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

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

14 DEC 1993

RECEIVED
HAZARDOUS WASTE
PROGRAM
DEC 1993

SUBJ: Lakes Holloman and Stinky RCRA Facility Investigation Report

TO: US Environmental Protection Agency
Region VI, 6H-CS
Attn: Mr Lowell Seaton
First Interstate Bank Tower
1445 Ross Avenue
Dallas, TX 75202-2733

1. A draft of Phase 2 Resource Conservation and Recovery Act (RCRA) Facility Investigation Report for Lakes Holloman and Stinky is attached. Please review and provide comments. We will contact you regarding the meeting in Dallas to discuss the results.

2. We would also like to inquire regarding the review status of the following documents:

a. Preliminary Assessment/Site Investigation of Four Waste Sites
b. Table 1 Phase 2 RCRA Facility Investigation Work Plan
c. Permit Modification of Table 1 Solid Waste Management Units.

We would appreciate receiving your comments as soon as possible so we can proceed with investigation, clean-up and closure. Funding is presently available for these activities and we would like to use this opportunity to continue our efforts in improving the Holloman AFB environment.

3. Please direct questions to Mr Warren Neff or Mr Tim O'Donnell at (505) 475-3931.

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Deputy Base Civil Engineer

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Lakes RFI Report

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Headquarters, Air Combat Command
Langley Air Force Base,
Virginia

Draft Final

Phase 2 - RCRA Facility Investigation Report for Lakes Holloman and Stinky

Sewage Lagoons and Lakes Investigation

December 1993

49th FIGHTER WING

49 CES/CEV
Holloman Air Force Base,
New Mexico

PURPOSE OF DOCUMENT

A. This report presents the results, conclusions, and recommendations of the Phase 2 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for Lakes Holloman and Stinky at Holloman Air Force Base (AFB), New Mexico. Holloman AFB operates a RCRA-permitted on-site storage facility for currently generated hazardous wastes. The permit requires investigation of Lakes Holloman and Stinky under the RCRA corrective action program. This document was prepared for, and in cooperation with, the Base Environmental Office: 49 CES/CEV, 550 Tabosa Avenue, Holloman AFB, NM, 88330-8454, phone 505/475-3931.

B. The objective of this Phase 2 RFI is to determine whether the uppermost aquifer hydraulically downgradient of Lakes Holloman and Stinky has been affected by constituents present in sludge and soil in the lakes. The report presents the results of data collected during the most recent field investigation and provides recommendations for future groundwater sampling at Lakes Holloman and Stinky.

C. The report contains data evaluation criteria, conclusions, and recommendations. Using the data evaluation criteria, conclusions address the interpretation of laboratory and hydrogeologic data. Recommendations are based on the conclusions and address proposed groundwater monitoring requirements for the lakes.

DCN 93-269-069-26-06
RCN 269-069-26-50

PHASE 2

RCRA FACILITY INVESTIGATION REPORT FOR LAKES HOLLOMAN AND STINKY

SEWAGE LAGOONS AND LAKES INVESTIGATION HOLLOMAN AIR FORCE BASE, NM

DRAFT FINAL

Prepared for:

49 CES/CEV
Holloman Air Force Base, NM

and

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Under Contract No. DACW45-91-D-0018 with:

US Army Corps of Engineers
Omaha District
Omaha, Nebraska

December 1993

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A-E SQCSR	Architect-Engineer Sampling and Quality Control Summary Report
AFB	Air Force Base
BGL	Below Ground Level
CDAP	Chemical Data Acquisition Plan
DQOs	Data Quality Objectives
EPA	Environmental Protection Agency
GWMP	Groundwater Monitoring Plan
HHSs	Human Health Standards
HIR	Hydrogeologic Investigation Report
HSWA	Hazardous and Solid Waste Amendments
MCLs	Maximum Contaminant Levels
MDL	Method Detection Limit
MSL	Mean Sea Level
NMED	New Mexico Environment Department
NM WQCC	New Mexico Water Quality Control Commission
PCB	Polychlorinated Byphenols
ppb	Part per billion
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SMCLs	Secondary Maximum Contaminant Levels
SWMU	Solid Waste Management Unit
TDS	Total Dissolved Solids
UTL	Upper Tolerance Limit

EXECUTIVE SUMMARY

The *Phase 2 RCRA Facility Investigation Report, Sewage Lagoons and Lakes Investigation* presents the results, conclusions, and recommendations of the Phase 2 RCRA Facility Investigation (RFI) at Lakes Holloman and Stinky at Holloman AFB. This executive summary provides a brief overview of the purpose, scope of sampling, conclusions, and recommendations.

The lakes are two of the solid waste management units (SWMUs) listed in the Hazardous and Solid Waste Amendments (HSWA) portions of the Base's RCRA permit to operate a storage area for currently generated hazardous wastes. Under the RCRA corrective action program, the Base is required to conduct an RFI of these units.

Previous sampling during the Phase 1 RFI indicated that the sludge and soil in Lakes Holloman and Stinky contain Method 8080 pesticides and metals. Therefore, a Phase 2 RFI was recommended. The objective of this Phase 2 RFI was to determine whether the uppermost aquifer hydraulically downgradient of Lakes Holloman and Stinky has been affected by constituents present in sludge and soil in the lakes. Groundwater beneath Holloman AFB is classified as nonpotable by U.S. EPA and State of New Mexico standards. As shown in Figure 1, five monitor wells were used for the investigation. Groundwater from the monitor wells was sampled once and analyzed for Appendix IX parameters.

The primary constituents detected in groundwater samples were Method 8080 pesticides. Pesticide concentrations are very low, ranging from one-tenth to one-hundredth of a part per billion. The quantification of over half of the pesticides was estimated because concentrations were detected below the analytical reporting limit. The presence of 12 Method 8080 pesticides was determined to be certain in the groundwater. The presence of the remaining Method 8080 pesticides was considered unlikely or they were not detected. Method 8080 pesticides were primarily detected in monitor wells MW-16, MW-17, and MW-18 and mostly absent in MWS-09 and MWS-16.

The extent of Method 8080 pesticides in groundwater downgradient of Lakes Holloman and Stinky is unknown because of the lack of monitor wells located further downgradient. However, using the results of groundwater monitoring conducted for the sewage lagoons for comparison (*Phase 1 Groundwater Assessment Monitoring Report*) (Radian, 1993), it is anticipated that concentrations of Method 8080 pesticides will decrease downgradient of the lakes and that the presence of pesticides further downgradient will be uncertain or unlikely when detected and will not be reproducible over time.

No metals constituents have conclusively affected groundwater. The concentrations for antimony, cadmium, cobalt, mercury, and tin were above the Upper Tolerance Limits for background in some monitor wells, but average concentrations downgradient of the lakes were not greater than average background concentrations. These data indicate groundwater may be affected by those constituents but the results are inconclusive.

Although other organic and inorganic constituents were detected in groundwater, the concentrations were not significant and not consistently detected in the monitor wells. Therefore, they are not considered constituents of concern.

