GW - 23

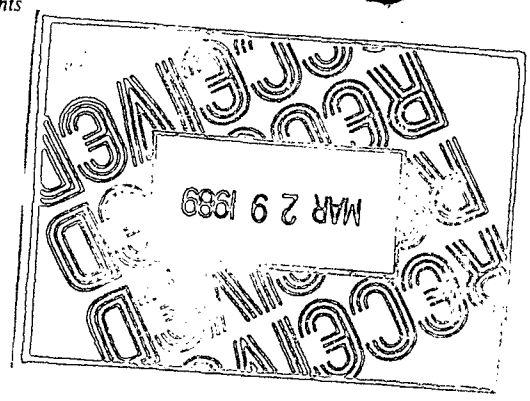
MONITORING REPORTS

DATE:

1989 - 1988

A.T. Kearney, Inc.
225 Reinekers Lane
P.O. Box 1405
Alexandria, Virginia 22313
703 836 6210
Facsimile 703 836 0547

Management
Consultants



AT KEARNEY

March 27, 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. R26-06-02; Comprehensive Ground-Water Monitoring Evaluation; Phillips Petroleum-Artesia Natural Gas Plant; Artesia, New Mexico; EPA I.D. No. NMD060709667; CME Report

Dear Mr. Clark:

As you requested, we have enclosed one copy of the deliverable 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 Part 265 Subpart F and applicable sections of Part 270. Detailed lists of the deficiencies and potential regulatory violations are provided in our report.

Feel free to contact me or Steve Muse, the Work Assignment Manager, at our new number (703) 548-4700, if you have any questions or desire a floppy disk.

Sincerely,

Arthur Glazer
Technical Director

Enclosure

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

COMPREHENSIVE GROUND-WATER MONITORING EVALUATION REPORT

Phillips Petroleum-Artesia Natural Gas Plant
Artesia, New Mexico
EPA I.D. Number NMD060709667

Prepared for:

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

Prepared by:

Kearney/Centaur
A Division of A.T. Kearney, Inc.
225 Reinekers Lane
Alexandria, VA 22313

EPA Contract No. 68-01-7374
Work Assignment No. R26-06-02

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 and operated to detect releases of hazardous constituents or to define the rate and extent of migration of hazardous constituents from a regulated land-based treatment, storage, or disposal unit. 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 - Artesia Natural Gas Plant (Artesia) and to identify any regulations under 40 CFR Parts 265 and 270 which may have been violated.

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 (EID); previously conducted facility inspection reports; the facility's contractor reports; regional geologic and hydrogeologic reports; the facility's sampling and analysis plan; communications with EID and Phillips personnel; and an interview with Phillips personnel during the field evaluation.

1.3 Components of the Comprehensive Ground-Water Monitoring Evaluation

A CME is a two-phased process comprised 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 for the operation of the system, as well as verification (where possible) of the findings of the office evaluation.

To assist the reviewer 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 reviewer for each facility at which a CME is performed.

1.4 Facility Description and Operation

The Artesia facility (EPA ID No. NMD060709667) is located near Artesia, New Mexico in the southeastern part of the state (Section 7, T185, R28E). At the Artesia plant, raw natural gas is processed for recovery of liquid hydrocarbon and sulfur.

The facility operated a surface impoundment for the treatment of cooling tower blowdown water from 1962 to 1983. The water contained chromium which was used as a corrosion inhibitor. In September 1983, the facility discontinued using chromium and began using a non-hazardous phosphate treatment for corrosion control (8). In February 1986, the facility discontinued use of the surface impoundment and in March 1986 began closure activities. A map depicting the surface impoundment, the former GWMS and the new GWMS is included as Exhibit 1-1.

1.5 History of the Regulatory Status of the Artesia Facility

1.5.1 Status of the Permit Process for the Artesia Facility

The Artesia facility notified EPA of its hazardous waste management activities in August 1980, and on November 19, 1980 submitted a Part A permit application. In June 1982, the owner/operator notified EPA that after a review of the facility's process, it had been determined that the facility had

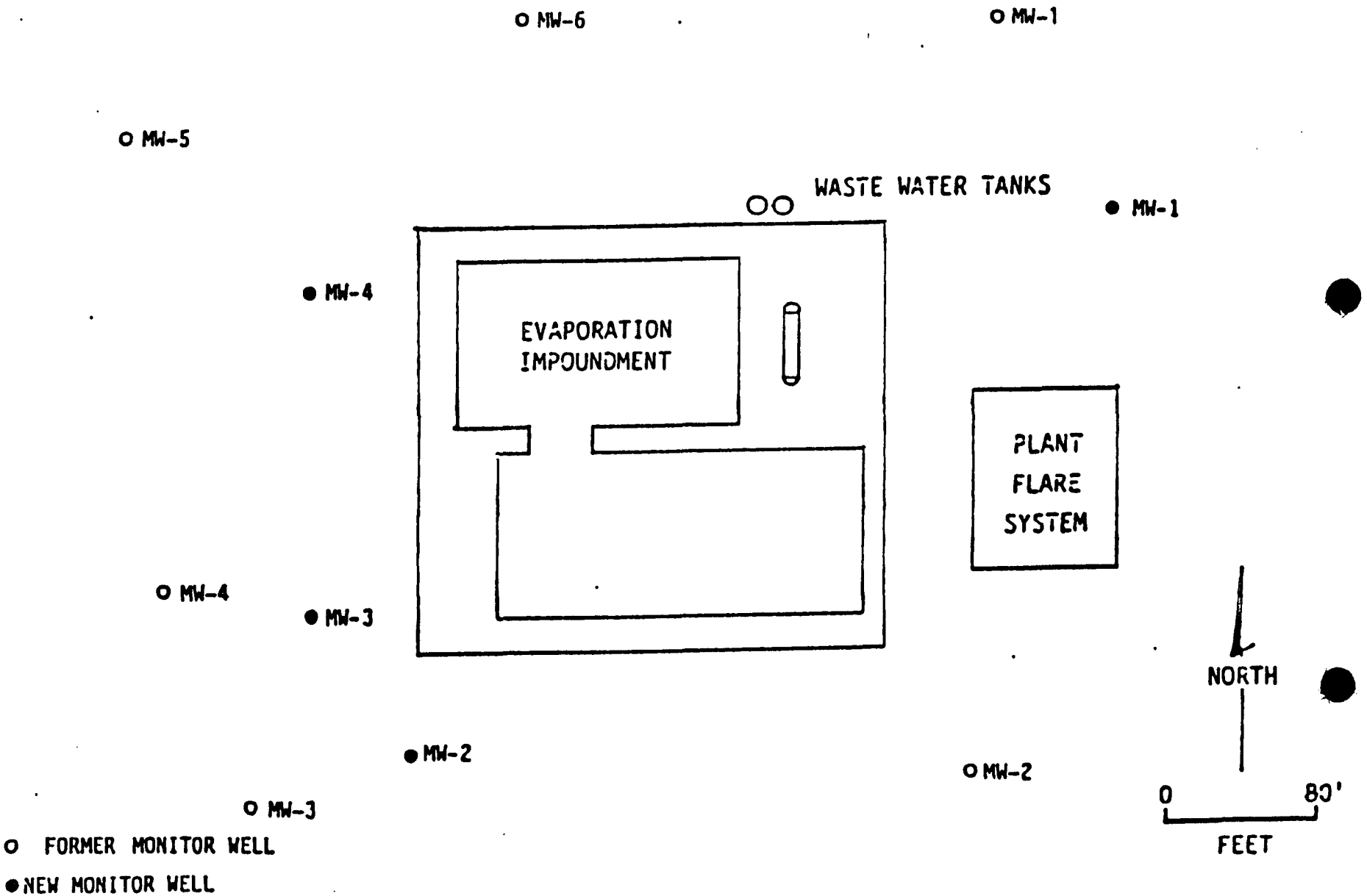

EXHIBIT 1-1: Surface impoundment and current and former monitoring well locations at the Artesia facility (Reference 11).

incorrectly notified and applied for a RCRA permit. The notification and Part A application were then withdrawn. EPA issued a Warning Letter to the Artesia facility in February 1983 for failure to submit an annual report for hazardous waste management operations during 1981. The facility filed an amended Part A application in March 1983. In September 1983, EPA issued a Compliance Order to the Artesia facility directing it to cease all hazardous waste activity, submit a closure plan/post-closure plan for the surface impoundment, or submit a Part B application for a RCRA operating permit. In August 1984, the facility submitted a closure/post-closure plan for closure of the surface impoundment. In September 1984, the facility applied to the New Mexico Oil Conservation Division (NMOCD) for an injection well permit in order to dispose of liquids resulting from closure of the surface impoundment. The facility submitted a report to demonstrate clean closure of the impoundment in February 1985. Closure certification approval by EID is pending. NMOCD approved Artesia's application for an injection well permit in July 1985.

In December 1987, Artesia submitted a revised post-closure plan to address ground-water monitoring requirements[6].

1.5.2 Ground-Water Monitoring Status of the Artesia Facility

The Artesia facility operated a surface impoundment for the disposal/treatment of cooling tower blowdown water from 1962 to 1983. The facility constructed six interim status monitoring wells to monitor the uppermost aquifer beneath the surface impoundment from 1981 to 1984. These wells were judged by EID and EPA Region VI to be inadequately designed and were plugged and abandoned. EID directed the facility to install four new monitoring wells (MW-1 through MW-4) and, in April 1988, the facility constructed these wells at the surface impoundment. The facility began sampling the wells in May 1988 under first year interim status detection monitoring requirements. The facility will continue to monitor under interim status, pending approval or rejection of the surface impoundment closure certification by EID.

2.0 KEY FINDINGS

This section presents the findings of the CME in terms of the elements of ground-water performance standards which have not been met by the Artesia 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

Elements of 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; ground-water flow directions and rates must be properly defined; and geologic and hydrogeologic formations underlying the site must be fully characterized	o Failure to adequately characterize site hygrogeology and 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)
	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)
	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	
	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.)

Elements of 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; ground-water flow directions and rates must be properly defined; and geologic and hydrogeologic formations underlying the site must be fully characterized (cont.)	o Failure to perform pump tests to determine hydraulic conductivity of uppermost aquifer and to prove a lack of interconnection between aquifers	§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 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 field notes and adequate boring logs	§270.24(c)(2)
	o Failure to prepare geologic or soil maps	§270.14(c)(2)
	o Failure to perform material tests and geochemical analyses on boring samples	§270.14(c)(2)
	o Failure to prepare structure maps of the water-bearing formations and confining layer	§270.14(c)(2)

* Indicates potential Class I regulatory violation.

Table 2-1 (Cont.)

Elements of Ground-Water Performance Standards 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; ground-water flow directions and rates must be properly defined; and geologic and hydrogeologic formations underlying the site must be fully characterized (cont.)	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)
Background monitoring wells must be constructed so as to yield samples that are representative of site ground-water quality and located so as to yield samples unaffected by the facility	o Failure to install a background well hydraulically upgradient from the surface impoundment	*§265.90(a) *§265.91(a)(1)
Downgradient monitoring wells must be located so as to immediately detect any contamination migrating from the facility and constructed so as to yield samples representative of on-site ground-water quality	o Failure to implement a ground water monitoring program capable of determining the facility's impact on the quality of ground water in the uppermost aquifer underlying the facility	*§265.90(a)
	o Failure to properly develop monitoring wells after construction	*§265.91(a)

* Indicates potential Class I regulatory violation.

Table 2-1 (Cont.)

Elements of Ground-Water Performance Standards 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-collected and analyzed		§265.93(d)(4) §270.14(c)(4)
	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 use trip blanks for each type of sample container	§265.90(a) §265.92(a) §265.93(d)(4) §270.14(c)(4)
	o Failure to document type of sample containers for for inorganics in the sampling and analysis plan	§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 Failure to obtain equipment blanks	§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)

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

The office evaluation and field evaluation phases of a CME involve a 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 Appendixes 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 EID requested that the Kearney Team obtain splits of ground-water samples collected by Phillips during the field evaluation at the Artesia facility. Samples from MW-1 through MW-4 were to be analyzed for volatile organics, semi-volatile organics, turbidity and Priority Pollutant Metals. EID requested the Kearney Team to obtain analytical services for the volatile and semi-volatile samples, and that the metals and turbidity analyses be performed by the New Mexico Health and Environmental Department, Scientific Laboratory Division in Albuquerque. At the request of the laboratory division, samples submitted for metals analyses were preserved with nitric acid in the field. The Kearney Team provided sample containers and preservatives necessary for the split samples.

The field evaluation at the Artesia facility was conducted on October 26 and 27, 1988. The Kearney Team included Steve Muse and Marianne Smith. The team arrived at the facility at 10:50 a.m. (CST) on October 26, and met briefly with Mike Ford, the Environmental Technician 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 recordkeeping. Mr. Ford agreed to provide sample splits to the Kearney Team. Ambient air temperatures ranged from 65°F to 75°F, winds were from the south at 15 mph and skies were sunny to partly cloudy for the two days.

All samples were stored on ice in coolers from the time of collection (October 27) until they were delivered to the analytical laboratories by Federal Express on October 29, 1988. Samples were shipped to the laboratories on the morning of October 28 because the latest tme Federal Express would accept packages for delicery was 4:00 p.m. The Kearney Team could not deliver the coolers to Federal Express until after 4:00 p.m.

Artesia personnel collected samples for analysis of water quality, and indicator parameters, and parameters listed in Appendix III to Part 265, as well as benzene, toluene, ethylbenzene and xylene.

4.0 ANALYTICAL RESULTS

The samples collected by the Kearney Team for analysis of volatiles, semi-volatiles, turbidity and inorganics were shipped on the day following 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 (Hazardous Substance List) (volatiles and semi-volatiles) and turbidity. 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. Concentrations of the organic constituents detected are presented in Table 4-1.

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

During the field evaluation, a strong organic odor was noted in the samples which were collected. However, the HNu vapor analyzer detected no organic vapors in the samples or at the well heads.

