1.	<1.	<1.	<1.
Chloroethane	<1.	<1.	<1.	<1.
Bromomethane	<1.	<1.	<1.	<1.
1,1-dichloroethylene	<1.	<1.	<1.	<1.
Methylene Chloride	7.0	5.7	4.7	6.0
trans-1,2-dichloroethylene	<1.	<1.	<1.	<1.
1,1-dichloroethane	<1.	<1.	<1.	<1.
Chloroform	1.4	1.4	1.3	1.5
1,2-dichloroethane	<1.	<1.	<1.	<1.
1,1,1-trichloroethane	<1.	<1.	<1.	<1.
Benzene	4.6	<1.	6.1	1.4
Carbontetrachloride	<1.	<1.	<1.	<1.
1,2-dichloropropane	<1.	<1.	20.	<1.
Bromodichloromethane	<1.	<1.	<1.	<1.
Trichloroethylene	<1.	<1.	<1.	<1.
2-chloroethylvinyl Ether	<1.	<1.	<1.	<1.
trans-1,3-dichloropropene	<1.	<1.	<1.	<1.
cis-1,3-dichloropropene	<1.	<1.	<1.	<1.
1,1,2-trichloroethane	<1.	<1.	<1.	<1.
Toluene	2.1	<1.	161.	<1.
Dibromochloromethane	<1.	<1.	<1.	<1.
1,1,2,2-tetrachloroethylene	<1.	<1.	<1.	<1.
Chlorobenzene	<1.	<1.	<1.	<1.
Ethylbenzene	<1.	<1.	<1.	<1.
Bromoform	<1.	<1.	<1.	<1.
1,1,2,2-tetrachloroethane	<1.	<1.	<1.	<1.
Fluorobenzene	<1.	<1.	<1.	<1.
31509-36-	1	2	3	4

Attachment to Olb-20-86

TABLE I

SEMIVOLATILE ORGANIC ANALYSES OF LEE MONITORING WELL WATERS

Sample received: August 28, 1985

Analysis	Concentration, ppb			
	M.W. #1	M.W. #2	M.W. #3	M.W. #4
Bis(2-chloroethyl)ether	<20	<20	<20	<20
1,3-dichlorobenzene	<20	<20	<20	<20
1,4-dichlorobenzene	<20	<20	<20	<20
1,2-dichlorobenzene	<20	<20	<20	<20
Bis(2-chloroisopropyl)ether	<20	<20	<20	<20
N-nitorsodi-n-propylamine	<20	<20	<20	<20
Nitrobenzene	<20	<20	<20	<20
Hexachloroethane	<20	<20	<20	<20
Isophorone	<20	<20	<20	<20
n-nitrosodimethylamine	<20	<20	<20	<20
Bis-(2-chloroethoxy)methane	<20	<20	<20	<20
1,2,4-trichlorobenzene	<20	<20	<20	<20
Naphthalene	<20	<20	<20	<20
Hexachlorobutadiene	<20	<20	<20	<20
Hexachlorocyclopentadiene	<20	<20	<20	<20
2-chloronaphthalene	<20	<20	<20	<20
2,6-dinitrotoluene	<20	<20	<20	<20
Dimethylphthalate	<20	<20	<20	<20
Acenaphthylene	<20	<20	<20	<20
Acenaphthene	<20	<20	<20	<20
2,4-dinitrotoluene	<20	<20	<20	<20
Diethylphthalate	<20	<20	<20	40
Fluorene	<20	<20	<20	<20
4-chlorophenylphenylether	<20	<20	<20	<20
N-nitrosodiphenylamine	<20	<20	<20	53
4-bromophenylphenylether	<20	<20	<20	<20
Hexachlorobenzene	<20	<20	<20	<20
Phenanthrene	<20	<20	<20	<20
Anthracene	<20	<20	<20	<20
Dibutyl phthalate	<20	<20	<20	<20
Fluoranthene	<20	<20	<20	<20
Pyrene	<20	<20	<20	<20
Benzylbutylphthalate	<20	<20	<20	<20
Bis(2-ethylhexyl)phthalate	<20	<20	<20	<20
Benzidine	<20	<20	<20	<20
Di-n-octylphthalate	<20	<20	<20	<20
Benzo(b&k)fluoranthene	<20	<20	<20	<20
Benzo(a)pyrene	<20	<20	<20	<20
3-3'-dichlorobenzidine	<20	<20	<20	<20
Chrysene & benzo(a)anthracene	<20	<20	<20	<20
Indeno(1,2,3-c,d)pyrene	<20	<20	<20	<20
Dibenzo(a,h)anthracene	<20	<20	<20	<20
Benzo(g,h,i)perylene	<20	<20	<20	<20
Phenol	<20	<20	<20	<20
2-chlorophenol	<20	<20	<20	<20
2-nitrophenol	<20	<20	<20	<20
2,4-dimethylphenol	<20	<20	<20	<20
2,4-dichlorophenol	<20	<20	<20	<20
4-chloro-3-methylphenol	<20	<20	<20	<20
2,4,6-trichlorophenol	<20	<20	<20	<20
2,4-dinitrophenol	<20	<20	<20	<20
4-nitrophenol	<20	<20	<20	<20
2-methyl-4,6-dinitrophenol	<20	<20	<20	<20
Pentachlorophenol	<20	<20	<20	<20
31509-36-	1	2	3	4