Installation of additional monitor wells is not recommended because the overall nature of contamination is understood. Furthermore, comparison of the results for the lakes to the sewage lagoons assessment monitoring indicate concentrations of Method 8080 pesticides decrease and are not reproducible further downgradient. Therefore, the current monitor wells are sufficient to satisfy the RCRA corrective action requirements. It is recommended that monitoring be continued and conducted in coordination with the existing long-term monitoring program at the Base. It is recommended that samples be collected from

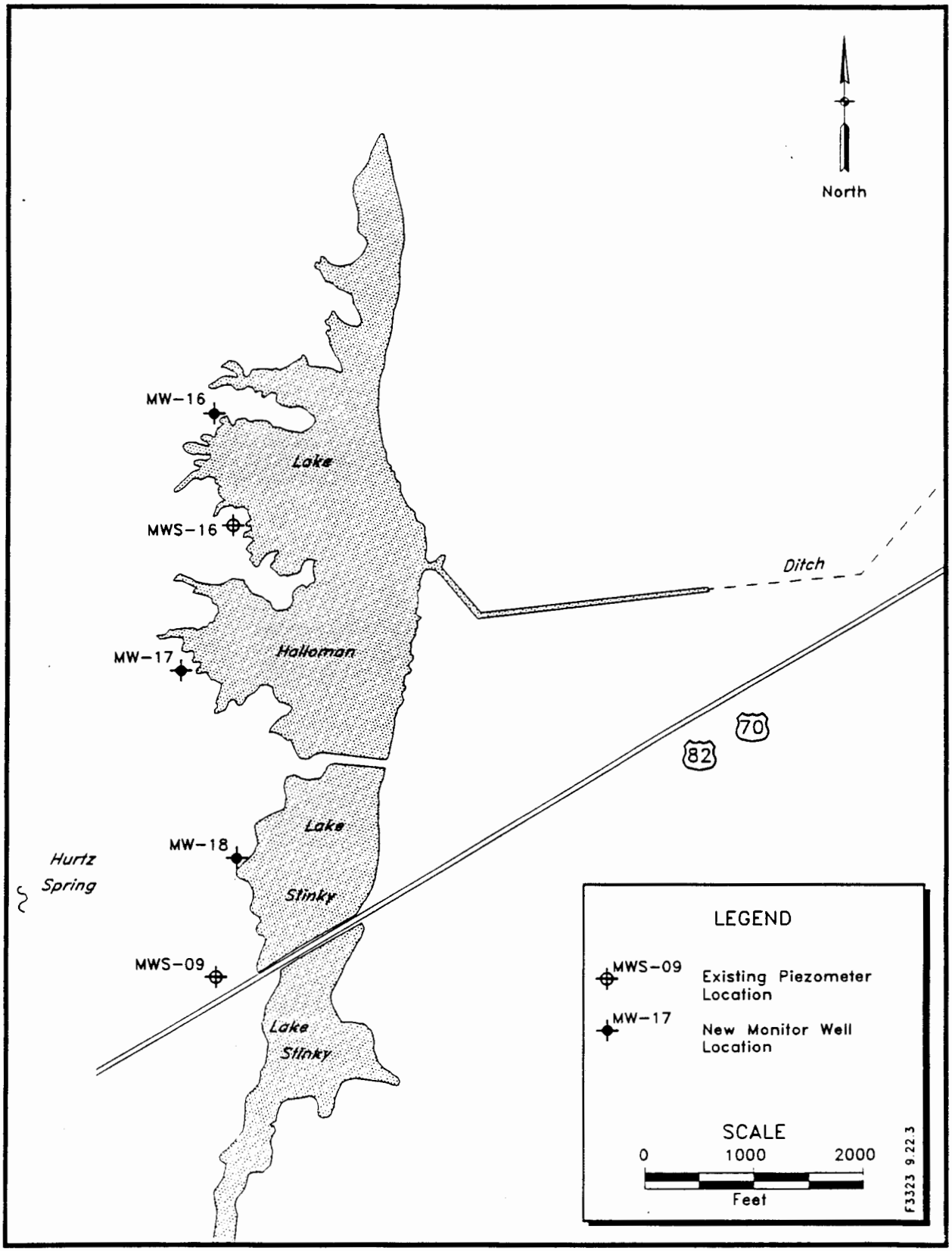


Figure 4-1. Location of Monitor Wells

network monitor wells every other year for ten years and be analyzed for Method 8080 pesticides and metals.

In addition, it is recommended that risk-based data be used to establish long-term monitoring criteria. Future groundwater monitoring requirements may need to be revised based on proposed construction activities for the new wastewater treatment plant.

Section 1
INTRODUCTION

The purpose of this document is to present the results, conclusions, and recommendations of the Phase 2 RCRA Facility Investigation (RFI) for Lakes Holloman and Stinky at Holloman Air Force Base (AFB), New Mexico. Figure 1-1 illustrates the location of the Base and the lakes.

1.1 Background

Holloman AFB operates a RCRA-permitted on-site storage facility for currently generated hazardous wastes. Because of this, the Base is subject to the RCRA corrective action program. The Hazardous and Solid Waste Amendments (HSWA) portions of the permit require Holloman AFB to investigate several of the solid waste management units (SWMUs) identified in the RCRA Facility Assessment (RFA). Units listed in Tables 1, 2, and 3 of the HSWA permit must each comply with a schedule for implementing the corrective action program. Lake Holloman (including the Ditch from Pond G to Lake Holloman) (SWMU No. 139) and Lake Stinky (SWMU 140), are listed in Table 1 of the permit and, therefore, require investigation under the RCRA corrective action program. Because the lakes are similar to the sewage lagoons, site-specific investigations have been conducted in coordination with sewage lagoons investigations and not other SWMUs listed in Table 1 of the HSWA permit. Sludge and soil samples were collected from the lakes in 1992 as Phase 1 of the RFI. The results of this study are presented in the *Site Characterization Report* (Radian, 1992) and indicated that Method 8080 pesticides and metals are present in the sludge and soil from Lakes Holloman and Stinky. The Phase 1 study recommended a Phase 2 RFI be conducted to determine whether a release has occurred to groundwater.

1.2 Objective

The objective of this Phase 2 RFI at Lakes Holloman and Stinky is to determine whether the uppermost water-bearing zone hydraulically downgradient of Lakes Holloman and Stinky has been impacted by constituents present in sludge and soil in the lakes. To ensure this objective was met, Data Quality Objectives (DQOs) for data collection and data interpretation activities were developed; these are presented in the *Chemical Data Acquisition Plan* (CDAP) (Radian, 1993) which guided the investigation.