TABLE 4-1

ANALYTICAL RESULTS SUMMARY

WELL NUMBER/SAMPLE NUMBER

CONSTITUENT	MW-1 10/88	MW-2 10/88	MW-3 10/88	MW-4 10/88	MW-5 10/88	MW-6 10/88
Turbidity	8.4[1]	16.0	37.0	15.0	0.35[3]	0.70[3]
Acetone[4]	ND[2]	ND	ND	ND	16	ND
Benzene	10	14	ND	ND	ND	ND
Ethylbenzene	ND	50	ND	ND	ND	ND
Aluminum[5]	0.3	0.6	0.3	0.5	ND	ND
Arsenic	0.012	0.095	0.105	0.013	ND	ND
Barium	ND	0.8	ND	ND	ND	ND
Boron	0.4	0.6	0.3	0.5	ND	ND
Calcium	150.	280.	270.	320.	0.1	ND
Chromium	0.009	0.011	ND	ND	ND	ND
Nickel	ND	0.06	ND	ND	ND	ND
Iron	0.2	2.7	3.6	0.3	ND	ND
Magnesium	50.	120.	96.	100.	ND	ND
Manganese	0.11	2.4	4.1	0.1	ND	ND
Silicon	25.	35.	25.	28.	ND	ND
Strontium	2.3	4.7	3.7	4.6	ND	ND
Tin	0.2	0.3	0.3	0.8	0.1	ND
Vanadium	0.1	ND	ND	0.1	ND	ND
Zinc	ND	ND	ND	0.1	ND	ND

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(1) Expressed as Nephelometric Turbidity Units (NTU)

(2) ND = Not Detected

(3) MW-5 was an Equipment Blank and MW-6 was a Field Blank

(4) Organic results expressed in parts per billion

(5) Metals results expressed in parts per million

5.0 SUMMARY AND CONCLUSIONS

5.1 Office Evaluation

The following sections present the findings from the CME office evaluation for Artesia: Section 5.1.1, the facility's evaluation of site subsurface geology; Section 5.1.2, the facility's site hydrogeologic assessment; and Section 5.1.3, 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 Artesia facility were reviewed. The first investigation was completed in 1984 and the second in 1988. Both investigations 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 are 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 were noted during review of the facility's geologic information. The following is a description of the deficiencies which the facility should address:

- 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 Adequacy of the Characterization of the Uppermost Aquifer and Related Data Gaps

The hydrogeologic assessment conducted by Phillips at the Artesia 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 analyses) were performed on borings samples;

- No piezometers were installed for use in determining the hydraulic gradient;

- No pump tests or slug tests were performed;

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

- o No hydrogeologic cross-sections were prepared;

- o 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;

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

- o The potentiometric surface map based on data collected in May 1988 does not include flow lines or static water level data, and the contour lines are not logical or accurate based on data presented;

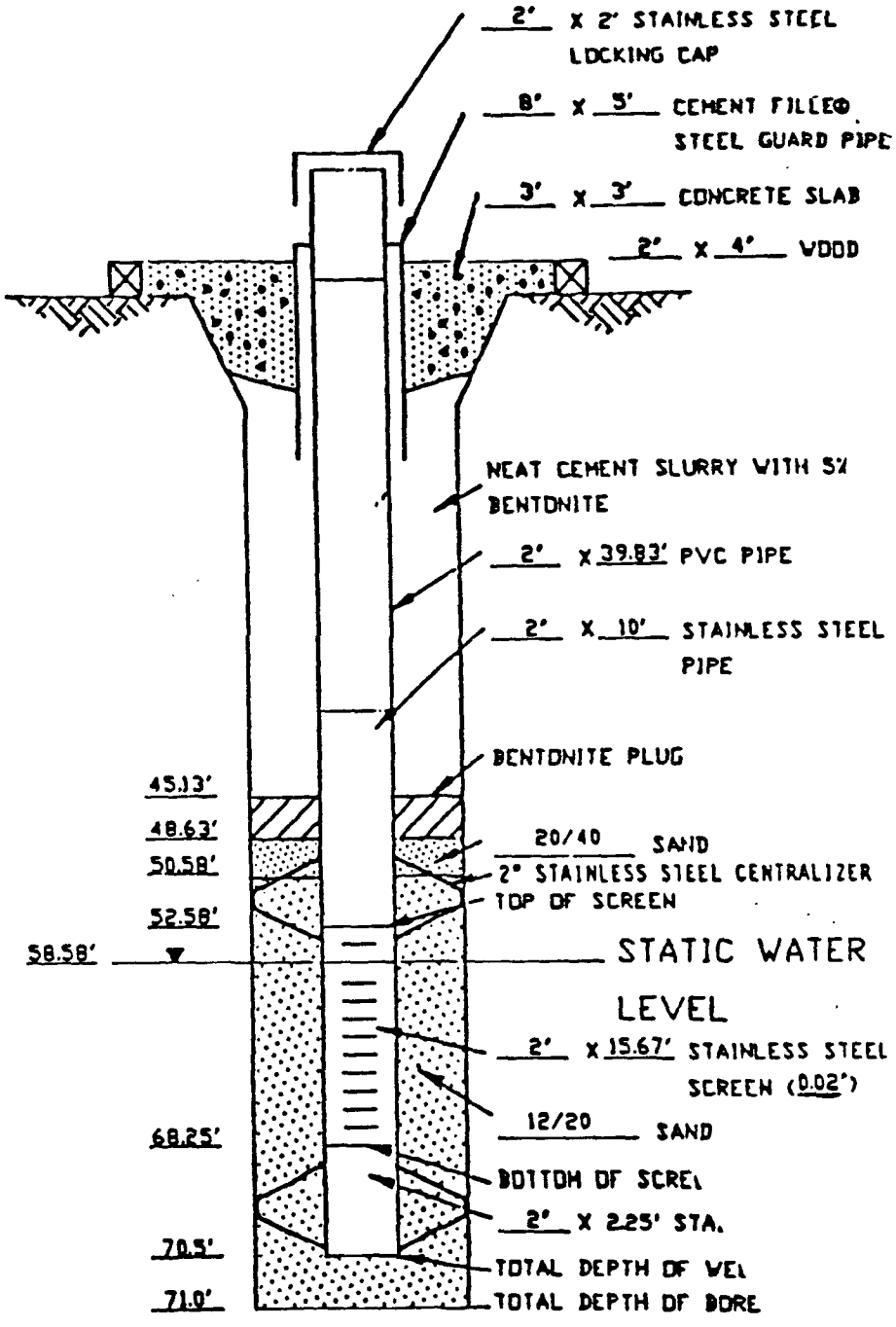
- o A vertical component of flow through unsaturated and saturated zones was not considered; and

- o Flow nets have not been prepared.

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

The Artesia facility has closed the surface impoundment which the GWMS monitors and is awaiting approval of its closure certification by EPA and EID. The evaluation of the design and construction of the monitoring wells was based on requirements for detection monitoring under 40 CFR Parts 265.90 and 265.91. (Exhibit 5-1 is a diagram of the design of the wells.) The design and construction of the monitoring wells at the Artesia facility meets the performance standards for such systems as discussed in the RCRA TEGD. See Section 5.2.1 for further discussion of the GWMS at Artesia.

EXHIBIT 5-1



TYPICAL MONITOR WELL DESIGN

PHILLIPS ARTESIA GAS PLANT

(From Reference 11).

5.2 Field Evaluation

The field evaluation at the Artesia facility was conducted October 26 and 27, 1988 to verify 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.

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

As indicated in Section 5.1.3, the design of the monitoring wells at Artesia is consistent with recommendations in the TEGD. However, based on water level data and analytical results from both the facility's May 1988 sampling and this CME, the facility's upgradient well may actually be downgradient. (Table 5-2 is a summary of water level data collected during this CME.) In fact, it may be impossible to locate an upgradient or background well immediately adjacent to the surface impoundment, due to apparent ground-water mounding resulting from seepage from the impoundment. (During the field evaluation, it was noted that the impoundment contained standing water which had accumulated from rainfall.) It is recommended that a new background well be constructed as far away from the present location as property boundaries permit.

Because leakage from unlined ponds and impoundments tends to generate a radial flow pattern in the subsurface, it may be necessary to install additional downgradient wells adjacent to the impoundment in order to adequately monitor the saturated zone and to verify the presence/absence of a ground-water mound beneath the site. It is suggested that the additional downgradient wells be placed so as to completely encircle the impoundment.

TABLE 5-2

SUMMARY OF WATER LEVEL DATA

	MW-1	MW-2	MW-3	MW-4
Elevation of Reference Point[1]	3611.47	3605.23	3603.38	3606.13
Depth of Static Water Level[2]	61.04	54.76	52.91	55.84
Elevation of Static Water Level[3]	3550.43	3550.47	3550.47	3550.29

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

2 Feet below top of steel outer casing; as measured on 10/26/88.

3 Elevation of static water level on 10/26/88.

In addition, the results of the turbidity analysis (Table 4-1 and Appendix E) indicate that the monitoring wells may not have been constructed properly or that the wells were not properly developed after construction. Turbidity levels in all four wells exceed the recommended maximum of 5 NTU. It may be necessary for the facility to redevelop the existing wells in order to obtain non-turbid samples.

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 six inches thick was installed at the surface around the casing stick-up;
- A two-inch diameter steel casing inside a six-inch protective casing was visible at the surface;
- 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 the facility's sample collection procedures were identified during the field evaluation:

- No consideration was given to the possibility that volatile organic constituents could be present in the ground water at the facility. The facility should monitor the head space in the wells for the presence of organic vapors prior to purging and sampling, and should also implement a procedure which allows for the detection of an immiscible layer(s) of organic constituents in the wells.

- o With the exception of the sample for volatiles, samples are not transfered directly from the bailer to the appropriate sample container. The samples are first placed in polyethylene beakers and then transfered to sample containers. This practice agitates and aerates the samples and also increases the possibility of contaminating the sample;

- o The facility is careless in handling the sampling bailer, sometimes allowing it to come in contact with the ground or other points which have not been decontaminated;

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

- o The facility uses propylene rope instead of fluorocarbon resin-coated or single-strand stainless steel wire to lower and retrieve bailers.

5.2.3 Adequacy of Sample Preservation and Handling Procedures

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

- o The facility'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;

- The facility's sampling and analysis plan states that equipment blanks will be analyzed for benzene, toluene, ethyl benzene and xylene (BTEX). Equipment blanks are used 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 facility's sampling and analysis plan states that trip blanks will be provided and analyzed only for BTEX. Trip blanks are used 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 facility's sampling and analysis plan includes procedures to be used by the analytical laboratory for cleansing sample containers for organics, but not for inorganics.

5.2.4 Adequacy of Chain-of-Custody Procedures

Chain-of-custody procedures documented in the facility'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 facility is a looseleaf notebook. This may seem to be an innocuous item. However, 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. This type of notebook is a better means for recording and 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 Artesia 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 operation may have had on the quality of the ground-water.

5.2.6 Surficial Well Inspection and Field Observation

During the field evaluation, it was noted that the GWM at Artesia is adequately maintained and the wells are structurally stable at the surface.

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

The Artesia facility is in the detection monitoring phase under 40 CFR Part 265 Subpart F. The program is not adequate due to deficiencies noted in this report.

The facility should address these deficiencies using the TEGD as a guide. The following major inadequacies and/or regulatory violations were noted during this CME:

- The facility's geologic and hydrogeologic investigations are inadequate;
- The facility has not adequately characterized the uppermost aquifer and first confining layer;
- The monitoring wells produce turbid samples and may require redevelopment;
- The location of the upgradient or background well is suspect; and
- There is not a sufficient number of downgradient wells.

6.0 REFERENCES

1. Closure and Post-Closure Plan for Waste Facility, Phillips Petroleum Artesia, New Mexico Plant, July 27, 1984.

2. Consent Agreement and Final Order, U.S. EPA Region VI, Docket Number RCRA VI-314-14, August 1984.

3. Henderson, James, Report of Inspection at Phillips Petroleum Artesia Plant, October 2, 1986.

4. Compliance Order and Notice of Opportunity for Hearing, U.S. EPA Region VI, Docket Number RCRA VI-314-11, September 1983.

5. Correspondence from John Gould (NMEID) to B.F. Ballard (Phillips), October 13, 1987.

6. Post Closure Plan for Surface Impoundment, Phillip Petroleum - Artesia New Mexico Plant, December 1987.

7. Correspondence from R.L. Stameto (New Mexico Oil Conservation Division) to E.E. Clark (Phillips), July 1, 1985.

8. Julie Wanslow, Report of the Compliance Evaluation Inspection at Phillips Petroleum Artesia Plant, September 1987.

9. Correspondence from E.E. Clark (Phillips) to Joe D. Romey (New Mexico Oil Conservation Division), September 6, 1984.

10. Assessment Plan Outline, Artesia Gas Plant, June 6, 1988.

11. Geoscience Consultants, LTD., Report on the Installation of a Ground-Water Monitoring System at the Phillips 66 Natural Gas Company Artesia Plant, June 6, 1988.

12. Geoscience Consultant, LTD., Sampling and Analysis Plan for Phillips 66 Natural Gas Company Artesia, Eunice, Lee and Lusk Plants, June 3, 1988.

13. Results of Sampling Performed at Phillips Artesia Plant on August 1986 by NMEID.

14. Phillips Petroleum Company, Response to EPA Comments on Artesia Plant Closure Plan, July 9, 1986.

15. Radian Corporation, Reports of Analyses of Ground-Water Samples from the Phillips Petroleum Artesia Plant, June 29, 1988.

16. Hendrickson, G.E. and R.S. Jones, Ground-Water Report 3, Geology and Ground-Water Resources of Eddy County, New Mexico, 1952.

17. Notice of Violation, at Phillips Petroleum facilities in Artesia, Eunice, Lee and Lusk, New Mexico, Issued by the NMEID, January 25, 1988.

18. Phillips Petroleum Artesia Plant, Static Water Level Data and Driller's Logs from Former Ground-Water Monitoring System, May 1984 through September 3, 1987.

19. A.T. Kearney, Inc., PR/VSI Report for Phillips Petroleum Company, Artesia Natural Gas Plant, June 1988.

20. Part A Permit Application, Phillip Petroleum, Artesia Natural Gas Plant, November 19, 1980.

21. Amended Part A Permit Application, Phillips Petroleum, Artesia Natural Gas Plant, March 25, 1983.

APPENDIX A

OFFICE EVALUATION CHECKLIST

Facility Name: Phillips Petroleum-Artesia Natural Gas Plant Revision 1
EPA I.D. Number: NMD000709667 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
i.	Other (specify) First quarter analytical results.	

	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)
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

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

** Potentiometric surface map inadequate.

		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?	N
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	

* Surface impoundment undergoing RCRA closure.

	Information Provided (Y/N/I)
o Is a waste management area delineated for each regulated unit?	N/A

	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?	N
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 and air-foam rotary (Ingersoll Rand TH-60 rig)	
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
o Ditch sampling?	N

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

** Confining layer not identified.

*** The information for 1984 borings not provided.

		Information Provided (Y/N/I)
	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
	o Depth and reason for termination of borehole?	Y**

* Only in 1988 logs, not in 1984 logs.

** Reason for termination not provided.

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

* Possible hydrocarbon staining noted in MW-4 at 0-5' interval.

** Only in 1988 logs, not in 1984 logs.

		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 generated.

		Information Provided (Y/N/I)
7.	Do the laboratory data corroborate the field data for mineralogy and subsurface geochemistry?	N*

* 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

* No topographic map provided.

		Information Provided (Y/N/I)
c.	descriptions of nearby water bodies?	N/A
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?	N
6.	Does the photograph clearly show surface water bodies, adjacent municipalities, and residences and are these clearly labelled?	N/A*

* No aerial photograph provided.

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 on 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) No

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.)	N
o Are ground-water flow-lines indicated?	N
o Are static water levels shown?	N
o Can hydraulic gradients be estimated?	N
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?	N

* 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) I	
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?	I*
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.	

* 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	

* Data not adequate to determine.

	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**
o _____	
_____	
_____	
_____	
c. What is the hydraulic conductivity of the confining unit (if present)? Not determined cm/sec	
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***

* Only lithologic logs from monitoring well boreholes from 70' to 175' deep.