PHILLIPS 66 NATURAL GAS COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY

ODESSA, TEXAS 79762
4001 PENBROOK

May 8, 1986

Monitor Well Analyses
Lee and Lusk Gasoline Plants

Mr. Roger C. Anderson
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Roger:

Attached please find copies of the chemical analyses performed on water samples from the monitoring wells at Lee and Lusk Gasoline Plants.

If you have any questions regarding these results, please contact me at (915) 367-1316.

Yours truly,

Michael D. Ford

Michael D. Ford
Environmental Analyst

MDF:ggp

Attachments

Gulf File: Phillips Plants

PHILLIPS 66

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA 74004
PHONE: 918 661-6600 CABLE CODE: PHILPETROL TELEX: 49-2455

ENGINEERING AND SERVICES

HAZARDOUS WASTE SECTION

March 21, 1986

Lusk, Lee, Eunice and Artesia Plants
Supplemental Sampling Results

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Jack Ellvinger, Environmental Supervisor
Hazardous Waste Section
New Mexico Environmental Improvement Division
P. O. Box 968
Harold-Runnels Building
Santa Fe, NM 87501-0968

Dear Mr. Ellvinger:

Samples were procured from the Lusk, Lee, Eunice and Artesia Plants' water sampling wells and surface impoundments in the Fall of 1985 during a joint sampling effort by Phillips and the New Mexico Environmental Improvement Division (EID). Each sample that was procured was split between Phillips and the EID. Results of the analysis of Phillips' samples are attached.

Referring to the attached data, please note that for the Lusk, Lee and Eunice Plants, "well #1" corresponds to the "upgradient" well; in the case of the Artesia Plant, "well #3" is the upgradient well. Samples from monitoring wells #1 and #2 at the Eunice Plant were lost because the containers holding these samples froze and broke while being stored in a laboratory refrigerator prior to analysis. Analyses of the samples for metals were performed by Southwestern Laboratories of Midland, Texas. Analyses of the samples for volatile and semivolatile compounds were performed by the Phillips Research Center, located in Bartlesville, Oklahoma.

Phillips requests that EID provide Phillips a copy of all analytical results from the analysis of EID's split samples from the Lusk, Lee, Eunice and Artesia Plants.

It is Phillips' understanding that EID is currently preparing a public notice which, when published by EID in a local newspaper (or broadcast via radio or television), will extend to the public and to Phillips the opportunity to submit comments on the closure plans previously submitted by Phillips for the Lusk, Lee, Eunice and Artesia Plants. The Lusk plan is dated January 23, 1984; the other three plans are dated July 27, 1984. Following the comment period and after any questions are adequately addressed, EID will proceed with the administrative actions necessary to RCRA-close the Lusk, Lee, Eunice and Artesia Plants.

If you have any questions regarding the Lusk, Lee, Eunice or Artesia Plants, please contact either Frank Collis at (918) 661-1063 or W. C. Stoltz at (918) 661-5613.