1.3 Scope of Investigation

The sampling and analytical program was structured to meet the requirements of the New Mexico Environment Department (NMED) and EPA, Region VI in determining the presence or absence of contamination hydraulically downgradient of Lakes Holloman and Stinky. Field activities began in February 1993 and ended April 1993. Figure 1-2 illustrates the location of three new monitor wells (MW-16, MW-17, and MW-18) and two existing piezometers (MWS-09 and MWS-16); all five are installed in the uppermost water-bearing zone. One round of groundwater samples was collected from each of the five monitor wells and analyzed for Appendix IX parameters. In addition to analytical sampling, two water-level surveys were conducted using groundwater and surface water data. Appendix A contains records of all field activities.

1.4 Report Contents

This report presents the results of data collected during the most recent field investigation and provides recommendations for future groundwater sampling at Lakes Holloman and Stinky. Emphasis is given to the discussion of conclusions for newly acquired data. A brief comparison is made with historical data and with the results of the groundwater investigations for the sewage lagoons presented in the *Draft Final Phase 1 Groundwater Assessment Monitoring Report* (Radian, 1993).

This report contains six sections which are described below.

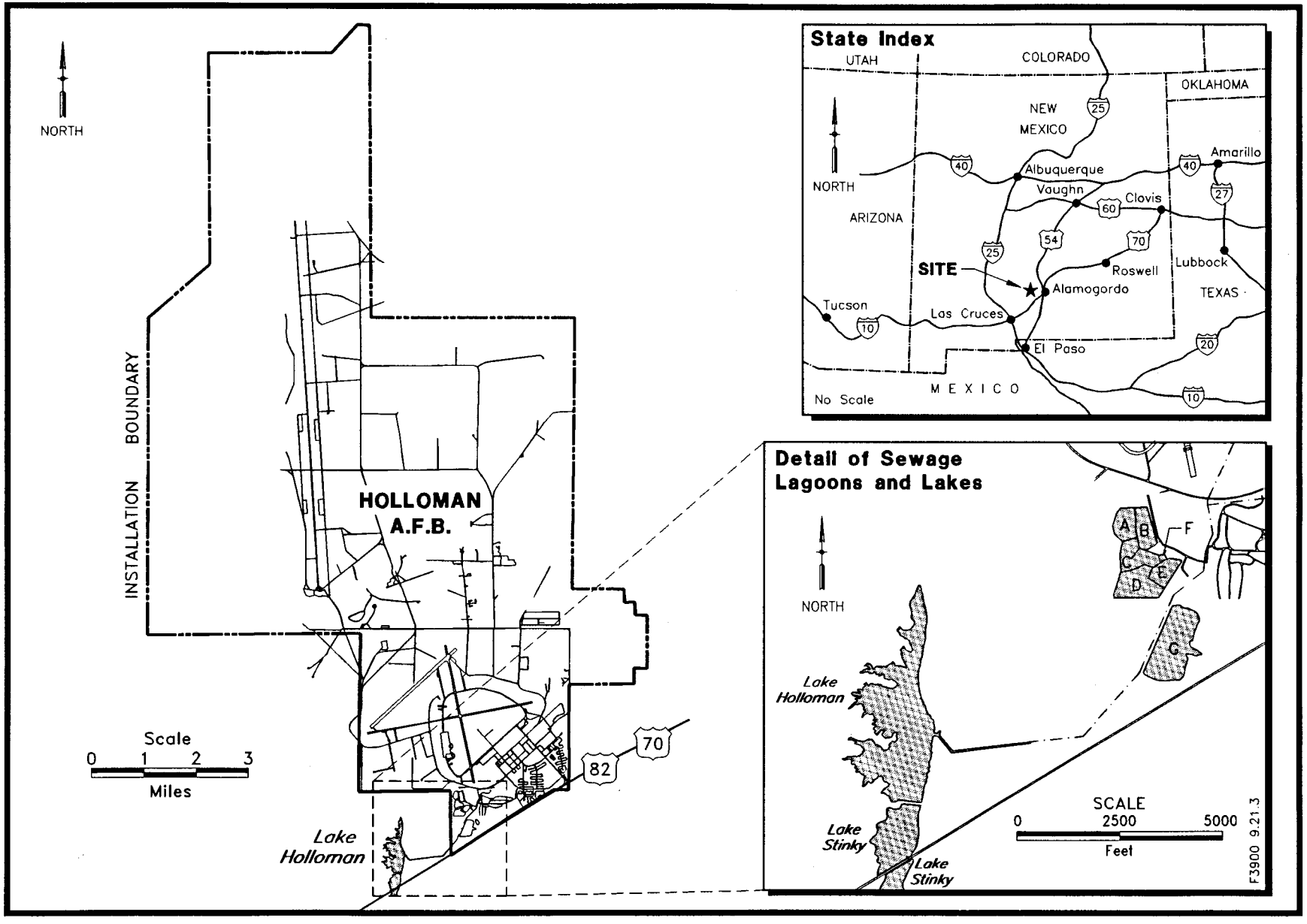


Figure 1-1. Location of Lakes Holloman and Stinky at Holloman AFB

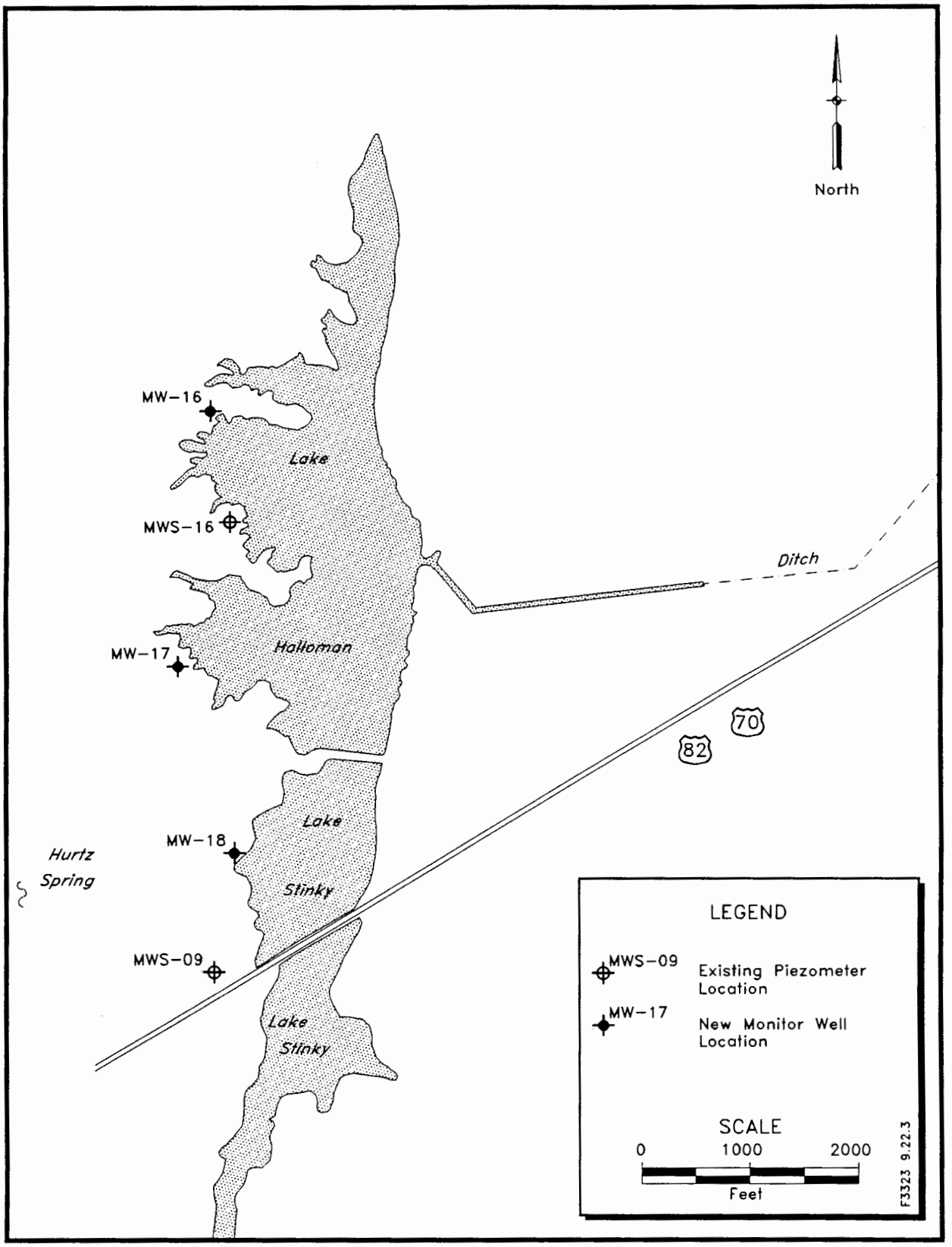


Figure 1-2. Location of New and Existing Monitor Wells

- Section 2 provides an overview of the results of geologic and hydrogeologic studies conducted during the RFI.
- Section 3 provides rationale for data evaluation.
- Section 4 presents the conclusions for the Phase 2 RFI and a comparison of Phase 2 RFI results to historical data and to data from Phase 1 assessment monitoring at the sewage lagoons.
- Section 5 presents recommendations for future groundwater monitoring requirements.
- Section 6 lists the references cited in this report.

Section 2
ENVIRONMENTAL SETTING

The geology, hydrology, and groundwater quality is presented using revised data collected during the most recent field investigation (Spring 1993). The *Hydrogeologic Investigation Report and Groundwater Monitoring Plan* (HIR/GWMP) (Radian, July 1989) and the *Remedial Investigation Report, Investigation, Study and Recommendation for 29 Waste Sites* (Radian, June 1992) contain additional information regarding the overall environmental setting (age, structure, and geologic history) at Holloman AFB. The reader is referred to these reports for a more detailed discussion of these topics.

2.1 Geology

The subsurface conditions at the site were defined by direct sampling and observation of the drilling operations of soil and/or monitor well borings drilled between 1987 and 1993. Figures 2-1 and 2-2 and cross sections A-A' through H-H' (shown on Plate 1) illustrate and describe the general stratigraphy of the site. Boring logs from the most recent field investigation are presented in Appendix A.