** Confining layer not identified.

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

	Information Provided (Y/N/I)
If yes or no, what is the rationale?	I***

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

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: This evaluation includes the four wells constructed in 1988. 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? N
- 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) Air-foam rotary

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

If yes, specify:

Type of drilling fluid Foam

Source of water used _____ I

Foam Type/brand not indicated

Polymers No

Other (specify) No

c. Was the cutting fluid, or additive, identified? N

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

Other methods _____

	Information Provided (Y/N/I)
e. Was compressed air used during drilling?	Y
o If yes, was the air filtered to remove oil?	Y
f. Did the owner/operator document procedure for establishing the potentiometric surface?	N
o If yes, explain how the location was established?	
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?	
- Shelby tube?	
- Core drill?	
- 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).	**

* 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.

		Material	Diameter (ID/OD)	Information Provided (Y/N/I)
o	Primary casing	Type 1, grade 1 1120 PVC, Sched. 40	2.067"/2.375"	
		Type 304, stainless steel, Schedule 40	2.067"/2.375"	
o	Secondary or outside casing (double) construction)	Steel to depth of five feet.	6"OD	
o	Screen	Schedule 304 Stainless Steel	1.9"/2.375"	

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?

N/A

	Information Provided (Y/N/I)
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? 15.6'	
o Is the screen manufactured?	Y

	Information Provided (Y/N/I)
b. Was a filter pack installed?	Y
o What kind of filter pack was employed? (specify) 12/20 grade packaged 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 = 19.4' x 6.5"; MW-2 thru MW-4 = 15' x 6.5"	
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?	
- Bailer?	
- Air surging?	
- Water pumping?	Y
- Other (specify) Pouring distilled and formation water into wells and pumping with stainless steel, air-lift development pump.	
4. Annular space seals	
a. What is the annular space in the saturated zone directly above the filter pack filled with:	*

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

Information Provided (Y/N/I)

- Sodium bentonite? (specify type and grit) Type and grit not indicated
- Cement? (specify neat or concrete) No
- Other (specify) _____

o Was the seal installed by:

- Dropping material down the hole and tamping? N
- Dropping material down the inside of a hollow-stem auger? N
- Tremie pipe method? Y
- Other (specify) No

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

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) N/A

o Was this seal installed by:

- Dropping material down the hole and tamping? N/A
- Dropping material down the inside of hollow stem auger? N/A
- Other (specify) N/A

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

	Information Provided (Y/N/I)
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 96' from MW-3 and approximately 268' from MW-4. MW-3 is approximately 184' from MW-4 according to site map. 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

---

* Location based on data from former GWMS.

** Confirmed during field evaluation.

		Information Provided (Y/N/I)
	monitoring wells?	Y*
c.	What length screen has the owner/operator employed in the background monitoring well(s)? 15.6'	
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. The upgradient well may not be upgradient. See Section 5.2.1 of report text.

	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
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	

		Information Provided (Y/N/I)
	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*
f. Were sufficient hydraulic conductivity tests performed to document lateral and vertical	

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

		Information Provided (Y/N/I)
	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?	N
	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?	***

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

** Only for the upper portion of the aquifer.

*** See Section 5.2.1 of report text.

		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?	N*
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**
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

* Upgradient well appears to be downgradient. See Section 5.2.1 of report text.

** See Section 5.2.1 of report text.

		Information Provided (Y/N/I)
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
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

APPENDIX B

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

---

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	*	*
b. Secondary or outside casing	Steel	6" 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 steel pipe at the top of the PVC. Two-inch steel casing was visible at the surface.

Information
Provided
(Y/N/U)

4. Is the protective cover fitted with locks to prevent tampering? Y

If a facility utilizes more than a single well design, answer the above questions on separate sheets for each well design.

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?
Electric sampler and 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/A
2.	Do the procedures used minimize mixing with water-soluble phases?	N/A
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? Teflon bailer	
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?	N/A
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

* Retrieval line is braided propylene rope.

		Information Provided (Y/N/U)
6.	If bailers are used, are the contents transferred to the sample container in a way that minimizes agitation and aeration?	N
7.	Is care taken to avoid placing clean sampling equipment on the ground or other contaminated surfaces prior to insertion into the well?	N
8.	If dedicated sampling equipment is not used, is equipment disassembled and thoroughly cleaned between samples?	Y
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

* Methanol

** Distilled water.

	Information Provided (Y/N/U)
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*
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)

---

* Methanol.

** Distilled water.

		Information Provided (Y/N/U)
	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
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

---

* Samples collected in clean polyethylene beakers and transferred to appropriate containers.

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

		Information Provided (Y/N/U)
d.	1:1 hydrochloric acid rinse?	I
e.	Tap water rinse?	I
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?	Y
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?	Y
b. Manganese?	Y
c. Sodium?	Y
d. Total metals?	Y
e. Dissolved metals?	Y
f. Fluoride?	Y
g. Endrin?	N*
h. Lindane?	N*
i. Methoxychlor?	N*

* Stored at 4*°C only.

		Information Provided (Y/N/U)
j.	Toxaphene?	N
k.	2,4, D?	N
l.	2,4,5, TP Silvex?	N
m.	Radium?	Y
n.	Gross alpha?	Y
o.	Gross beta?	Y
3.	Are samples for the following analyses field-acidified to pH <2 with H_2SO_4:	
a.	Phenols?	Y
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

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

		Information Provided (Y/N/U)
2.	Are samples for volatile organics analyses transferred directly to the appropriate vials to eliminate headspace over the sample?	Y*
3.	Are samples for metals analyses split into two portions?	Y
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?	Y
6.	Is one equipment blank prepared each day of ground-water sampling?	N**

* Samples for volatiles are agitated too much during transfer from bailer to vials.

** 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

		Information Provided (Y/N/U)
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
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?	I
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

* Form does not request date or time of collection.

		Information Provided (Y/N/U)
c.	Laboratory sample number (if different than field number)?	Y
d.	Analyses to be performed?	Y

		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	

* See Section 5.2.3 of the report text.

		Information Provided (Y/N/U)
	has been properly calculated and reported?	Y
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 slightly turbid upon inspection and analytical results verify this.

APPENDIX C

FIELD LOG

Projects (continued) .....

(1)

Phillips Petroleum NGP - Artesia, NM

Comprehensive Groundwater Monitoring Evaluation

Steve Mase - ATK/Centaur
Marianne Smith - ATK/Centaur
Mike Ford - Phillips Petroleum

Arrive plant 10:50 am 10/26/88
Mike Ford arrives 11:30
All photos taken during this CME in MST
Proceed to MW-1 upgradient well
begin setting up to purge well

Photo #1 11:31 setting up well to purge at MW-1

Static Water level at 61.04 feet from ~~[illegible]~~ PSm top of ~~stainless~~ galvanized PSm steel casing.

(2)

~~Galvanized~~ ~~Stainless~~ steel Top elevation 3611.47' MSL
ground elevation 3609.52' MSL
Total well depth = 70.5'
Will purge 6 gallons

Photo #2 11:38 measuring well depth at MW-1

Retrieval line for bailer is 100 ft. of polypropylene braided rope.

Begin purging 12:00

Water clear with organic odor

Photo #3 12:00 purging MW-1

Complete purging MW-1 at 12:20

Photo #4 12:25 MW-2;

Setting up to purge.
Will purge 7 gallons
Static water level = 54.76' from top of ~~stainless~~ steel casing.
Total well depth = 65.7' as measured from top of ~~stainless~~ steel casing.

(3)

Top of ~~stainless~~ steel casing = 3605.23' MSL
Ground elevation = 3602.54' MSL

Total depth from as-built drawings is 64.91' MSL

Discrepancy in well depth = (65.7' - 64.91') = 0.79'

Water slightly turbid with definite organic odor

Complete purging at MW-2 at 1:00

Break for lunch until 1:45

Photo #5 1:55 MW-3

Measured static water level = 52.91' from top of ~~stainless~~ steel
Stainless steel casing top elevation = 3603.38' MSL
Ground elevation = 3600.56' MSL

Total depth = 65.5' as measured
Total depth from as-built drawing = 64.27'

(4)

Photo # 6 - 2:06 Measuring

Static water level with ~~stainless~~ steel tape

Total depth discrepancy = (65.5 - 64.27) = 1.23'

Will purge 8 gallons
Begin purging at 2:15
Water clear ↑ with definite organic odor to slightly turbid

Photo # 7 - 2:20 purging MW-3.

Complete purging at MW-3 at 2:40.

Photo # 8 - 2:46 MW-4.

Measured static water level = 55.84' from Top of ~~Stainless~~ PVC casing

(5)

Top of ~~Stainless~~ PVC casing elevation = 3606.13' MSL
Ground elevation = 3603.50' MSL
Total well depth = 67.5 measured

Photo # 9 - 2:53 Measuring

Well depth at MW-4
Measured well depth = 67.5'
Well depth from as-built drawing = 66.64'
Total depth discrepancy = (67.5' - 66.64') = 0.86'
Will purge 8 gallons

Begin purging 3:00 at MW-4
Water clear to ↑ slightly turbid with slight organic odor

Photo # 10 - 3:08 purging MW-4.

Complete purging at MW-4 at 3:30

~~Photo # 11 - 3:45~~ PSH

(6)

Observation of sampling equipment decontamination by Mike Ford of Philips

1. Wearing latex gloves.
2. tap water rinse.
3. wash bailer w/ non phosphate detergent and tap water.
4. Rinse w/ Tap water
5. Rinse w/ Methanol
6. Rinse w/ Distilled water
7. Rinse w/ Distilled water
8. Rinse w/ Distilled water

Photo # 11 - 3:46 Sampling equipment decontamination - tap water rinse

Photo # 12 - 3:48 Washing w/ non-phosphate detergent

Photo # 13 - 3:51 Disassembling bailer

Photo # 14 - 3:54 Washing w/ non-phosphate detergent.

(7)

Photo # 15 : 3:56 Tap water rinsing bailer

Photo # 16 : 3:56 " " " "

Photo # 17 : 4:04 Pouring MeOH into bucket

Photo # 18 4:05 Bailer Parts being rinsed in methanol

Photo # 19 : 4:13 (MS) ~~Reassembling bailer~~ Rinsing Bailer w/ Methanol
Photo # 20

Distilled Water = Bottled drinking water

Methanol = AR Anhydrous (Mallinckrodt)

Photo # 21 4:14 → Reassembling Bailer

Photo # ~~20~~ 21 (MS) 22 4:15 Final Rinse w/ Distilled water

Photo # 23 4:15 Re-wrapping bailer in plastic sleeve

Leave facility at 4:30

(8) 10/27/88

Arrive at facility 7:45

Photo #25 - 8:15 Collecting equipment blank at MW-1 labeled MW-5

Photo #26 - 8:30 Equipment blank sample

Photo #27 - 8:45 pH and conductivity meters used by facility for field analyses.

Conductivity = 1250 micromhos
pH = 6.90
Temperature = 19°C
} MW-1

HNu = zero

(9)

Begin sampling at MW-1 at 8:45.

Complete sampling at 9:20

Water clear with definite organic odor

Photo #28 - 10:13 Collecting sample at MW-2.

Conductivity = 3400 micromhos
Temperature = 20°C
pH = 6.88
HNu = zero

Water clear with definite organic odor.

Complete sampling 10:35 PSW

(10)

Photo # 29 - 11:06

Collecting VOA at MW-3.

Complete sampling 11:35 at MW-3

Water clear with definite organic odor

Conductivity = 1800 micromhos
Temperature = 21°C
pH = 6.97

Collected duplicate BNA for MS-MSD at MW-3, labeled [redacted] PSM duplicate

Collected field blank at MW-3 labeled MW-6

Photo # 30 - 12:52 Acidifying radiochemistry sample at MW-4

HNu reading = zero.
Conductivity = 2300 micromhos
Temperature = 21°C
pH = 6.95

} MW-4

(11)

Complete sampling at 12:45 at MW-4

Water clear with definite organic odor.

Photo # 31 @ 1:19 MW-4
Looking East after sampling.

Leave facility at 1:20

APPENDIX D

PHOTO LOG

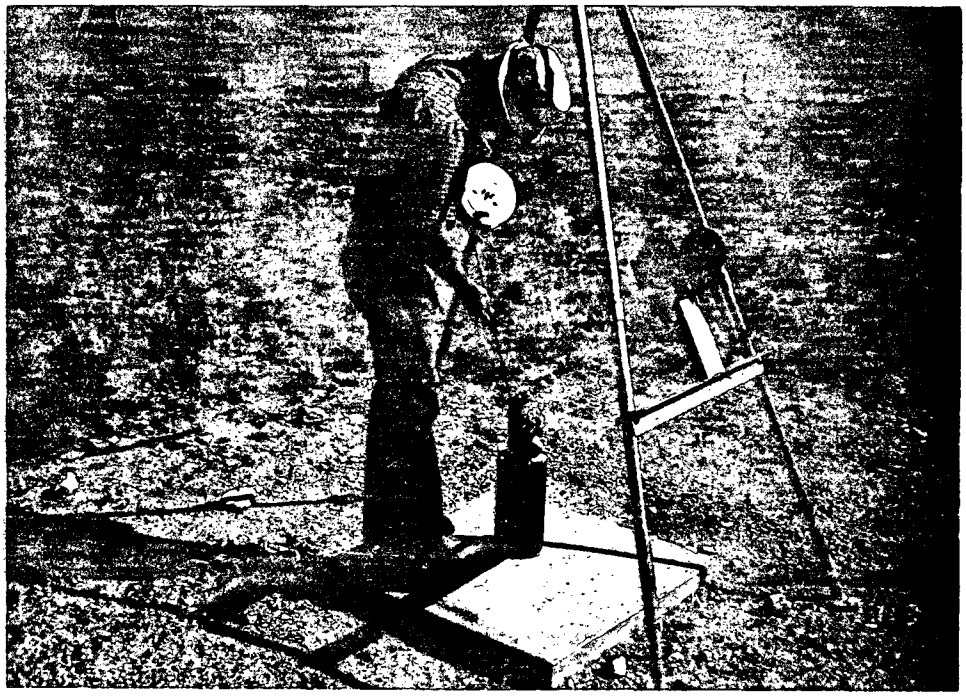

Photo 1: 11:31; 10/26/88; Measuring static water level at MW-1 using electronic sounder.