Very truly yours,

B. F. Ballard

B. F. Ballard, Director
Environment Control
10 D4 Phillips Building

BFB:FPC:tsv/B:002
Enclosure

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Client No. 3355796

File No. C-1950-W

Report No. 36762

Report Date 9-23-85

Date Received 8-28-85

Delivered By A. Hubble

Report of tests on: Water

Client: Phillips Petroleum Company

Identification: Lee Plant, Well No. 1

		mg/L
Arsenic	Less than	0.05
Barium	Less than	1
Cadmium	Less than	0.01
Chromium	Less than	0.05
Lead		0.05
Mercury	Less than	0.002
Selenium	Less than	0.01
Silver	Less than	0.05
Nickel	Less than	0.2
Cyanide		0.003

Technician: JDN, GMB, LT, MT

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Attn: Mike Ford

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Gary M. Burch

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1703 W. Industrial Avenue [915-683-3348] • P.O. Box 2150 • Midland, Texas 79701

Client No. 3355796

File No. C-1950-W

Report No. 36763

Report Date 9-23-85

Date Received 8-28-85

Delivered By A. Hubble

Report of tests on: Water

Client: Phillips Petroleum Company

Identification: Lee Plant, Well No. 2

		mg/L
Arsenic	Less than	0.05
Barium	Less than	1
Cadmium	Less than	0.01
Chromium	Less than	0.05
Lead	Less than	0.05
Mercury	Less than	0.002
Selenium	Less than	0.01
Silver	Less than	0.05
Nickel	Less than	0.2
Cyanide	Less than	0.001

Technician: JDN, GMB, LT, MT

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Client No. 3355796

File No. C-1950-W

Report No. 36764

Report Date 9-23-85

Date Received 8-28-85

Delivered By A. Hubble

Report of tests on: Water

Client: Phillips Petroleum Company

Identification: Lee Plant, Well No. 3

		mg/L
Arsenic	Less than	0.05
Barium	Less than	1
Cadmium	Less than	0.01
Chromium	Less than	0.05
Lead	Less than	0.05
Mercury	Less than	0.002
Selenium	Less than	0.01
Silver	Less than	0.05
Nickel	Less than	0.2
Cyanide	Less than	0.001

Technician: JDN, GMB, LT, MT

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Client No. 3355796

File No. C-1950-W

Report No. 36765

Report Date 9-23-85

Date Received 8-28-85

Delivered By A. Hubble

Report of tests on: Water

Client: Phillips Petroleum Company

Identification: Lee Plant, Well No. 4

		mg/L
Arsenic	Less than	0.05
Barium	Less than	1
Cadmium	Less than	0.01
Chromium	Less than	0.05
Lead	Less than	0.05
Mercury	Less than	0.002
Selenium	Less than	0.01
Silver	Less than	0.05
Nickel	Less than	0.2
Cyanide	Less than	0.001

Technician: JDN, GMB, LT, MT

Copies 3cc Phillips Petroleum Co.
Attn: Mike Ford

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Gary M. Burch

Attachment to Olb-1-86

TABLE I

VOLATILE ORGANIC ANALYSIS OF LEE MONITORING WELL WATERS

Sample received: August 28, 1985

Analysis	Concentration, ppb			
	M.W. #1	M.W. #2	M.W. #3	M.W. #4
~~Chloromethane~~	~~2.6~~	~~2.5~~	~~2.9~~	~~4.5~~
Vinyl Chloride	<1.	<1.	<1.	<1.
Chloroethane	<1.	<1.	<1.	<1.
Bromomethane	<1.	<1.	<1.	<1.
1,1-dichloroethylene	<1.	<1.	<1.	<1.
~~Methylene Chloride~~	~~7.0~~	~~5.7~~	~~4.7~~	~~6.0~~
trans-1,2-dichloroethylene	<1.	<1.	<1.	<1.
1,1-dichloroethane	<1.	<1.	<1.	<1.
~~Chloroform~~	~~1.4~~	~~1.4~~	~~1.3~~	~~1.5~~
1,2-dichloroethane	<1.	<1.	<1.	<1.
1,1,1-trichloroethane	<1.	<1.	<1.	<1.
Benzene	4.6	<1.	6.1	1.4
Carbontetrachloride	<1.	<1.	<1.	<1.
1,2-dichloropropane	<1.	<1.	20.	<1.
Bromodichloromethane	<1.	<1.	<1.	<1.
Trichloroethylene	<1.	<1.	<1.	<1.
2-chloroethylvinyl Ether	<1.	<1.	<1.	<1.
trans-1,3-dichloropropene	<1.	<1.	<1.	<1.
cis-1,3-dichloropropene	<1.	<1.	<1.	<1.
1,1,2-trichloroethane	<1.	<1.	<1.	<1.
Toluene	2.1	<1.	161.	<1.
Dibromochloromethane	<1.	<1.	<1.	<1.
1,1,2,2-tetrachloroethylene	<1.	<1.	<1.	<1.
Chlorobenzene	<1.	<1.	<1.	<1.
Ethylbenzene	<1.	<1.	<1.	<1.
Bromoform	<1.	<1.	<1.	<1.
1,1,2,2-tetrachloroethane	<1.	<1.	<1.	<1.
Fluorobenzene	<1.	<1.	<1.	<1.
31509-36-	1	2	3	4