The sediments consist of sand, silt, and clay and are subdivided into six very broadly definable units which appear to be continuous across the site (Figure 2-1). This interpretation is supported by available data; however, irregularities exist on a smaller scale because of the discontinuous nature of alluvial and lacustrine deposits. Data collected from further investigation at the site may serve to refine this interpretation.

2.2 Hydrology

2.2.1 Surface Water

The wastewater treatment facility consists of seven aeration/evaporation lagoons which receive approximately 1.3 million gallons of residential and industrial wastewater per day. Wastewater entering the facility flows in parallel into Ponds A or B then in series through Ponds C, D, E, F, and G. The discharge from the last impoundment in the series (Pond G) flows via an open ditch to Lakes Holloman and Stinky for eventual evaporation. In addition to the runoff from the sewage lagoons, this ditch receives runoff from the golf course, the flight line approach zone, lawn-irrigation, and the roadside. Water entering the ditch discharges into the lower eastern part of Lake Holloman. During high water conditions, overflow from Lake Holloman discharges into, and accumulates in, Lakes Stinky. All ponds and lakes are unlined and surface water infiltrates into groundwater.

2.2.2 Groundwater

The groundwater elevation was surveyed in March, April, and August 1993 to determine seasonal variation associated with precipitation and evaporation rates at Holloman AFB. Actual measurements are provided in Appendix A, part 6. As part of the survey, surface water elevations were measured in Ponds A, D, and G and in Lakes Holloman and Stinky to provide data necessary to characterize local relationships between surface water and groundwater. Figures 2-3 and 2-4 illustrate the contoured groundwater surface as measured during the two surveys. Figure 2-5 graphically illustrates the three-dimensional geometry of the water table and the relationship of groundwater and surface water for the April 1993 water level survey.

In the vicinity of the wastewater treatment facility, the depth to groundwater ranges from 2 ft below ground level (BGL) near the sewage lagoons to 13 ft BGL near Lakes Holloman and Stinky. Under an average hydraulic gradient of 0.3, the groundwater flows consistently from northeast to southwest. However, surface water in the unlined lakes causes groundwater mounding. Immediately to the east of Lakes Holloman and Stinky, groundwater flows toward the southeast, not southwest. Direct evidence of this can be seen by comparing the elevation of surface water during August in Lake Holloman (4018.8 ft msl) to that of groundwater in monitor wells MWS-08 and MWS-11 (4018.33 and 4016.32 ft msl, respectively).