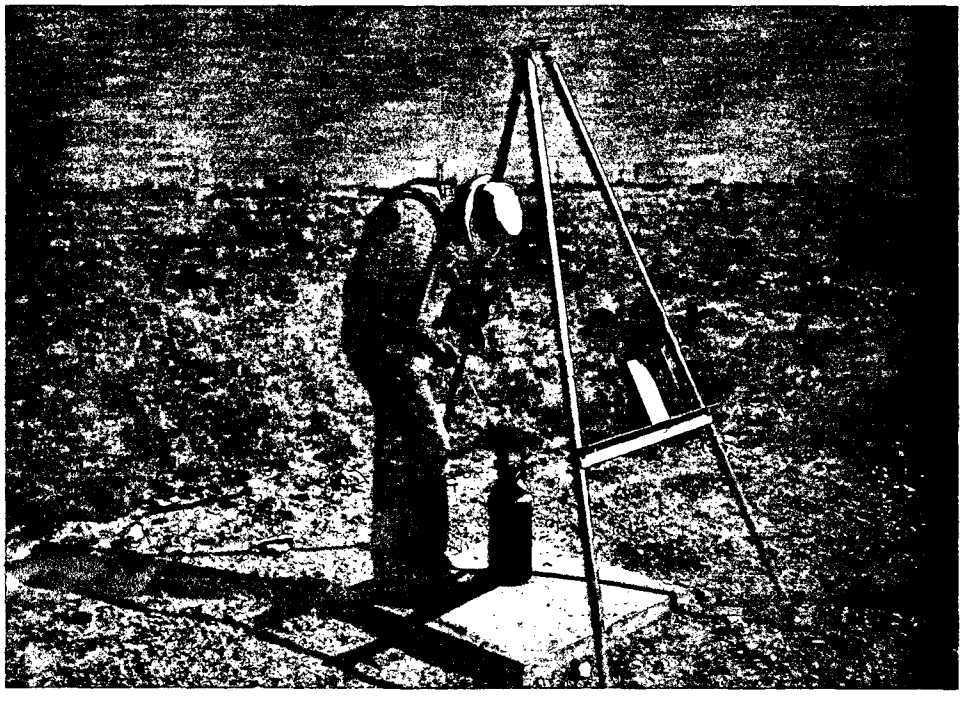

Photo 2: 11:38; 10/26/88 measuring total well depth at MW-1 using stainless steel tape.

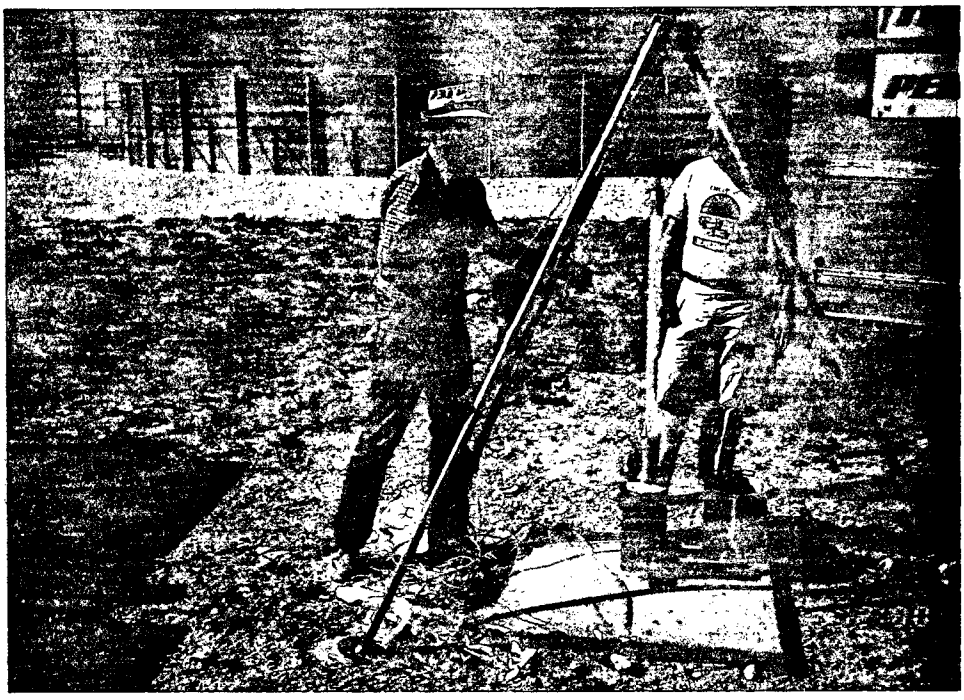

Photo 3: 12:00; 10/26/88; Evacuating MW-1 prior to sampling.

Photo 4: 12:25; 10/26/88; preparing to evacuate MW-2.

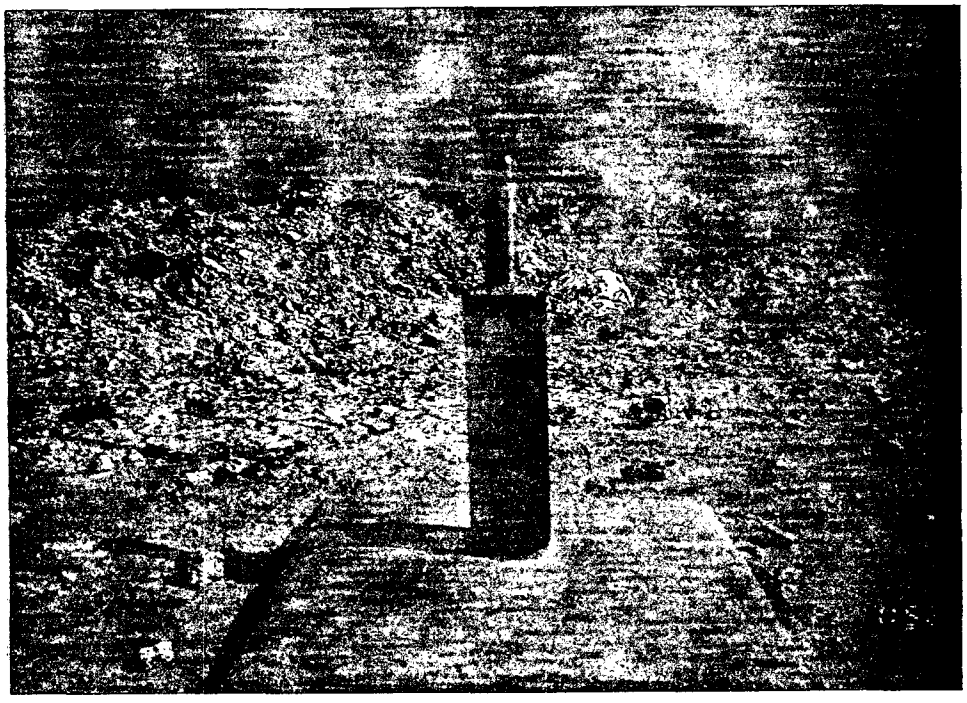

Photo 5: 1:55; 10/26/88; MW-3 prior to evacuating.

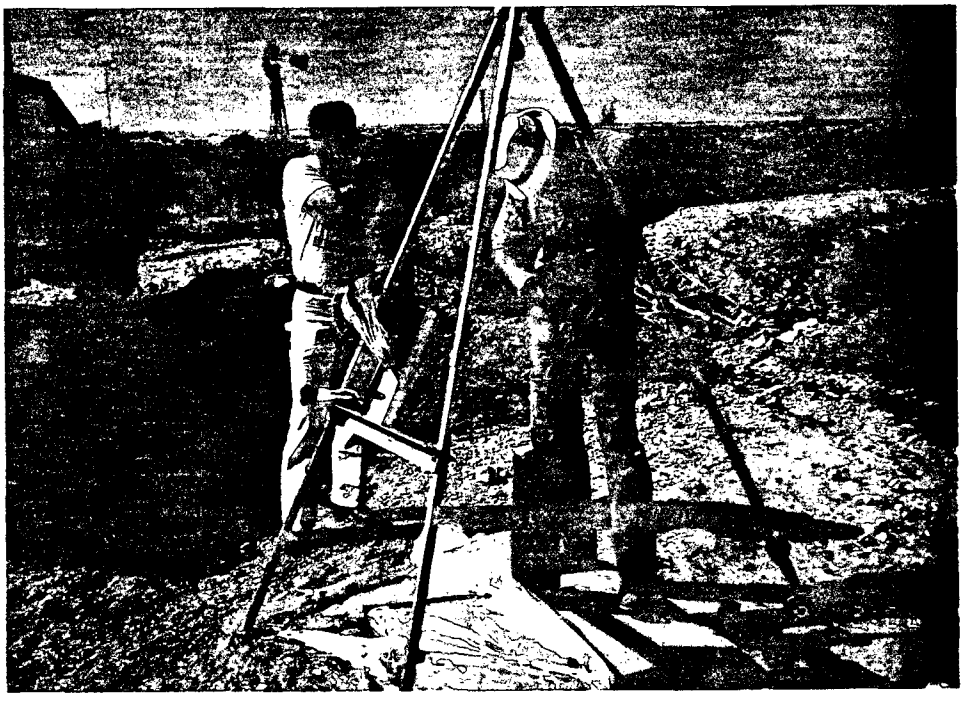

Photo 6: 2:06; 10/26/88; measuring static water level with stainless steel tape.

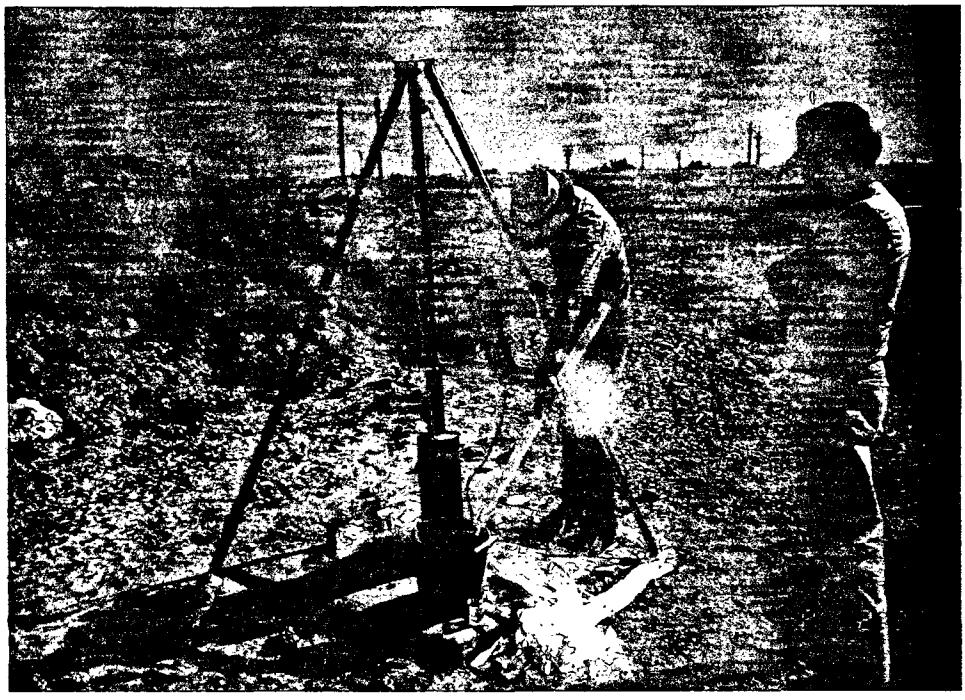

Photo 7: 2:20; 10/26/88; Evacuating MW-3; note Teflon bailer and propylene rope; surface impoundment berm is in left background.

Photo 8: 2:46; 10/26/88; MW-4 prior to evacuating; note refinery in background.

Photo 9: 2:53; 10/26/88; measuring well depth prior to evacuating.

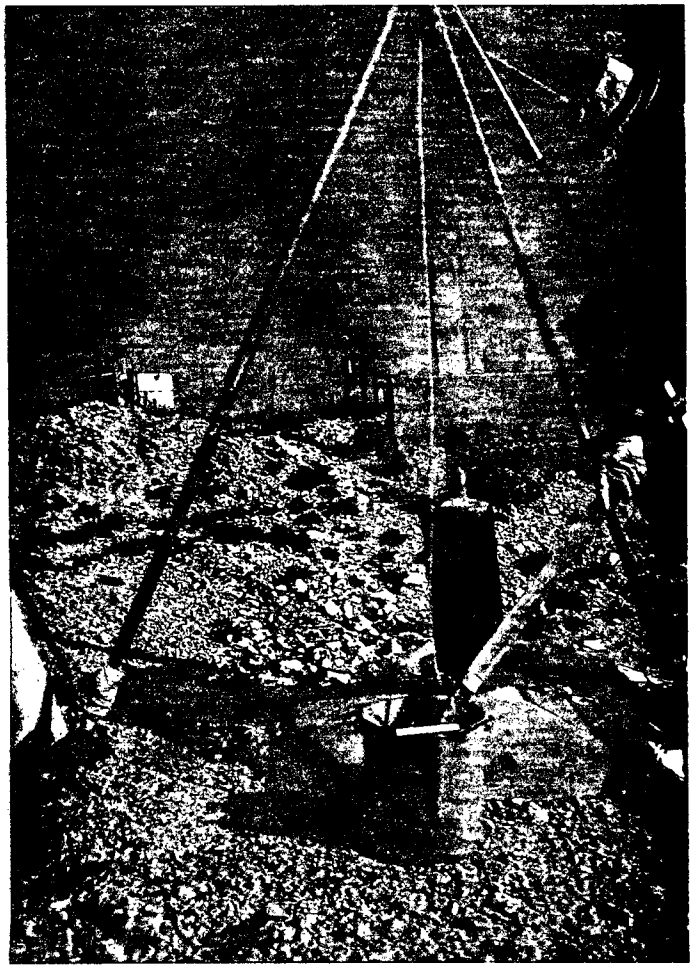

Photo 10: 3:08; 10/26/88;
Evacuating MW-4.

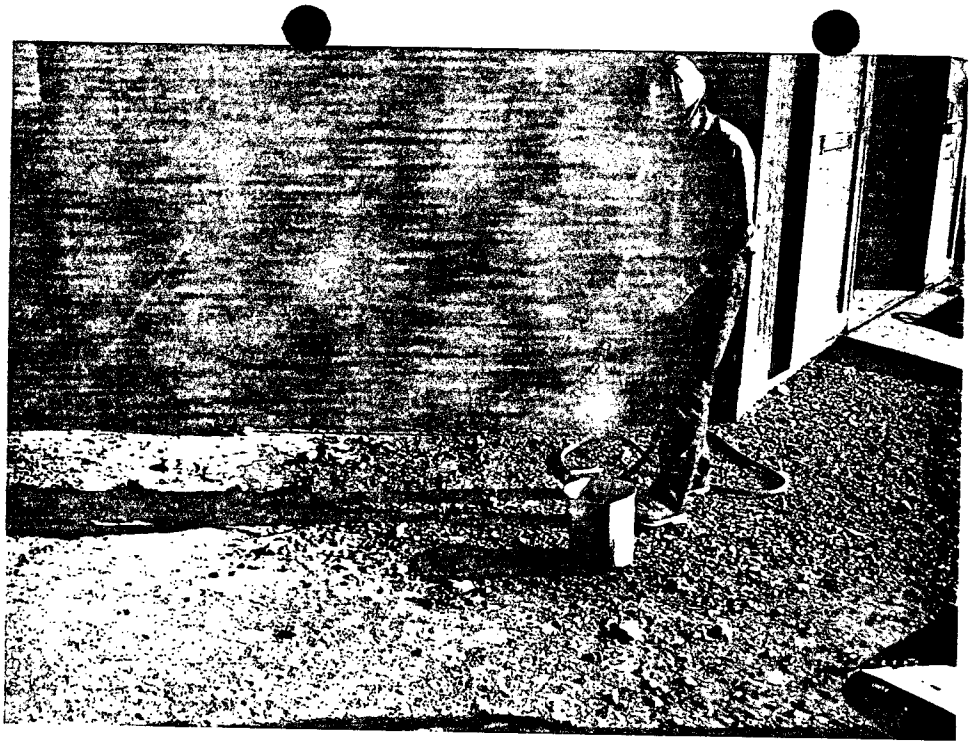

Photo 11: 3:48; 10/26/88; Decontamination of Teflon bailer; tap water rinse.