Attachment to 01b-20-86

TABLE I

SEMIVOLATILE ORGANIC ANALYSES OF LEE MONITORING WELL WATERS

Sample received: August 28, 1985

Analysis	Concentration, ppb			
	M.W. #1	M.W. #2	M.W. #3	M.W. #4
Bis(2-chloroethyl)ether	<20	<20	<20	<20
1,3-dichlorobenzene	<20	<20	<20	<20
1,4-dichlorobenzene	<20	<20	<20	<20
1,2-dichlorobenzene	<20	<20	<20	<20
Bis(2-chloroisopropyl)ether	<20	<20	<20	<20
N-nitorsodi-n-propylamine	<20	<20	<20	<20
Nitrobenzene	<20	<20	<20	<20
Hexachloroethane	<20	<20	<20	<20
Isophorone	<20	<20	<20	<20
n-nitrosodimethylamine	<20	<20	<20	<20
Bis-(2-chloroethoxy)methane	<20	<20	<20	<20
1,2,4-trichlorobenzene	<20	<20	<20	<20
Naphthalene	<20	<20	<20	<20
Hexachlorobutadiene	<20	<20	<20	<20
Hexachlorocyclopentadiene	<20	<20	<20	<20
2-chloronaphthalene	<20	<20	<20	<20
2,6-dinitrotoluene	<20	<20	<20	<20
Dimethylphthalate	<20	<20	<20	<20
Acenaphthylene	<20	<20	<20	<20
Acenaphthene	<20	<20	<20	<20
2,4-dinitrotoluene	<20	<20	<20	<20
~~Diethylphthalate~~ *	<20	<20	<20	40
Fluorene	<20	<20	<20	<20
4-chlorophenylphenylether	<20	<20	<20	<20
~~N-nitrosodiphenylamine~~ *	<20	<20	<20	53
4-bromophenylphenylether	<20	<20	<20	<20
Hexachlorobenzene	<20	<20	<20	<20
Phenanthrene	<20	<20	<20	<20
Anthracene	<20	<20	<20	<20
Dibutyl phthalate	<20	<20	<20	<20
Fluoranthene	<20	<20	<20	<20
Pyrene	<20	<20	<20	<20
Benzylbutylphthalate	<20	<20	<20	<20
Bis(2-ethylhexyl)phthalate	<20	<20	<20	<20
Benzidine	<20	<20	<20	<20
Di-n-octylphthalate	<20	<20	<20	<20
Benzo(b&k)fluoranthene	<20	<20	<20	<20
Benzo(a)pyrene	<20	<20	<20	<20
3-3'-dichlorobenzidine	<20	<20	<20	<20
Chrysene & benzo(a)anthracene	<20	<20	<20	<20
Indeno(1,2,3-c,d)pyrene	<20	<20	<20	<20
Dibenzo(a,h)anthracene	<20	<20	<20	<20
Benzo(g,h,i)perylene	<20	<20	<20	<20
Phenol	<20	<20	<20	<20
2-chlorophenol	<20	<20	<20	<20
2-nitrophenol	<20	<20	<20	<20
2,4-dimethylphenol	<20	<20	<20	<20
2,4-dichlorophenol	<20	<20	<20	<20
4-chloro-3-methylphenol	<20	<20	<20	<20
2,4,6-trichlorophenol	<20	<20	<20	<20
2,4-dinitrophenol	<20	<20	<20	<20
4-nitrophenol	<20	<20	<20	<20
2-methyl-4,6-dinitrophenol	<20	<20	<20	<20
Pentachlorophenol	<20	<20	<20	<20
31509-36-	1	2	3	4