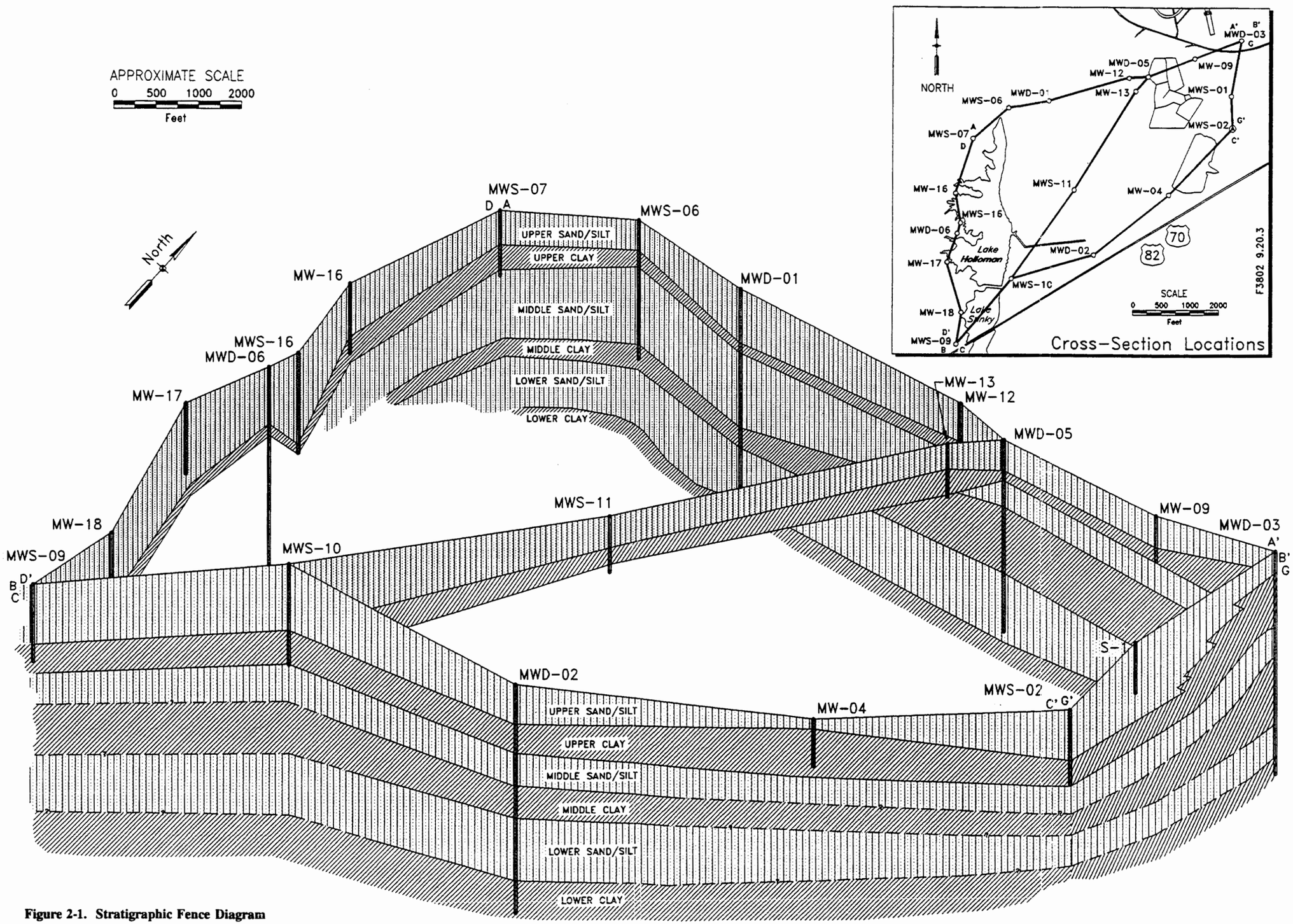


Figure 2-1. Stratigraphic Fence Diagram

Approximate Feet BGL	General Stratigraphic Section	Unit	Average Thickness (feet)	Lithologic Description
		UPPER SAND/SILT	12	SAND AND SILT – light tan to dark brown, poorly graded quartzose, minor gypsum crystals, dark accessory minerals, loose, dry to moist, rare green staining near base of unit
12		UPPER CLAY	6	CLAY – reddish–brown to greenish–gray, slightly silty, poorly graded, plastic, firm to friable, contains scattered pockets of small gypsum crystals, semi–continuous, becoming thinner in the north portion of site
18		MIDDLE SAND/SILT	10	SAND AND SILT – reddish–brown to light gray, moderately to poorly graded, slightly clayey in zones, minor dark accessory minerals, loose, wet to saturated, minor gypsum crystals, rare pockets of carbon coated material
28		MIDDLE CLAY	25	CLAY – reddish–brown to greenish–gray, poorly graded, becoming more greenish–gray westward, medium to high plasticity, slightly to moderately sandy, common pockets of medium to large gypsum crystals, moderately stiff to firm, wet to saturated
53		LOWER SAND/SILT	15	SAND AND SILT – brown to grayish–green, fine to medium grained, moderately to poorly graded, becoming more clayey near base, minor gypsum crystals, common dark accessory minerals, wet to saturated
68		LOWER CLAY	>8	CLAY – grayish–green, silty, poorly graded moderate to high plasticity, thin interbedded layers of fine grained silty sand, minor gypsum crystals, wet to saturated