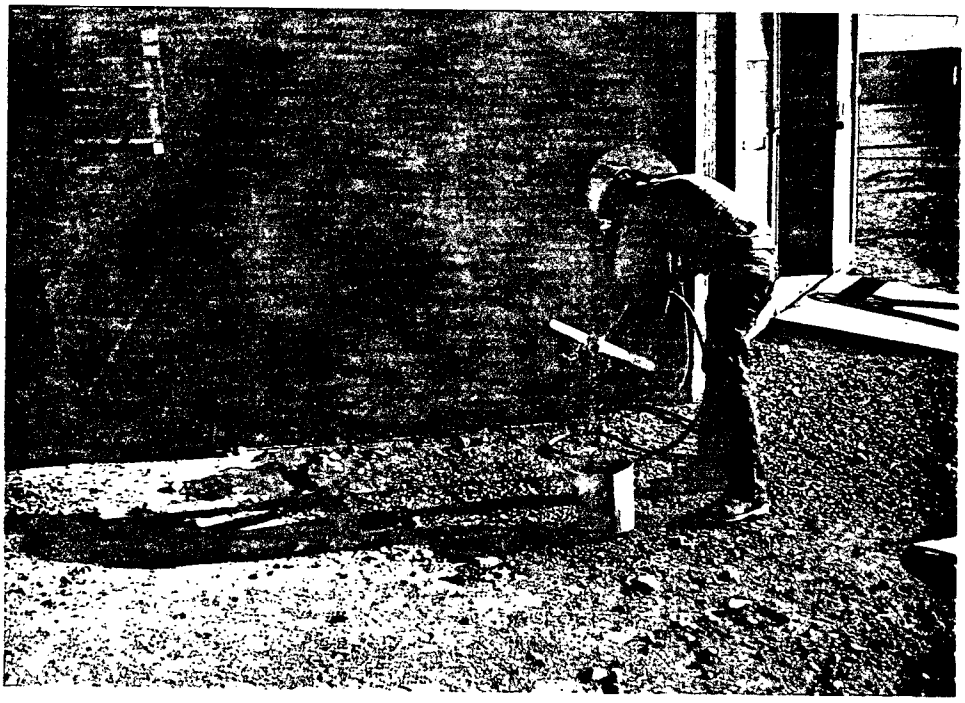

Photo 12: 3:49; 10/26/88; Decontamination of Teflon bailer; washing with non-phosphate detergent.

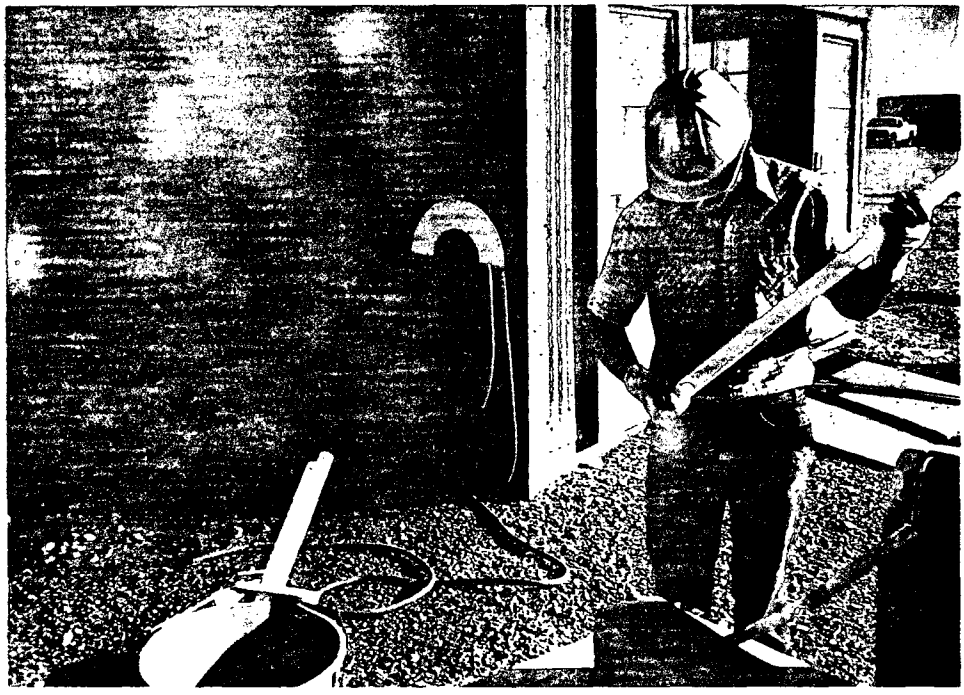

Photo 13: 3:51; 20/36/88; dissembling Teflon bailer prior to decontamination.

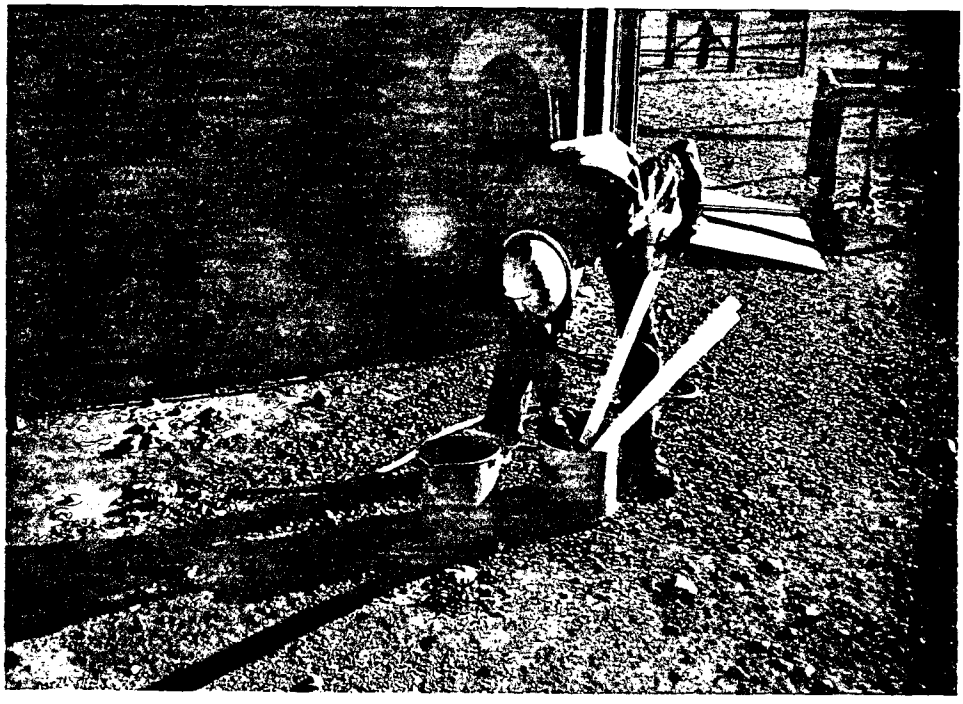

Photo 14: 3:54; 10/26/88; Washing bailer with non-phosphate detergent.

Photo 15: 3:56; 10/26/88; Tap water rinse of Teflon bailer.

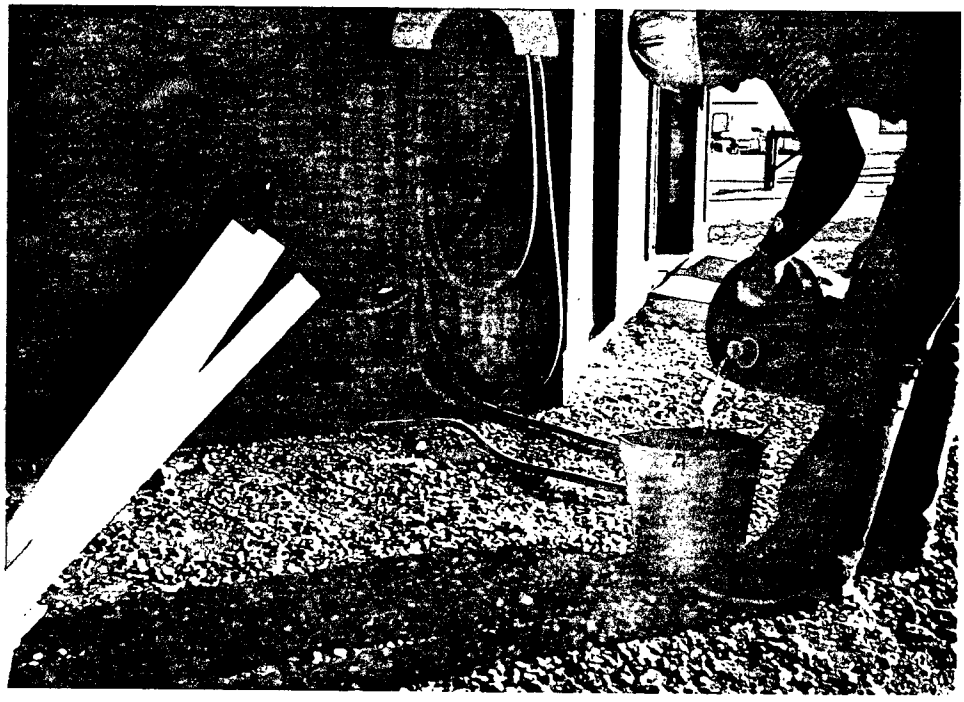

Photo 17: 4:04; 10/26/88; Pouring methanol into bucket. (Note: Photo 16 was over-exposed.)

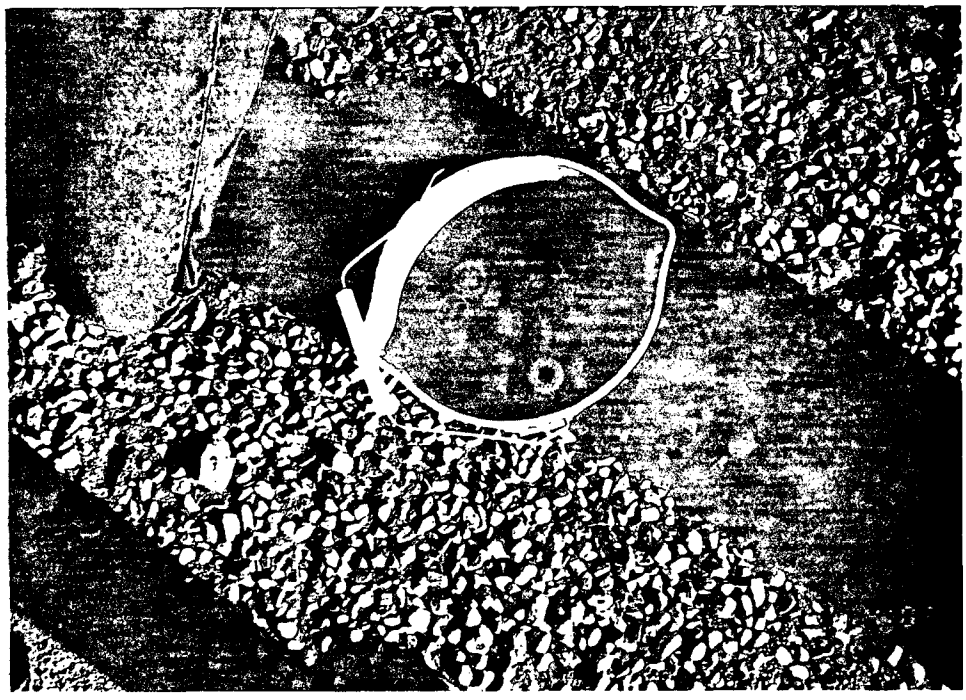

Photo 18: 4:05; 10/26/88; Bailer caps and check valves being rinsed in methanol.

Photo 19: 4:13; 10/26/88; Rinsing bailer with methanol.

Photo 20: 4:13; 10/26/88; Rinsing bailer with methanol.

Photo 21: 4:14; 10/26/88; reassembling bailer.

Photo 22: 4:14; 10/26/88; Final distilled water rinse of bailer.

Photo 23: 4:15; 10/26/88; Wrapping decontaminated bailer in plastic cover.

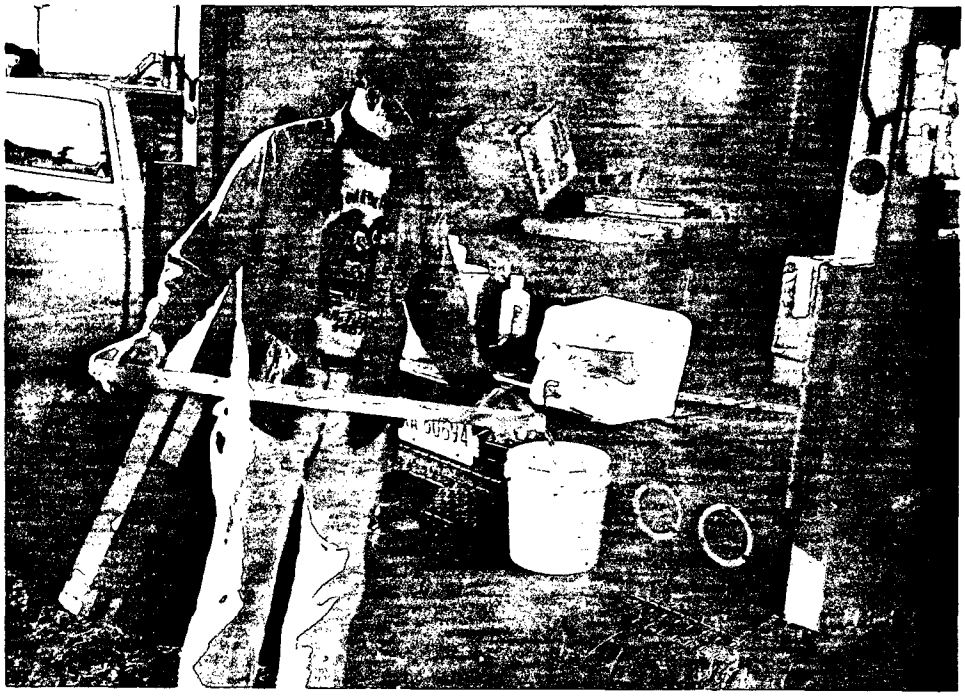

Photo 25: 8:14; 10/27/88; Collecting distilled water rinseate of bailers for equipment blank.

Photo 26: 8:30; 10/27/88; Equipment blank sample. (Note: Photo 24 was overexposed.)