COMPANY

4-15-86
copied for:
R.D. Skinner
W.C. Stoltz
R.B. Copeland
M.D. Ford
Files 218, 320, 388, 391
FPC

HEALTH ENVIRONMENT department

STATE OF NEW MEXICO

TONEY ANAYA
GOVERNOR

DENISE D. FORT
DIRECTOR

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968, Santa Fe, New Mexico 87504-0968
(505) 984-0020

ENVIRONMENT CONTROL
APR 10 1986
B. F. B
DGF | MEM |

M
N
F

8 April 1986

B.F. Ballard
Director, Environmental Control
10 D4 Phillips Building
Phillips Petroleum Company
Bartlesville, Oklahoma 74004

Dear Mr. Ballard:

Enclosed please find the results of analyses on the samples EID split with Phillips at your plants in Artesia, Eunice, Lee and Lusk, New Mexico.

If you have any questions regarding these results, please contact me at (505) 827-2931.

Sincerely,

Ann Claassen

Ann Claassen
Water Resource Specialist
Hazardous Waste Section

STATE OF NEW MEXICO
HEALTH AND ENVIRONMENT

ENVIRONMENTAL IMPROVEMENT DIVISION
P.O. Box 968 Santa Fe, New Mexico 87504
505-984-0020

4/7/86

Dave —

Here is a summary of our results for Phillips Artesia, Eunice, Lee + Lusk. I have the original lab sheets if you want to see them.

– Ann C.
x2931

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[illegible]

RESULTS OF SAMPLING

PHILLIPS PETROLEUM GAS REFINERIES

ARTESIA, EUNICE, LEE AND LUSK

Attached are the results for the New Mexico Environmental Improvement Division's samples taken at the Philllips plants in August 1985 ~~1986~~. At each plant, samples were taken from each of the RCRA wells (4 wells per plant). At Lusk and Artesia, samples were also taken from surface impoundments. Table 1 identifies each sample.

All samples were collectd by Alice Barr with the assistance of Kelley Crossman. The samples were appropriately preserved and shipped under chain-of-custody to the State Laboratory in Albuquerque for analysis. Table 2 gives the analytical procedure for each parameter. Note that calcium and magnesium are reported under both General Chemistry and Metals. The Gen. Chem results were obtained by the Water Chemistry Section using wet analytical techniques; the Metals results were obtained by the Metals Section using ICAP.

All results are in milligrams per liter (mg/l), except as follows:

pH	pH units
conductivity	micromhos/cm (lab cond. at 25 °C)
temperature	degrees Celcius
organics	parts per billion

Abbreviations and symbols used to report the results are as follows:

Cond.	conductivity
GEN. CHEM.	general chemistry
ND	not detected (see below)
NR	not reported
PPB	parts per billion
Temp.	temperature (in Celcius)
TDS	total dissolved solids (total filterable residue)
TOC	total organic carbon
<	less than
>	greater than
~	approximately
[ ]	tentative identification

The value of many metals is reported as ND (none detected). The detection limits, in mg/l, were as follows:

Arsenic	0.005
Mercury	0.0005
Selenium	0.005
Manganese	0.05
All others	0.1

TABLE 1. SAMPLE IDENTIFICATION, PHILLIPS PETROLEUM PLANTS

NOTE: The designation of a well as upgradient or downgradient is Phillip's designation.

Phillips Petroleum -- Artesia

MW-1	monitoring well 1, downgradient
MW-3	monitoring well 3, upgradient
MW-6	monitoring well 6, downgradient
PND-1,w	first RCRA pond, surface water
PND-4,s	first RCRA pond, sediment
PND-2,s	second pond (middle), sediment
PND-3,,w	third pond, surface water
Blank	Field blank using deionized water

Phillips Petroleum -- Eunice

MW-1	monitoring well 1, upgradient
MW-2	monitoring well 2, downgradient
MW-3	monitoring well 3, downgradient
MW-4	monitoring well 4, downgradient

Phillips Petroleum -- Lee

MW-1	monitoring well 1, upgradient
MW-2	monitoring well 2, downgradient
MW-3	monitoring well 3, downgradient
MW-4	monitoring well 4, downgradient
Blank	Field blank using deionized water