F3805 9.20.3

Figure 2-2. Generalized Description of Stratigraphic Section

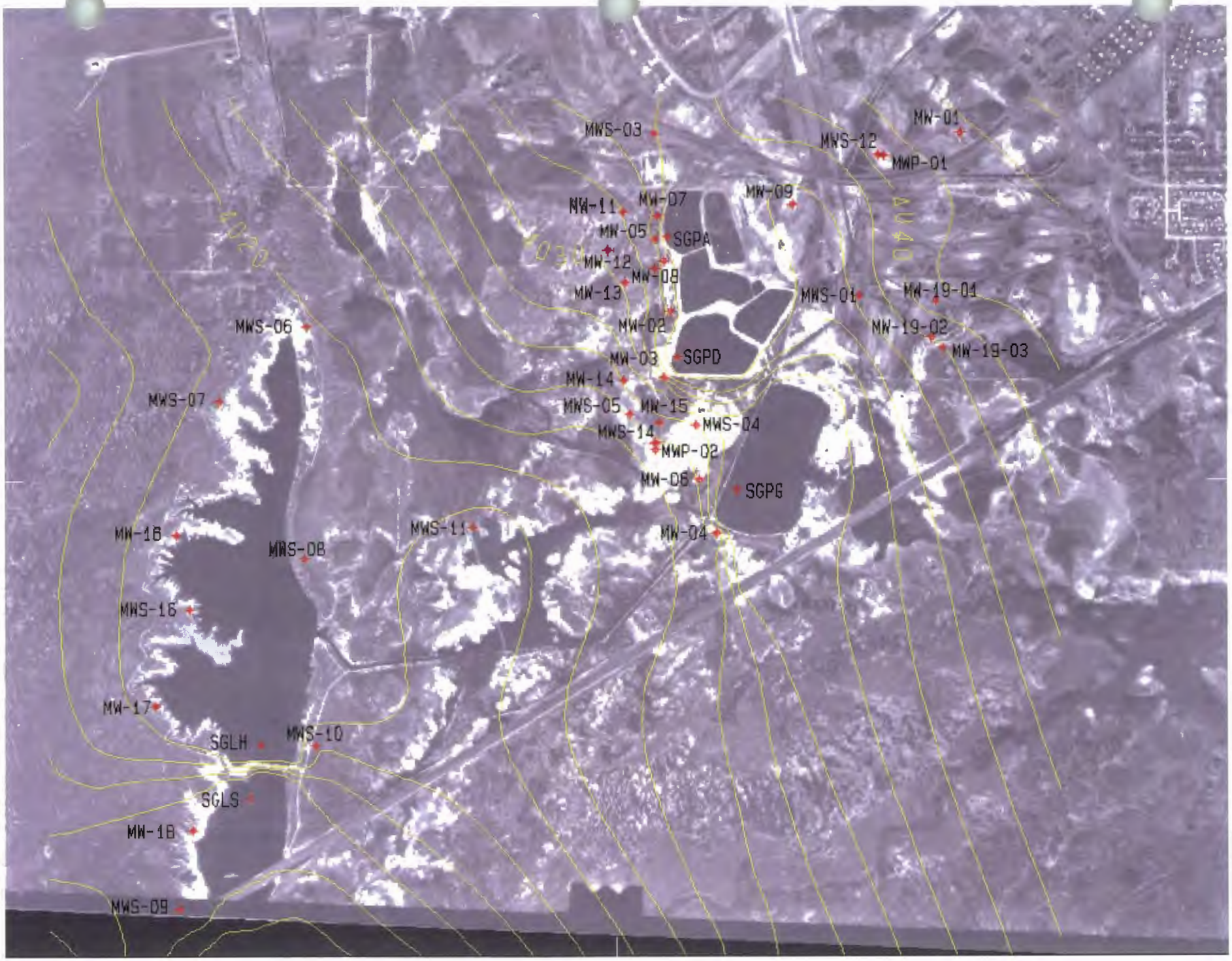


Figure 2-3. Groundwater Contour Map (April 1993)

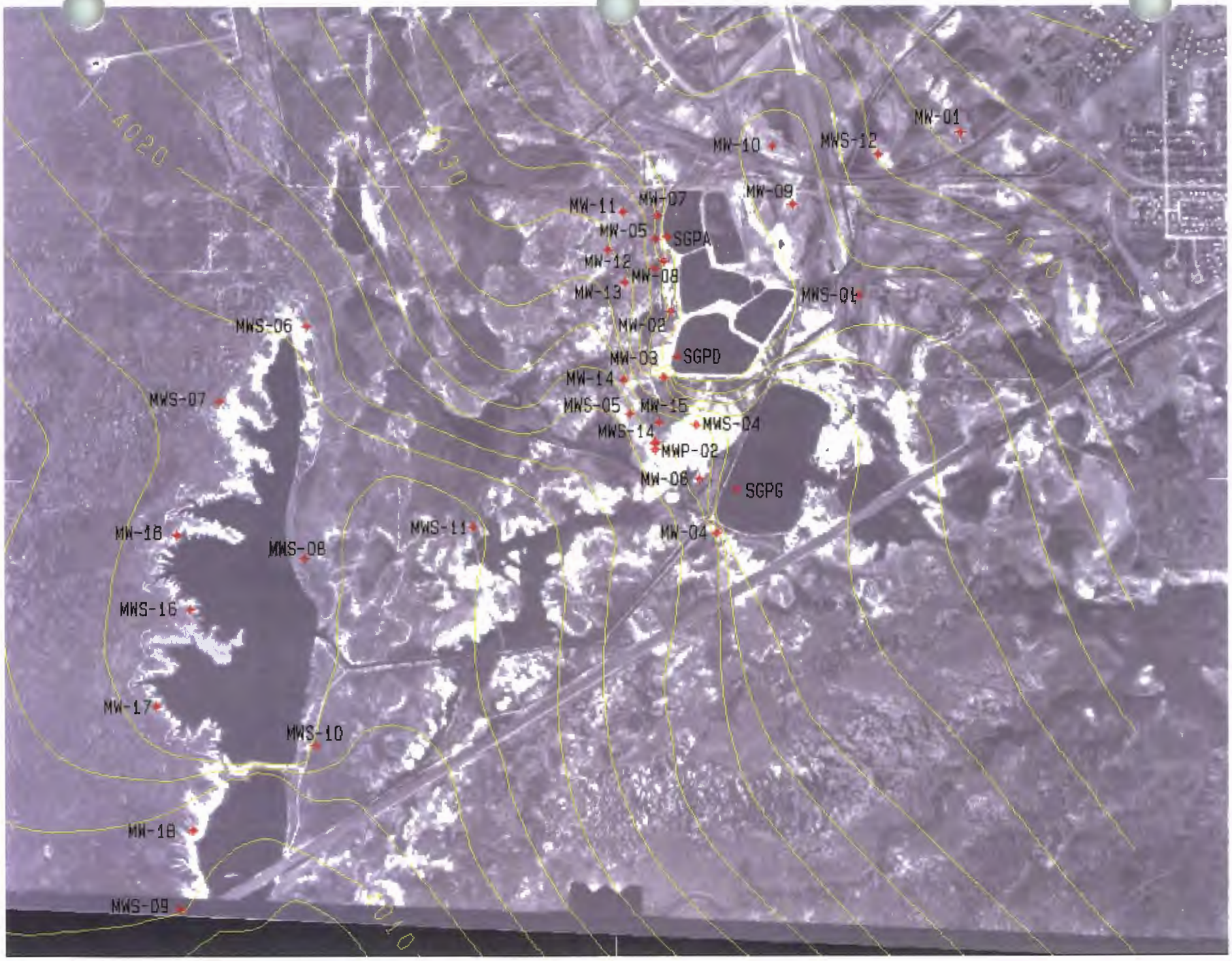
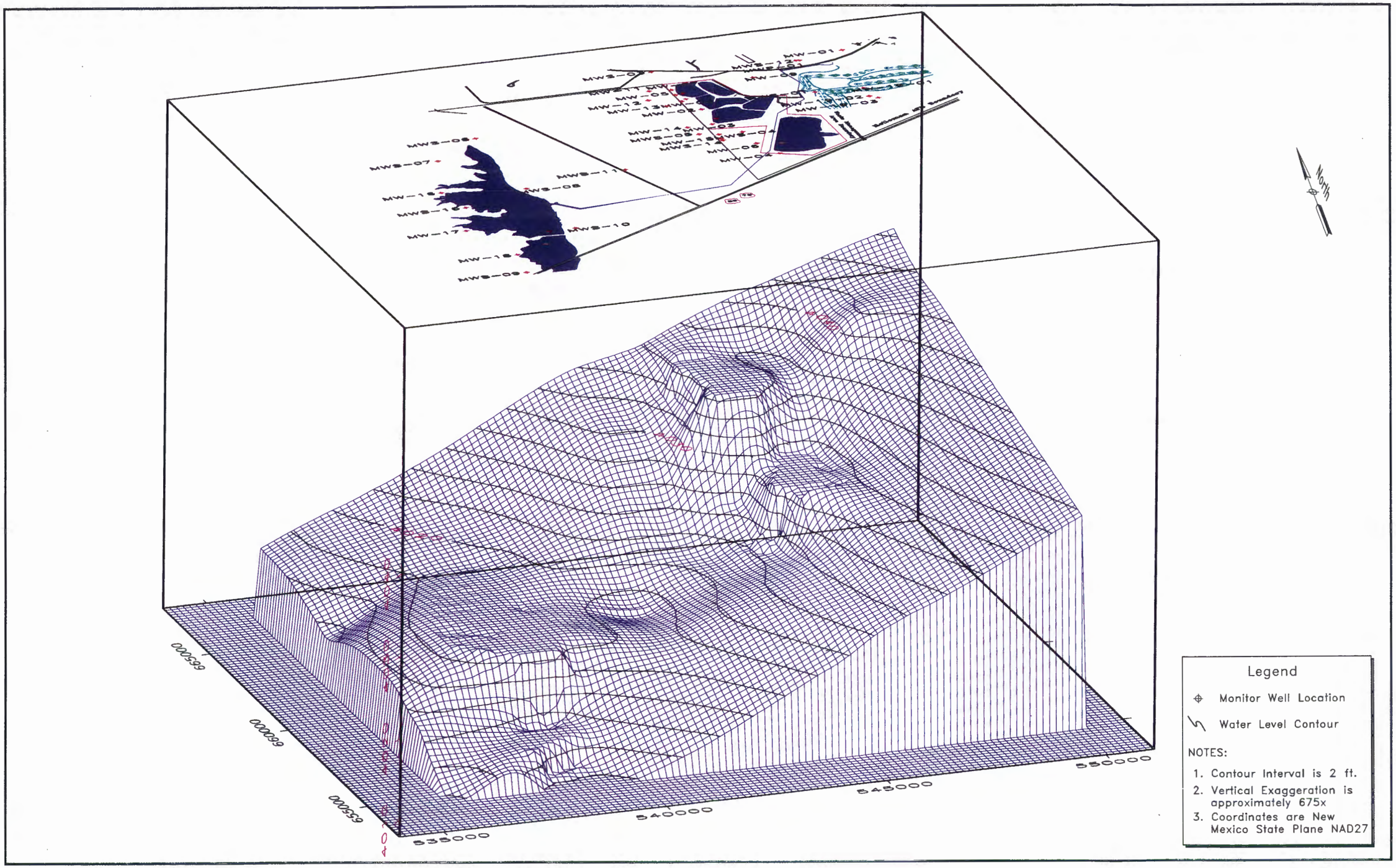