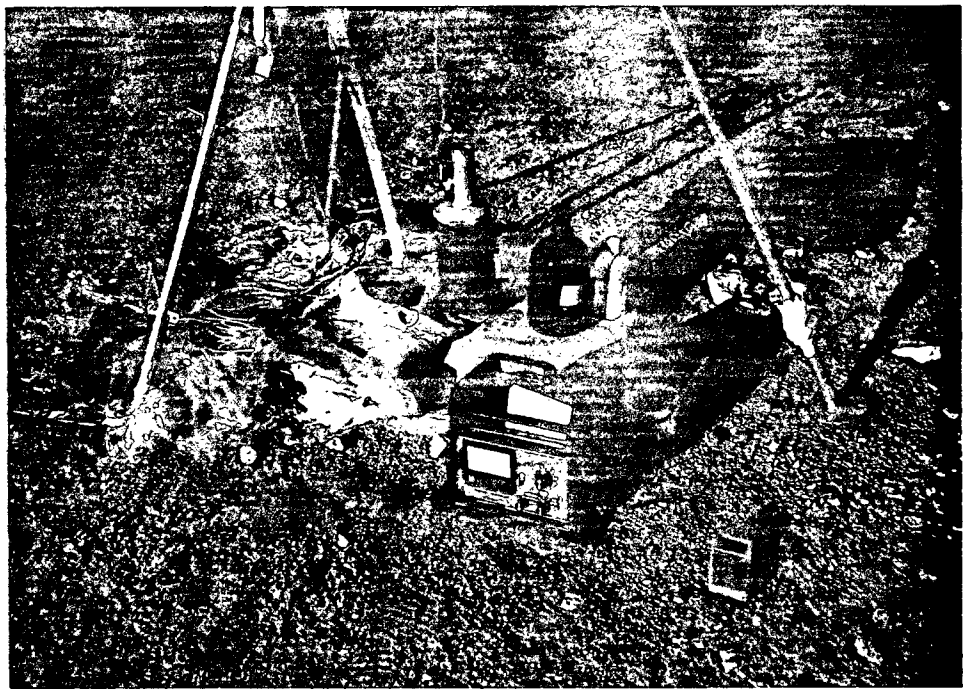

Photo 27: 8:44; 10/21/88; MW-1; pH and conductivity meters used by facility personnel for field analyses.

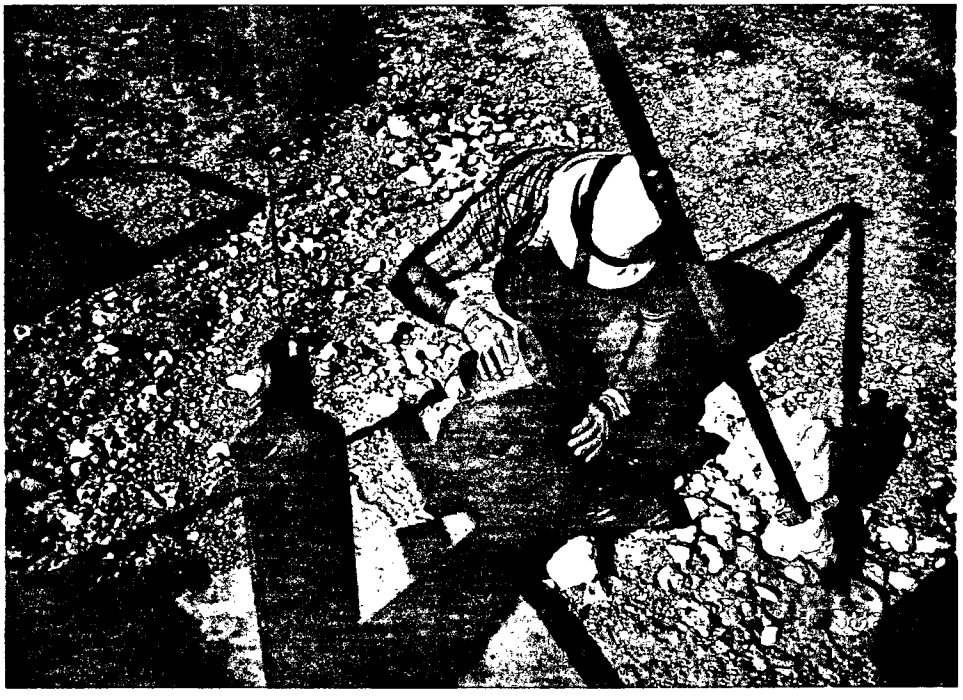

Photo 28: 10:13; 10/27/88; Collecting samples at MW-2; note polyethylene beaker used to transfer samples from bailer to sample containers.

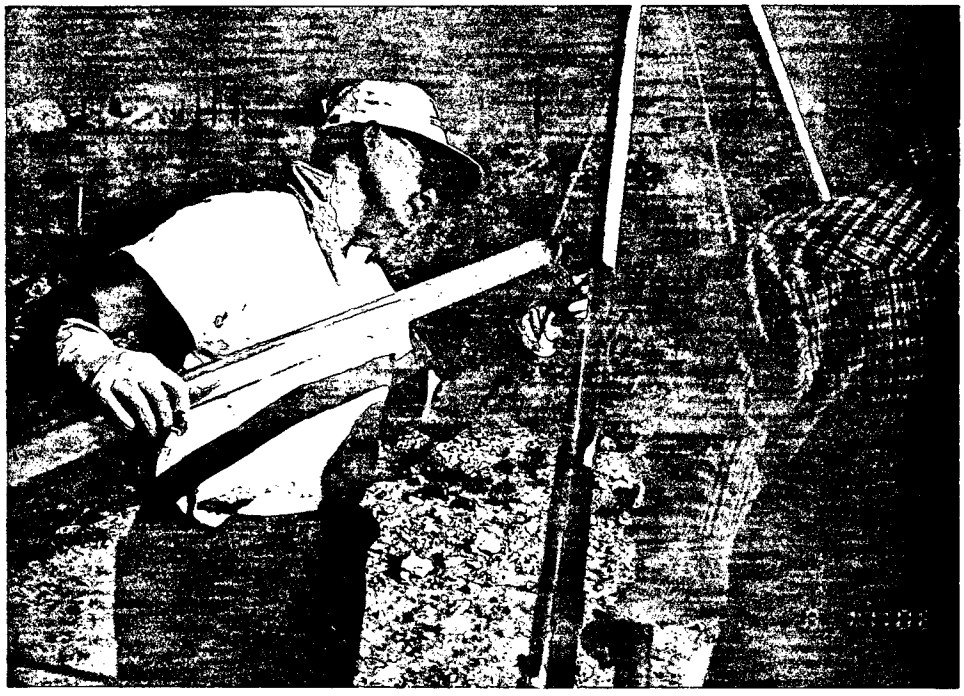

Photo 29: 11:06; 10/27/88; Collecting sample for volatile organics analyses at MW-3.

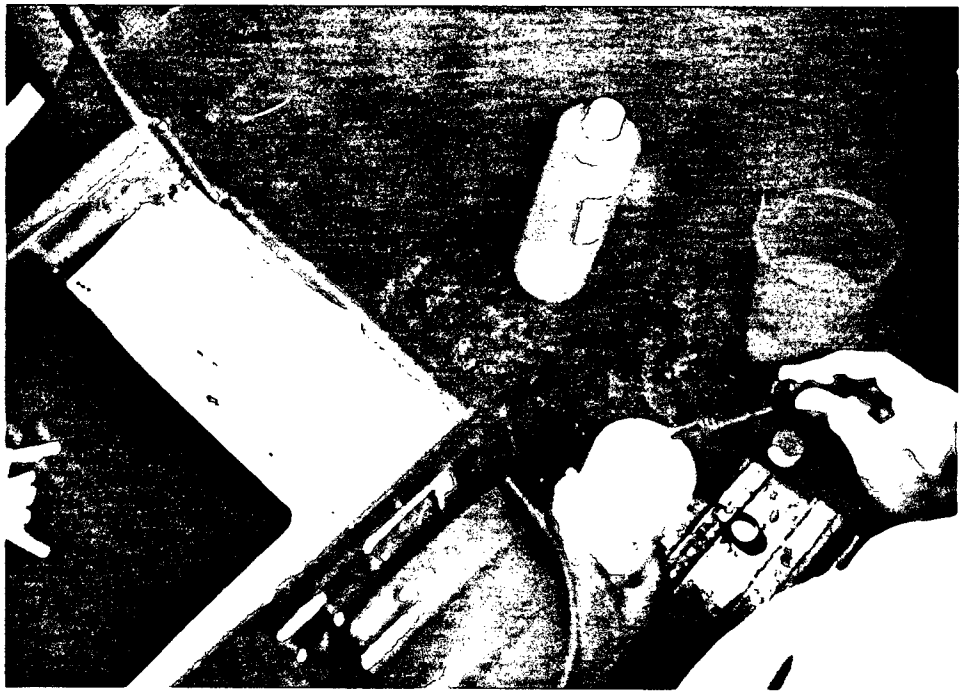

Photo 30: 12:52; 10/27/88; Acidifying radiochemistry sample at MW-4.

APPENDIX E

ANALYTICAL RESULTS

ENVIRONMENTAL MONITORING AND SERVICES, INC.
Analytical Results Summary for A.T. KEARNEY
PHILLIPS - ARTESIS PLANT
RFS: 80459

Client Sample I.D.	EMSI Number	Date Received	Rep	Method	Analyte	Result	Detection Limit (*)	Units	Date Analyzed	Dil Factor
MW-1	CAT-880018	10/31/88	Orig		TURBIDITY	8.40	.020	NTU	11/29/88	1.0
MW-2	CAT-880019	10/31/88	Orig		TURBIDITY	16.0	.020	NTU	11/29/88	1.0
MW-3	CAT-880020	10/31/88	Orig		TURBIDITY	37.0	.020	NTU	11/29/88	1.0
MW-4	CAT-880021	10/31/88	Orig		TURBIDITY	15.0	.020	NTU	11/29/88	1.0
MW-5	CAT-880022	10/31/88	Orig		TURBIDITY	.350	.020	NTU	11/29/88	1.0
MW-6	CAT-880023	10/31/88	Orig		TURBIDITY	.070	.020	NTU	11/29/88	1.0
			Dup		TURBIDITY	.060	.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-1ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C06

Level: (low/med) LOW Date Received: 10/31/88

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

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	10	
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

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

MW-1ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C06

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ Date Analyzed: 11/03/88

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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C07

Level: (low/med) LOW Date Received: 10/31/88

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

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	14	
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	50	
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

MW-2ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C07

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ Date Analyzed: 11/03/88

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 4

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	METHYLETHYL BENZENE ISOMER	32.37	35	J
2. 103-65-1	BENZENE, PROPYL-	34.27	15	J
3. 000-00-0	TRIMETHYL BENZENE ISOMER	35.21	6.0	J
4. 611-14-3	ETHYL METHYL BENZENE ISOMER	35.94	8.0	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C08

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ Date Analyzed: 11/03/88

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

EPA SAMPLE NO.

MW-3ART

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C08

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ Date Analyzed: 11/03/88

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 000-00-0	ALKYLBENZENE ISOMER	29.31	7.0	J
2. 000-00-0	ALKYLBENZENE ISOMER	35.44	5.0	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C12

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ Date Analyzed: 11/03/88

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

EPA SAMPLE NO.

MW-4ART

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C12

Level: (low/med) LOW Date Received: 10/31/88

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

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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-5ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C10

Level: (low/med) LOW Date Received: 10/31/88

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

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	16	
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	14	
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

EPA SAMPLE NO.

MW-5ART

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C10

Level: (low/med) LOW Date Received: 10/31/88

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

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 2

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 110-54-3	HEXANE	6.40	9.0	J
2. 000-00-0	ALKENE	8.37	9.0	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C11

Level: (low/med) LOW Date Received: 10/31/88

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

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	3	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

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

MW-6ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C11

Level: (low/med) LOW Date Received: 10/31/88

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

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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4ARTMS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C16

Level: (low/med) LOW Date Received: 10/31/88

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

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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4ARTMSD

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C17

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ Date Analyzed: 11/03/88

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

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: MW-4ART

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	50.0	0	45.6	91	61-145
Trichloroethene	50.0	0	44.7	89	71-120
Benzene	50.0	0	43.5	87	76-127
Toluene	50.0	0	42.6	85	76-125
Chlorobenzene	50.0	0	47.7	95	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50.0	39.2	78	15 *	14	61-145
Trichloroethene	50.0	39.7	79	12	14	71-120
Benzene	50.0	40.5	81	7	11	76-127
Toluene	50.0	40.7	81	5	13	76-125
Chlorobenzene	50.0	43.2	86	10	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 1 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: AT KEARNEY MW-4 #880021
5C TO 110C @ 6C/MIN ON FINN 4021

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

Lab File ID: 110388C04 Lab Sample ID: _____

Date Analyzed: 11/03/88 Time Analyzed: 0700

Matrix: (soil/water) WATER Level:(low/med) LOW

Instrument ID: 4021

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	MW-1ART		110388C06	0802
02	MW-2ART		110388C07	0827
03	MW-3ART		110388C08	0851
04	MW-4ART		110388C12	1114
05	MW-5ART		110388C10	1019
06	MW-6ART		110388C11	1045
07	MW-6LUS		110388C05	0740
08	MW-4ARTMS		110388C16	1256
09	MW-4ARTMSD		110388C17	1325

COMMENTS: VBLK02
5C TO 110C @ 6C/MIN ON FINN 4021

2A
WATER VOLATILE SURROGATE RECOVERY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	MW-1ART	95	97	95		0
02	MW-1LUS	97	91	84		0
03	MW-2ART	99	96	91		0
04	MW-2LUS	99	91	92		0
05	MW-3ART	96	99	90		0
06	MW-3LUS	97	94	95		0
07	MW-4ART	95	98	91		0
08	MW-4LUS	89	93	91		0
09	MW-5ART	100	97	95		0
10	MW-5LUS	102	97	84		0
11	MW-6ART	92	100	88		0
12	MW-6LUS	102	101	93		0
13	MW-4ARTMS	94	98	86		0
14	MW-4ARTMSD	98	98	89		0
15	VBLK01	96	93	92		0
16	VBLK02	109	98	91		0

	QC LIMITS
S1 (TOL) = Toluene-d8	(88-110)
S2 (BFB) = Bromofluorobenzene	(86-115)
S3 (DCE) = 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

Lab File ID: 110288C09 Lab Sample ID: _____

Date Analyzed: 11/02/88 Time Analyzed: 1228

Matrix: (soil/water) WATER Level:(low/med) LOW

Instrument ID: 4021

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	MW-1LUS		110288C16	1628
02	MW-2LUS		110288C11	1335
03	MW-3LUS		110288C12	1409
04	MW-4LUS		110288C13	1436
05	MW-5LUS		110288C14	1504

COMMENTS: VBLK01
5C AT 5MIN THEN 6C/MIN TO 100C ON FINN 4021

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK01

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110288C09

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 11/02/88

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	1	J
67-64-1	Acetone	1	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

EPA SAMPLE NO.

VBLK01

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110288C09

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 11/02/88

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

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK02

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C04

Level: (low/med) LOW Date Received: _____

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

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	1	J
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

EPA SAMPLE NO.