Phillips Petroleum -- Lusk

MW-1	monitoring well 1, upgradient
MW-2	monitoring well 2, downgradient
MW-3	monitoring well 3, downgradient
MW-4	monitoring well 4, downgradient
R-PND,w	RCRA pond, surface water
R-PND,s	RCRA pond, sediment
O-PND,s	Oily pond next to RCRA pond, sludge

TABLE 2. ANALYTICAL METHODS

PARAMETER	PRESERVATION	ANALYTICAL METHOD
Gen. Chem.		
Field pH	none	Hach Mini pH Meter
Field Cond.	none	Yellow Springs S-C-T Meter
Calcium	ice	EPA Method 215.2
Magnesium	ice	EPA Methods 130.2 and 215.2
Sodium	ice	Std. Methods 325(b)
Potassium	ice	Std. Methods 325(b)
Bicarbonate	ice	EPA Method 310.1
Chloride	ice	EPA Method 325.2
Sulfate	ice	EPA Method 375.2
TDS	ice	EPA Method 160.1
Fluoride	ice	EPA Method 340.2
Nitrate-N	ice, H_2SO_4	EPA Method 352.2
TOC	ice, H_2SO_4	EPA Method 415.1
Metals		
Arsenic	HNO_3	EPA Method 206.2
Mercury	HNO_3	EPA Method 245.1
Selenium	HNO_3	EPA Method 270.2
All others (ICAP Scan)	HNO_3	EPA Method 207
Organics		
GC/MS Purgeables	Ice	EPA Method 624

PHILLIPS PETROLEUM -- LEE

	MW-1	MW-2	MW-3	MW-4	Blank*
GEN CHEM..					
Field pH	7.9	7.3	7.4	7.5	-
Field Cond.	345	475	490	468	-
Field Temp.	23	25	25	23	-
Lab pH	8.1	8.21	7.96	7.97	7.25
Lab Cond.	385	453	487	415	34
Calcium	24.0	41.6	60.0	60.0	4.0
Magnesium	12.2	16.6	19.5	12.0	4.9
Sodium	32.2	36.8	25.3	16.1	0
Potassium	0.82	1.56	1.17	0.78	0
Bicarbonate	120.9	199	157.4	156	7
Chloride	32.5	32.3	41.9	34.2	1.6
Sulfate	43.8	43.4	41.7	39.2	4.3
TDS	233	323	328	310	20
Fluoride	1.78	0.79	0.63	0.56	0.10
Nitrate-N	0.63	0.96	1.91	2.45	1.70
TOC	44.9	8.13	1.4	2.51	<1
METALS					
Arsenic	0.008	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND
Aluminum	1.5	0.4	0.4	0.2	ND
Barium	0.1	0.1	0.1	0.2	ND
Beryllium	ND	ND	ND	ND	ND
Boron	0.1	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND
Calcium	33	70	53	67	3.3
Chromium	ND	ND	ND	ND	ND
Cobalt	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND
Iron	0.9	0.4	0.7	0.3	ND
Lead	ND	ND	ND	ND	ND
Magnesium	5.7	11	8.1	11	0.4
Manganese	0.5	0.4	0.14	0.4	ND
Molybdenum	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND
Silicon	12	14	13	13	2.0
Silver	ND	ND	ND	ND	ND
Strontium	0.3	0.6	0.5	0.6	ND
Tin	ND	ND	ND	ND	ND
Vanadium	ND	ND	ND	ND	ND
Ytrrium	ND	ND	ND	ND	ND
Zinc	ND	ND	ND	ND	ND

* Sample containers filled in the field from NMEID deionized water container.

PHILLIPS PETROLEUM -- LEE

Gas Chromatograph/Mass Spectrometer Purgeable Screen

Results in [brackets] are tentative (unconfirmed) results.

SAMPLE	ORGANICS DETECTED	PPB
MW-1	Benzene	47
	Toluene	17
	m-Xylene	1
	o-Xylene	6
	[Tetrahydrofuran]	[>500]
	[Butanone]	[>500]
MW-2	Tetrahydrofuran	[>20]
	Butanone	[>20]
	[Pentene]	[5]
	[Cyclohexane]	[40]
MW-3	[Tetrahydrofuran]	[>50]
MW-4	[Tetrahydrofuran]	[>200]
Blank*	Trichloromethane	25
	Bromodichloromethane	7
	Bibromochloromethane	5
	Bromoform	4

* Sample containers filled in the field from NMEID deionized water container.