Figure 2-4. Groundwater Contour Map (August 1993)


MW-01
MWS-12
MWS-01
MWS-07
MW-15
MWS-11
MWS-05
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There is approximately a 0.5 to 2.5 ft difference in water elevations, indicating water flows away from Lake Holloman toward monitor wells MWS-08 and MWS-11. Figures 2-3 and 2-4 reflect the degree of mounding caused by the Ponds.

2.3 Groundwater Quality

Groundwater quality in the Tularosa Basin is potable to the east and west of Holloman AFB near recharge areas, but groundwater becomes progressively more mineralized as it flows downgradient toward the interior of the basin. This decrease in water quality can be attributed to slow groundwater migration from recharge to discharge areas and the presence of readily soluble minerals in the bolson sediments.

The groundwater beneath Holloman AFB is designated as unfit for human consumption based on New Mexico Water Quality Control Commission Regulations (NM WQCC 82-1, as amended through August 18, 1991, Parts 3-100 through 3-103) because it exceeds New Mexico Human Health Standards (HHSs) for total dissolved solids (TDS) and sulfate. Average values of other groundwater quality parameters measured at Holloman AFB (chloride, fluoride, and nitrate-nitrite) also exceed HHSs and, except for fluoride, also exceed federal primary and secondary drinking water maximum contaminant levels (MCLs; SMCLs) (Radian, June 1992). Water quality parameters reflect that the groundwater in this area is not potable.

Although U.S. EPA guidelines for groundwater classification are not recognized by the State of New Mexico, the U.S. EPA guidelines [*Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy* (U.S. EPA, 1986)] classify the groundwater beneath Holloman AFB as a III B aquifer. Class III groundwater, characterized by having a TDS concentration greater than 10,000 mg/L, is not considered a source or a potential source of drinking water. Class III B groundwater is characterized by a low degree of interconnection to adjacent surface waters or groundwater of a higher class. The average measured TDS value for groundwater is greater than 10,000 mg/L (Radian, June 1992). Because the Tularosa Basin is a closed basin, its groundwater does not discharge or connect to any adjacent aquifers. Adjacent surface waters include groundwater surfacing in Malone Draw and Lake Holloman. The TDS in Lake Holloman range from a winter low of 12,400 mg/L to a summer high of 17,000 mg/L (Cole, et al., 1981); therefore, groundwater at Holloman AFB is not interconnected with surface water of a higher class. In this latest investigation, TDS ranged from 11,000 to 12,000 mg/L in Lake Holloman and was 14,000 mg/L in Lake Stinky.

Section 3
DATA INTERPRETATION PROCESS

The data interpretation process involves validation of data and evaluation of results with respect to project-specific criteria. Criteria used to evaluate data are consistent with the requirements of the RFI set forth in RCRA guidance and Holloman AFB's HSWA permit. Figure 3-1 illustrates the data interpretation process and evaluation criteria for the Phase 2 RFI.

3.1 Data Validation

Data validation was performed to assess whether analytical data generated were defensible and of acceptable quality. Precision, accuracy, and completeness criteria specified in the project CDAP (Radian, 1993) were used as the basis for validation. Results of duplicate laboratory control sample analyses, duplicate matrix spike analyses, and field duplicate samples were evaluated. Matrix spike, surrogate spike and laboratory control sample recoveries were used to evaluate and estimate measurement accuracy. Completeness was calculated by dividing the number of valid results by the number of analyses scheduled for this investigation.

Quality control (QC) data associated with groundwater for this investigation indicate that chemical measurements are acceptable and defensible. Data show that QC mechanisms were effective in ensuring measurement data reliability within expected limits of sampling and analytical error. Detailed results of this data review and validation are presented in the draft *Sampling and Quality Control Summary Report (A-E SQCSR), Sewage Lagoons and Lakes Investigation* (Radian, August 1993).

Data qualifier flags have been added to some sample results to note exceptions from the quality control objectives or to provide information such as an indication of analyte coelution. A listing and description of the flags is presented in Table 3-1. Understanding these flags is critical for appropriate interpretation of laboratory results.

Table 3-1

Data Qualifier Flags for Analytical Results

Flag	Description
B	Analyte was also detected in the associated laboratory method blank. (Organic Methods)
J	Estimated value because the analyte was detected at a concentration less than the reported detection limit. (Organic Methods)
G	Analyte was not confirmed. Analyte was detected using both primary and secondary columns; however, the concentrations differ by more than a factor of two. (Method SW 8080)
X	Analyte was not confirmed. Analyte was detected using primary column only. (Method 8080)

3.2 Criteria for Determining a Release

Sampling was conducted to determine whether a release has occurred in the groundwater downgradient of Lakes Holloman and Stinky. This section outlines the evaluation criteria used to determine the presence or absence of Appendix IX constituents in the groundwater.

3.2.1 Method 8080 Pesticides

No previous groundwater sampling has been conducted to determine the presence or absence of Method 8080 pesticides in the groundwater downgradient of Lakes Holloman and Stinky.