VBLK02

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 110388C04

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ Date Analyzed: 11/03/88

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-1ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S10

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

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	8	J
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-1ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S10

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

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-1ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S10

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

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	2 PROPANOL ISOMER	9.00	24	J
2. 000-00-0	UNKNOWN	11.87	16	J
3. 000-00-0	UNKNOWN	12.35	12	J
4. 000-00-0	UNKNOWN	15.82	10	J
5. 000-00-0	UNKNOWN SULFUR	19.25	16	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-2ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S11

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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-2ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S11

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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	2	J
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

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

MW-2ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S11

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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

Number TICs found: 14

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

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	000-00-0	PYRIDINE DERIVATIVE	7.23	10	J
2.	000-00-0	METHYL ETHYL BENZENE ISOMER	7.47	10	J
3.	000-00-0	2-PROPANOL ISOMER	8.92	10	J
4.	000-00-0	METHYL ETHYL BENZENE ISOMER	11.82	8.0	J
5.	000-00-0	UNKNOWN ALIPHATIC	13.49	22	J
6.	000-00-0	UNKNOWN AROMATIC	16.17	12	J
7.	000-00-0	NAPHTHALENE ISOMER	16.59	12	J
8.	000-00-0	DICHLORO ETHYL BENZENE ISOME	17.12	14	J
9.	000-00-0	ISOCYANATO METHYL BENZENE IS	17.45	100	J
10.	000-00-0	UNKNOWN AROMATIC	17.95	16	J
11.	000-00-0	UNKNOWN AROMATIC	18.82	30	J
12.	000-00-0	UNKNOWN BRANCHED HYDROCARBON	20.29	48	J
13.	000-00-0	UNKNOWN	20.00	10	J
14.	000-00-0	UNKNOWN BRANCHED HYDROCARBON	23.22	68	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S11

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

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	39	J
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-3ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S11

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

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	2	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

EPA SAMPLE NO.

MW-3ART

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111588S11

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

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

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

Number TICs found: 10

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

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	000-00-0	TETRAMETHYL BENZENE	11.90	10	J
2.	000-00-0	UNKNOWN AROMATIC	15.50	10	J
3.	000-00-0	DIMETHYL NAPHTHALENE ISOMER	16.20	28	J
4.	000-00-0	UNKNOWN AROMATIC	16.25	24	J
5.	000-00-0	DIMETHYL NAPHTHALENE ISOMER	16.44	14	J
6.	000-00-0	DIMETHYL NAPHTHALENE ISOMER	16.49	12	J
7.	000-00-0	DIMETHYL NAPHTHALENE ISOMER	16.67	10	J
8.	000-00-0	UNKNOWN AROMATIC	17.39	10	J
9.	000-00-0	UNKNOWN AROMATIC	17.52	10	J
10.	000-00-0	UNKNOWN	22.54	14	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-3ARTRE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S10

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/16/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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-3ARTRE

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S10

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/16/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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	4	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	[redacted]	10	U

(1) - Cannot be separated from Diphenylamine

1F

EPA SAMPLE NO.

MW-3ARTRE

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S10

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/16/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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

Number TICs found: 4

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

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	000-00-0	CYCLOHEXANE ISOMER	7.98	22	J
2.	000-00-0	UNKNOWN ALCOHOL	8.59	32	J
3.	000-00-0	UNKNOWN AROMATIC	16.17	10	J
4.	000-00-0	UNKNOWN	22.45	10	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-4ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S07

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/16/88

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-4ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S07

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/16/88

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-4ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S07

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/16/88

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

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-5ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S12

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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-5ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S12

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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	20	
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	7	J
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-5ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S12

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111788S03

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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-6ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111788S03

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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---------7,1[redacted]imethylbenzanthracene	[redacted]	10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW-6ART

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111788S03

Level: (low/med) LOW Date Received: 10/31/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/17/88

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

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6LUSMS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111188S08

Level: (low/med) LOW Date Received: 10/27/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 10/31/88

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

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-6LUSMS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111188S08

Level: (low/med) LOW Date Received: 10/27/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 10/31/88

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

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

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW-6LUSMSD

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: SDG No.:

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111188S09

Level: (low/med) LOW Date Received: 10/27/88

% Moisture: not dec. dec. Date Extracted: 10/31/88

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

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-6LUSMSD

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111188S09

Level: (low/med) LOW Date Received: 10/27/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 10/31/88

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

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

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

Lab File ID: 111088S03 Lab Sample ID: _____

Date Extracted: 10/31/88 Extraction:(SepF/Cont/Sonc) CONT

Date Analyzed: 11/10/88 Time Analyzed: 1648

Matrix: (soil/water) WATER Level:(low/med) _____

Instrument ID: 4500B

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	MW-1LUS		111188S03	11/11/88
02	MW-2LUS		111188S04	11/11/88
03	MW-3LUS		111188S05	11/11/88
04	MW-5LUS		111188S07	11/11/88
05	MW-6LUS		111088S04	11/10/88
06	MW-6LUSMS		111188S08	11/11/88
07	MW-6LUSMSD		111188S09	11/11/88

COMMENTS: 51207-0452 AT KEARNEY METHOD BLANK 10/31/88 (H2O)
1.5 MIN @ 35C, THEN 10C/MIN TO 300C (FINN 4500B)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK01

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111088S03

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 10/31/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/10/88

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.

SBLK01

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111088S03

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 10/31/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/10/88

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

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SBLK01

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111088S03

Level: (low/med) _____ Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 10/31/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/10/88

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

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK02

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: SDG No.:

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111488S03

Level: (low/med) LOW Date Received:

% Moisture: not dec. dec. Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/14/88

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.

SBLK02

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111488S03

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/14/88

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

EPA SAMPLE NO.

SBLK02

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111488S03

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/02/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/14/88

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

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK03

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S08

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/16/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/16/88

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.

SBLK03

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S08

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. _____ dec. _____ Date Extracted: 11/16/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/16/88

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

EPA SAMPLE NO.

SBLK03

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

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

Sample wt/vol: 1000 (g/mL) ML Lab File ID: 111688S08

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/16/88

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 11/16/88

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. 000-00-1	UNKNOWN OXYGENATED	7.33	8.0	J

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	OTHER	TOT OUT
01	MW-1ART	51	51	49	63	56	54		0
02	MW-1LUS	49	47	78	62	37	45		0
03	MW-2ART	37	48	35	23	25	12		0
04	MW-2LUS	54	61	51	22	16 *	16		1
05	MW-3ART	50	51	46	9 *	5 *	6 *		3
06	MW-3ARTRE	50	87	100	D	7 *	24		1
07	MW-3LUS	50	53	59	44	40	52		0
08	MW-4ART	37	44	64	44	52	19		0
09	MW-4LUS	66	75	93	22	38	48		0
10	MW-5ART	36	46	58	38	42	35		0
11	MW-5LUS	37	51	81	89	86	59		0
12	MW-6ART	55	47	57	46	57	46		0
13	MW-6LUS	52	44	74	79	71	60		0
14	MW-6LUSMS	42	53	81	77	90	69		0
15	MW-6LUSMSD	46	58	83	68	77	67		0
16	SBLK01	70	52	78	62	74	41		0
17	SBLK02	51	53	67	64	56	43		0
18	SBLK03	42	64	97	49	86	64		0

	QC LIMITS
S1 (NBZ) = Nitrobenzene-d5	(35-114)
S2 (FBP) = 2-Fluorobiphenyl	(43-116)
S3 (TPH) = Terphenyl	(33-141)
S4 (PHL) = Phenol-d5	(10-94)
S5 (2FP) = 2-Fluorophenol	(21-100)
S6 (TBP) = 2,4,6-Tribromophenol	(10-123)

\# Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: MW-6LUS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
Phenol	200	0	139	70	12- 89
2-Chlorophenol	200	0	141	71	27-123
1,4-Dichlorobenzene	100	0	63.2	63	36 97
N-Nitroso-di-n-prop.(1)	100	0	66.4	66	41 116
1,2,4-Trichlorobenzene	100	0	62.2	62	39 98
4-Chloro-3-methylphenol	200	0	149	75	23 97
Acenaphthene	100	0	66.8	67	46-118
4-Nitrophenol	200	0	108	54	10- 80
2,4-Dinitrotoluene	100	0	64.2	64	24- 96
Pentachlorophenol	200	0	76.6	38	9-103
Pyrene	100	0	75.4	75	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	200	122	61	14	42	12- 89
2-Chlorophenol	200	130	65	9	40	27-123
1,4-Dichlorobenzene	100	63.8	64	-2	28	36 97
N-Nitroso-di-n-prop.(1)	100	72.2	72	-9	38	41 116
1,2,4-Trichlorobenzene	100	68.2	68	-9	28	39 98
4-Chloro-3-methylphenol	200	150	75	0	42	23 97
Acenaphthene	100	73.6	74	-10	31	46-118
4-Nitrophenol	200	97.8	49	10	50	10- 80
2,4-Dinitrotoluene	100	68.0	68	-6	38	24- 96
Pentachlorophenol	200	73.2	37	3	50	9-103
Pyrene	100	79.2	79	-5	31	26-127

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 11 outside limits
Spike Recovery: 0 out of 22 outside limits

COMMENTS: 51407-0452 AT KEARNEY 880017 (H2O)
1.5 MIN @ 35C, THEN 10C/MIN TO 300C (FINN 4500B)

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

Lab File ID: 111488S03 Lab Sample ID: _____

Date Extracted: 11/02/88 Extraction:(SepF/Cont/Sonc) CONT

Date Analyzed: 11/14/88 Time Analyzed: 1118

Matrix: (soil/water) WATER Level:(low/med) LOW

Instrument ID: 4500B

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	MW-1ART		111588S10	11/15/88
02	MW-2ART		111688S11	11/17/88
03	MW-3ART		111588S11	11/15/88
04	MW-4ART		111688S07	11/16/88
05	MW-5ART		111688S12	11/17/88
06	MW-6ART		111788S03	11/17/88

COMMENTS: 51407-0459 AT KEARNEY METHOD BLANK 11/02/88 (H2O)
1.5 MIN @35C,THEN 10C/MIN TO 300C(FINN 4500B)

4B

SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: EMSI Contract: 0452 0459

Lab Code: EMSI Case No.: ATK-1 SAS No.: _____ SDG No.: _____

Lab File ID: 111688S08 Lab Sample ID: _____

Date Extracted: 11/16/88 Extraction:(SepF/Cont/Sonc) CONT

Date Analyzed: 11/16/88 Time Analyzed: 2315

Matrix: (soil/water) WATER Level:(low/med) LOW

Instrument ID: 4500B

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	MW-3ARTRE		111688S10	11/17/88
02	MW-4LUS		111688S09	11/17/88

COMMENTS: 51407-0452 METHOD BLANK 11/16/88 H2O)
1.5 MIN @ 35C, THEN 10C/MIN TO 300C (FINN 4500B)

Albuquerque, NM 87106

Telephone: (505)841-2500

HEAVY METAL ANALYSIS FORM

Date Received	10/31/88	Lab No	ICAP-535	User Code	☐ 59400 ☐ 59300	☐ 53400 ☐ 59500	☒ 53300 ☐

COLLECTION DATE & TIME: yy 88 mm 10 dd 27 hh 08 mm 35

10-27-88

COLLECTED BY: Steve Moore

COLLECTION SITE DESCRIPTION: Phillips - Artesia MW-1

TO: Jim Ashby

OWNER: Phillips Pet.

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

SITE LOCATION:
County: Eddy

Township, Range, Section, Tract: (10N06E24342)

ATTN: Julie Wanslow
PHONE:

STATION/ WELL CODE: MW-1

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☒ Bailed ☐ Dipped ☐ Pump ☐ Tap	Water Level: 61.94' BTOC	Discharge:	Sample Type: Ground water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
6.90	1250 µmho	19°C °C	µmho

FIELD COMMENTS: Upgradient well

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED: Acidified in field - 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	0.3		Silicon	25.	
Barium	<0.1		Silver	<0.1	X <0.001
Beryllium	<0.1	X <0.02	Strontium	2.3	
Boron	0.4		Tin	0.2	
Cadmium	<0.1	☐ X <0.001	Vanadium	0.1	
Calcium	150.		Zinc	<0.1	
Chromium	<0.1	☐ X 0.009	Arsenic		☐ X 0.012
Cobalt	<0.05		Selenium		☐ X <0.005
Copper	<0.1	X <0.05	Mercury		☐
Iron	0.2 X				☐
Lead	<0.1	☐ <0.005			☐
Magnesium	50.				☐
Manganese	0.11 X				☐
Molybdenum	<0.1				
Nickel	<0.1	X <0.05			☐

RECEIVED
FEB 17 1989
HAZARDOUS WASTE SECTION

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

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

Reviewer: John K Warren
Date Reviewed: 2/9/89

cc: Relinquished by Steve Moore 10/27/88 @ 3:00pm

Albuquerque, NM 87108 Telephone: (505)841-2500

Date Received	10/31/88	Lab No. ICAP-536	User Code	☐ 59400 ☐ 53400 ☒ 53300 ☐ 59300 ☐ 59500 ☐

COLLECTION DATE & TIME: yy 88 mm 10 dd 27 hh 0955 mm
10/27/88

COLLECTED BY: Steve Morse

COLLECTION SITE DESCRIPTION: Phillips - Artesia MW-2

TO: Jim Ashby

OWNER: Phillips Pet

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

JAN 2 8 1989

SITE LOCATION:
County: Eddy

Township, Range, Section, Tract: (10N06E24342)

ATTN: Julie Thurlow
PHONE:

STATION/ WELL CODE: MW-2

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

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

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
6.88	3400 µmho	20 °C	µmho

FIELD COMMENTS:

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED: Acidified in field - 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	0.6		Silicon	35.	
Barium	0.8		Silver	<0.1	☒ <0.001
Beryllium	<0.1	☒ <0.02	Strontium	4.7	
Boron	0.6		Tin	0.3	
Cadmium	<0.1	☐ ☒ <0.001	Vanadium	<0.1	
Calcium	280.		Zinc	<0.1	
Chromium	<0.1	☐ ☒ 0.011	Arsenic		☐ ☒ 0.045
Cobalt	0.06		Selenium		☐ ☒ <0.005
Copper	<0.1	☒ <0.05	Mercury		☐
Iron	2.7 ☒				☐
Lead	<0.1	☐ ☒ <0.005			☐
Magnesium	120.				☐
Manganese	2.4 ☒				☐
Molybdenum	<0.1				☐
Nickel	0.1	☒ 0.006			☐

LAB COMMENTS: 5.0ml HNO_3 added @ SLD. JAA 11/1/88 DIGESTED

COC: Relinquished by Steve Morse 10/27/88 + 7:00PM

ICAP Analyst: JAA

Analysis Date: 12/12/88

Reviewer: Jim Ashby

Date Reviewed: 1/18/89

Albuquerque, NM 87106 Telephone: (505)841-2500

Date Received	10/31/88	Lab No. ICP-539	User Code	☐ 59400 ☐ 53400 ☒ 53300 ☐ 59300 ☐ 59500 ☐

COLLECTION DATE & TIME: yy 88 mm 10 dd 27 hh 11 mm 05

COLLECTED BY: Steve Musc

COLLECTION SITE DESCRIPTION: Phillips - Artesia MW-3

TO: Jim Ashley

OWNER: Phillips Pet

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

RECEIVED
FEB 27 1989
HAZARDOUS WASTE SECTION

SITE LOCATION:
County: Eddy

Township, Range, Section, Tract: (10N06E24342)

ATTN: Julie Wanslow
PHONE:

STATION/ WELL CODE: MW-3

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☒ Bailed ☐ Dipped	☐ Pump ☐ Tap	Water Level: 52.91 BTOC	Discharge:	Sample Type: Ground Water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
6.97	1800 µmho	21 °C	µmho

FIELD COMMENTS:

SAMPLE FIELD TREATMENT
Check proper boxes:

☒ WPN: Water Preserved w/HNO_3 Non-Filtered

☐ WPF: Water Preserved w/HNO_3 Filtered

LAB ANALYSIS REQUESTED:
acidified in field - 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	0.3		Silicon	25.	
Barium	<0.1		Silver	<0.1	☒ <0.001
Beryllium	<0.1	☒ <0.02	Strontium	3.7	
Boron	0.3		Tin	0.3	
Cadmium	<0.1	☐ ☒ 0.002	Vanadium	<0.1	
Calcium	270.		Zinc	<0.1	
Chromium	<0.1	☐ ☒ 0.020	Arsenic		☐ ☒ 0.105
Cobalt	<0.05		Selenium		☐ ☒ <0.005
Copper	<0.1	☒ <0.05	Mercury		☐
Iron	3.6 ☒				☐
Lead	<0.1	☐ ☒ <0.005			☐
Magnesium	96.				☐
Manganese	4.1 ☒				☐
Molybdenum	<0.1				☐
Nickel	<0.1	☒ <0.05			☐

LAB COMMENTS: 5.0 ml HNO_3 added @ SLD. JAA DIGESTED. 11/1/88

COC: Relinquished by Steve Musc 10/27/88 at 7:00 PM

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

Reviewer: John Keller
Date Reviewed: 2/7/89

Albuquerque, NM 87106 Telephone: (505)841-2500

Date Received	10/31/88	Lab No. ICAP-538	User Code	☐ 59400 ☐ 53400 ☒ 53300 ☐ 59300 ☐ 59500 ☐

COLLECTION DATE & TIME: 10-27-88 (yy 88, mm 10, dd 27, hh 12, mm 15)

COLLECTION SITE DESCRIPTION: Phillips Artesia MW-4

COLLECTED BY: Steve Muse (Kearney/Centaur)

TO: Jim Ashby 841-2553

OWNER: Phillips Petroleum

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

SITE LOCATION:
County: EDDY

Township, Range, Section, Tract: (10N06E24342)

ATTN: Julie Wanslow
PHONE: 827-2928

STATION/ WELL CODE: MW-4

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap

Water Level: 55.84'/TOC

Discharge:

Sample Type: Ground Water

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
6.95	2300 µmho	21 °C	µmho

FIELD COMMENTS:

SAMPLE FIELD TREATMENT
Check proper boxes:

☒ WPN: Water Preserved w/HNO_3 Non-Filtered

☐ WPF: Water Preserved w/HNO_3 Filtered

LAB ANALYSIS REQUESTED:

☒ ICAP Scan
Mark box next to metal if AA is required.

ANALYTICAL RESULTS (MG/L)

ELEMENT	ICAP VALUE	AA VALUE
Aluminum	0.5	
Barium	<0.1	
Beryllium	<0.1	X <0.02
Boron	0.5	
Cadmium	<0.1	☐ X <0.001
Calcium	320.	
Chromium	<0.1	☐ X <0.005
Cobalt	<0.05	
Copper	<0.1	X <0.05
Iron	0.3 X	
Lead	<0.1	☐ X <0.005
Magnesium	100.	
Manganese	0.10 X	
Molybdenum	<0.1	
Nickel	<0.1	X <0.05

ELEMENT	ICAP VALUE	AA VALUE
Silicon	28.	
Silver	<0.1	X <0.001
Strontium	4.6	
Tin	0.8	
Vanadium	0.1	
Zinc	0.1	
Arsenic		☐ X 0.013
Selenium		☐ X <0.005
Mercury		☐
		☐
		☐
		☐
		☐
		☐

RECEIVED
FEB 17 1989
HAZARDOUS WASTE SECTION

LAB COMMENTS:

ICC Relinquished by Marianne Smith 10-27-88 @ 7:00 PM

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

Reviewer: John L. Meyer
Date Reviewed: 2/9/89

Albuquerque, NM 87106 Telephone: (505)841-2500

Date Received	10/31/88	Lab No. ICAP 539	User Code	☐ 59400 ☐ 59300	☐ 53400 ☐ 59500	☒ 53300 ☐

COLLECTION DATE & TIME:	yy	mm	dd	hh	mm
10-27-88	88	10	27	08	25

COLLECTION SITE DESCRIPTION: Phillips - Artesia MW-5 (Equipment Blank)

COLLECTED BY: Steve Muse (Kearney/Centaur)

TO: Jim Ashby 841-2555

OWNER:

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

RECEIVED JAN 23 1989

ATTN: Julie Wanslow
PHONE: 827-2926

SITE LOCATION:
County:

Township, Range, Section, Tract: (10N06E24342)

STATION/ WELL CODE: MW-5

LATITUDE, LONGITUDE:

SAMPLING CONDITIONS:

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

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

FIELD COMMENTS: (EQUIPMENT BLANK)

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED:
☒ 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		Silver	<0.1	X <0.001
Beryllium	<0.1	X <0.02	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			☐

LAB COMMENTS: 5.0 ml HNO_3 added @ SLD AA

COC Relinquished by Marianne Smith 10-27-88 @ 7:00 pm

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

Reviewer: Jim Ashby
Date Reviewed: 1/18/89

Date Received	10/31/88	Lab No. [redacted] 540	User Code	☐ 59400 ☐ 53400 ☒ 53300 ☐ 59300 [redacted] ☐ 59500 ☐

COLLECTION DATE & TIME: 10-27-88 | yy 88 | mm 10 | dd 27 | hh 12 | mm 00

COLLECTED BY: Steve Muse (Kearney / Centaur)

COLLECTION SITE DESCRIPTION: Phillips Artesia MW-6 (Field Blank) ~~(EQUIPMENT BLANK)~~ (MS)

TO: Jim Ashby 841-2553

OWNER: Phillips Artesia

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

SITE LOCATION:
County: EDDY

Township, Range, Section, Tract: (10N06E24342)

ATTN: Julie Wanalow
PHONE: 827-2928

STATION/ WELL CODE: MW-16

LATITUDE, LONGITUDE: [redacted]

SAMPLING CONDITIONS:

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

pH(00400)	Conductivity(Uncorr.)	Water Temp.(00010)	Conductivity at 25°C (00094)
✓	✓ µmho	✓ °C	✓ µmho

FIELD COMMENTS: ~~(EQUIPMENT BLANK)~~ (MS) (FIELD BLANK)

SAMPLE FIELD TREATMENT Check proper boxes:		LAB ANALYSIS REQUESTED:
☒ 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
Aluminum	<0.1		
Barium	<0.1		
Beryllium	<0.1		x <0.02
Boron	<0.1		
Cadmium	<0.1	☐	x <0.001
Calcium	<0.1		
Chromium	<0.1	☐	x <0.005
Cobalt	<0.05		
Copper	<0.1		x <0.05
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

ELEMENT	ICAP VALUE		AA VALUE
Silicon	<0.1		
Silver	<0.1		x <0.001
Strontium	<0.1		
Tin	<0.1		
Vanadium	<0.1		
Zinc	<0.1		
Arsenic		☐	x <0.005
Selenium		☐	x <0.005
Mercury		☐	
		☐	
		☐	
		☐	
		☐	
		☐	
		☐	

RECEIVED
FEB 17 1989

LAB COMMENTS: 5.0 ml HNO_3 added @ SLD. JAA

COC Relinquished by Marianne Smith 10-27-88 at 7.00pm

ICAP Analyst: JAA

Analysis Date: 12/12/88

HAZARDOUS WASTE BUREAU

Date Reviewed: 2/14/89

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

and NITROGEN ANALYSIS

DATE RECEIVED: 10 31 88	LAB NO. W24[redacted]	USER CODE ☐ 59300 ☐ 59600 ☒ OT[redacted] 53300 EID	
Collection DATE: 10 27 88	SITE INFORM-ATION ►	Sample location: Phillips - Artesia MW-1 New Mexico	
Collection TIME: 8:35		Collection site description: Natural Gas Processor	
Collected by — Person/Agency: Steve Muse AT. Kearney			

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

881027 [redacted]0835

Station/well code: MW-1
Owner: Phillips Petroleum

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level: 61.94' BTOC	Discharge:	Sample type: Ground water
pH (00400): 6.90	Conductivity (Uncorrected): 1250 µmho	Water Temp. (00010): 19°C °C	Conductivity at 25°C (00094): µmho

Field comments: Upgradient well

RECEIVED NOV 21 1988 GROUND WATER BUREAU

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 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	0.65	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 22 1988 HAZARDOUS WASTE BUREAU

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	

Laboratory remarks: Analyze immediately after shaking
Relinquished by Steve Muse 10/27/88 @ 7:00pm

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

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

and NITROGEN ANALYSIS

DATE RECEIVED: 10/31/88	LAB NO. UC-4[illegible]	USER CODE ☐ 59300 ☐ 59600 ☑ OTHER: 53300 EID	
Collection DATE: 10/27/88	SITE INFORMATION ►	Sample location: Phillips - Artesia NM-2	
Collection TIME: 9:55		Collection site description: Natural Gas Processor	
Collected by — Person/Agency: Steve Musser AT Kearney			

Attn: Chris Dillon

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

PO# [illegible] 881027 0955

Station/well code: MW-2
Owner: Phillips Petroleum

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level: Will provide later	Discharge:	Sample type: Ground water
pH (00400): 6.88	Conductivity (Uncorrected): 3400 µmho	Water Temp. (00010): 20	Conductivity at 25°C (00094): µmho

RECEIVED NOV 21 1988 GROUND WATER/HAZARDOUS WASTE BUREAU

Field comments:

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 drops 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	5.7		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[illegible] HAZARDOUS WASTE BUREAU

NF, A-H_2SO_4			
☐ 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			
☐ 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	CJ

Laboratory remarks: Analyze immediately after shaking
Relinquished by Steve Musser 10/27/88 @ 7:00PM

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

and NITROGEN ANALYSIS

DATE RECEIVED 10 31 88	LAB NO. WC-4	USER CODE ☐ 59300 ☐ 59600 ☒ OTHER: 53300 EID
Collection DATE 10 27 88	SITE INFORMATION ►	Sample location Phillips - Artesia MW-3
Collection TIME 11:05		Collection site description Natural Gas Processor
Collected by — Person/Agency Steve Muse / AtKearney		

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 Warslow

PSm
~~[illegible]~~ / ~~[illegible]~~
881027 / 1105

Station/well code: MW-3
Owner: Phillips Petroleum

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level 52.91' BTOC	Discharge	Sample type Ground Water
pH (00400) 6.97	Conductivity (Uncorrected) 1800 µmho	Water Temp. (00010) 21°C °C	Conductivity at 25°C (00094) µmho

Field comments

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*:		

RECEIVED
NOV 21 1988

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	24		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:			

GROUND WATER / HAZARDOUS WASTE BUREAU
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	CG

Laboratory remarks: Analyze immediately after shaking.
Relinquished by Steve Muse 10/27/88 @ 9:00 AM

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 — (505) 841-2555

and NITROGEN ANALYSIS

DATE RECEIVED 10 31 88 | LAB NO. WC-4[illegible]

USER CODE ☐ 59300 ☐ 59600 ☒ OTHER 53302 EID

Collection DATE 10 27 88

Collection TIME 12:15

SITE INFORMATION ►

Sample location Phillips - Artesia MW-4

Collection site description Natural Gas Processor

Collected by — Person/Agency Steve Musa - Art Kearns

SEND FINAL REPORT TO ►

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

RECEIVED
NOV 21 1988
GROUND WATER/HAZARDOUS WASTE BUREAU

Pam
88/10/27 | 1215

Station/well code MW-4

Owner Phillips Petroleum

SAMPLING CONDITIONS

☒ Bailed ☐ Dipped ☐ Pump ☐ Tap	Water level 55.84' BTOC	Discharge	Sample type Ground Water
pH (00400) 6.95	Conductivity (Uncorrected) 2300 µmho	Water Temp. (00010) 21 °C	Conductivity at 25°C (00094) µmho

Field comments

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	21	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 21 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 11 14 88 | Reviewed by

Laboratory remarks: Conductivity Turbidity immediately after shaking
Relinquished by Steve Musa 10/27/88 at 7:00 PM

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

Albuquerque, NM 87106 — (505) 841-2555

DATE RECEIVED 10/31/88	LAB NO. WC-445	USER CODE ☐ 59300 ☐ 59600 ☒ OTH 5330 (EID)	
Collection DATE 10/27/88	SITE INFORM-ATION	Sample location Phillips - Bristol MW-5 (Equip. blank)	
Collection TIME 8:25		Collection site description Natural Gas Processor	
Collected by (Person/Agency) Steve Musa A.T. Kearney			

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

108827 / 0825

Station/well code MW 1 collection site
Owner Phillips Petroleum

SAMPLING CONDITIONS

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

Field comments

RECEIVED
NOV 21 1988
GROUND WATER / HAZARDOUS WASTE BUREAU

SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted

☒ NF: Whole sample (Non-filtered) ☐ F: Filtered in field with 0.45 µ membrane 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	0.23	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 23 1988
HAZARDOUS WASTE BUREAU

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	CO

Laboratory remarks: Centrifuge immediately after shaking
Relinquished by Steve Musa @ 10/27/88 at 700 PM

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

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

and NITROGEN ANALYSIS

DATE RECEIVED 10/31/88 | LAB NO. [redacted] | USER CODE ☐ 59300 ☐ 59600 ☒ OTHER 53500 EID

Collection DATE 10/27/88 | Collection TIME 12:00 | SITE INFORMATION ►

Sample location: Phillips - Bartesia MW-6 (field blank)

Collected by - Person/Agency: Steve Musa A.T. Kearney

Collection site description: Natural Gas Processor

881027 | 1200

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: Julia Winston

RECEIVED

Station/well code: MW-3 (collection site)

Owner: Phillips Petroleum

SAMPLING CONDITIONS

☒ Bailed ☐ Pump ☐ Dipped ☐ Tap	Water level: N/A	Discharge:	Sample type: field blank
pH (00400)	Conductivity (Uncorrected) µmho	Water Temp. (00010) °C	Conductivity at 25°C (00094) µmho

NOV [illegible] GROUND WATER/HAZARDOUS WASTE BUREAU

Field comments

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	0.06	11/1
☐ 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] HAZARDOUS WASTE SECTION

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

Analyst | Date Reported: 11 | 14 | 88 | Reviewed by: CS

Laboratory remarks: Analyze immediately after shaking
Relinquished by Steve Musa 10/27/88 at 7:00PM

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