As presented in Figure 3-1, the presence of Method 8080 pesticides are classified as certain or unlikely. The primary factor in assessing the presence or absence of analytes is the validity and certainty of analytical results. As noted on Table

Figure 3-1. Data Interpretation Process

3-1, data qualifier flags are added to analytical results to indicate their validity or certainty. Method 8080 pesticides are only considered certain if they are confirmed on both columns of the gas chromatogram. Uncertainty exists where the second column does not confirm concentration (G-flag) or presence (X-flag). When an analyte is not confirmed on the second column, it is unlikely that it is present in the groundwater. Although the J-flag indicates that the quantity of a pesticide is estimated, it does not indicate analytical uncertainty; and therefore is not a factor in evaluating the presence or absence of pesticides.

3.2.2 Metals

Groundwater samples were analyzed for metallic elements during this Phase 2 RFI to determine if metals in the sludges and soils in Lakes Holloman and Stinky have migrated to groundwater. This assessment involved chemical analyses to determine the total metals content of groundwater samples collected downgradient of the lakes. However, because metallic elements are naturally-occurring constituents of uncontaminated groundwater, conclusions regarding the presence/absence or nature and extent of contamination must consider the naturally-occurring concentrations of these target species.

For this Phase 2 RFI, two types of statistical analyses were used to compare results from downgradient monitor wells to upgradient "background" wells. Tests of central tendency (i.e., means comparisons) were used to determine if, on the average, concentrations of metals downgradient are greater than upgradient concentrations. Additionally, individual downgradient results were compared to upper tolerance limits (UTLs) for background [see Appendix B-1 of the *Phase 1 Groundwater Assessment Monitoring Report (Radian, 1993)* for information regarding background characterization and summary statistics useful for comparisons)]. The conclusions of these comparisons were confirmed or qualified by graphical analysis of the results.

Results of the statistical analyses for metals were classified as a conclusive release, inconclusive release, or no release. If both the means comparison test and UTLs indicated downgradient concentrations to be greater than background, then it was conclusive that a release occurred. If the two tests (means comparison and UTLs) contradicted each other, then existing data were not sufficient to determine if a release occurred (i.e., inconclusive release). Finally, if both tests indicated that downgradient populations were no different than background populations, they it was concluded that no release had occurred.

Appendix B contains a more detailed description of the methods used for these analyses. Section 4.1.2 presents the results of these analyses.

3.2.3 Other Organic Constituents

Historical sampling at the sewage lagoons has concluded that Method 8080 pesticides are the primary constituents of concern, and that other organic constituents, although detected in a few monitor wells, are not a significant concern. To determine whether organic constituents other than organochlorine pesticides are present in the groundwater downgradient of the lakes, groundwater samples collected from the monitor wells were analyzed for all Appendix IX parameters. Results are presented in Section 4.

3.2.4 Comparison with Historical Data

A comparison is made between historical sludge data and groundwater data collected during the Phase 2 RFI to determine whether results can be correlated. In cases where results of groundwater data differ from the results of historical sludge data, explanations are provided to account for this occurrence.

3.2.5 Comparison to Phase 1 Groundwater Assessment Monitoring Results

A comparison is made between data collected from the Phase 1 groundwater assessment monitoring investigation for the sewage lagoons and the data collected from the Phase 2 RFI at Lakes Holloman and Stinky to determine whether similarities exist between these two areas.

3.3 Evaluation of Risk

In other studies, site results were compared to RCRA Subpart S health-based action levels to

evaluate potential risk. Standard default exposure factors and assumptions are used to calculate action levels and do not account for site-specific conditions. Because they are inappropriate, they are not used for comparison with Phase 2 RFI results.

A site-specific risk assessment, including determination of the magnitude, frequency, duration, and route of human exposure, has been conducted to assess the potential risks associated with the lakes. To facilitate comparison with a worst-case scenario, a standard baseline risk assessment, assuming domestic use of groundwater, has also been conducted. The results of the risk assessment are presented in a separate report, *Draft Final Risk Assessment Report, Sewage Lagoons and Lakes Investigation* (Radian, December 1993), and are not addressed in the context of this report.

Section 4
RESULTS AND CONCLUSIONS

This section presents the results and conclusions for the Phase 2 RFI, and provides a comparison of Phase 2 RFI results with historical data and with the Phase 1 assessment monitoring data from the sewage lagoons. The terms presented for the evaluation criteria (Section 3) are used to discuss results and conclusions. Figure 4-1 is provided to reference monitor well locations to analytical results discussed in this section. Appendix C contains a complete listing of analytical results and reporting limits.

4.1 Phase 2 Results and Conclusions

4.1.1 Method 8080 Pesticides

The primary constituents detected in groundwater samples were Method 8080 pesticides. As presented in Table 4-1, the presence of twelve Method 8080 pesticides was determined to be certain in the groundwater. Method 8080 pesticides were detected in monitor wells MW-16, MW-17 and MW-18, but were absent in MWS-09 and MWS-16. The majority of Method 8080 pesticides were either absent in the groundwater or their presence were considered unlikely. Table 4-2 provides a summary of Method 8080 pesticides considered to have an unlikely presence. The following observations can be made from these results:

- The presence of pesticides is certain in monitor wells MW-16, MW-17 and MW-18 only. The presence of pesticides in monitor wells MWS-09 and MWS-16 is unlikely.
- Pesticide concentrations are very low, ranging from one-tenth to one-hundredth of a part per billion. The quantification of over half of the pesticides was estimated (J-flag) because concentrations were detected below the analytical reporting limit.

The extent of Method 8080 pesticides downgradient of Lakes Holloman and Stinky is unknown because of the lack of monitor wells located further downgradient.

4.1.2 Other Appendix IX Parameters

An objective of the Phase 2 RFI sampling was to determine the presence of other Appendix IX parameters (besides Method 8080 pesticides) in the groundwater downgradient of Lakes Holloman and Stinky. Results are presented and discussed separately for metals and all other organic and inorganic constituents.

Metals

Table 4-3 presents the conclusions of the statistical analyses for metals. No metals constituents have conclusively impacted groundwater. Concentrations of antimony, cadmium, cobalt, mercury, and tin data were above UTLs in some monitor wells, but the average concentrations downgradient of Lakes Holloman and Stinky were not greater than average background concentrations. These results indicate groundwater may be impacted by those constituents; however, the results are inconclusive. Table 4-3 also lists the metals with concentrations not significantly different than background concentrations.

Other Organic and Inorganic Constituents

Other organic and inorganic constituents detected in groundwater include: an unknown alkane, bis(2-ethylhexyl)phthalate, unknown semivolatile organic compounds, cyanide, and sulfide. No polychlorinated biphenyls (PCBs), organophosphorus pesticides, chlorinated herbicides, dioxins, or furans were detected in any monitor wells. A summary of analytical results for these constituents is presented in Appendix C of this report.

As concluded from previous Appendix IX analysis of sludge and soil samples, these other constituents were not detected at significant concentrations and were not seen consistently in

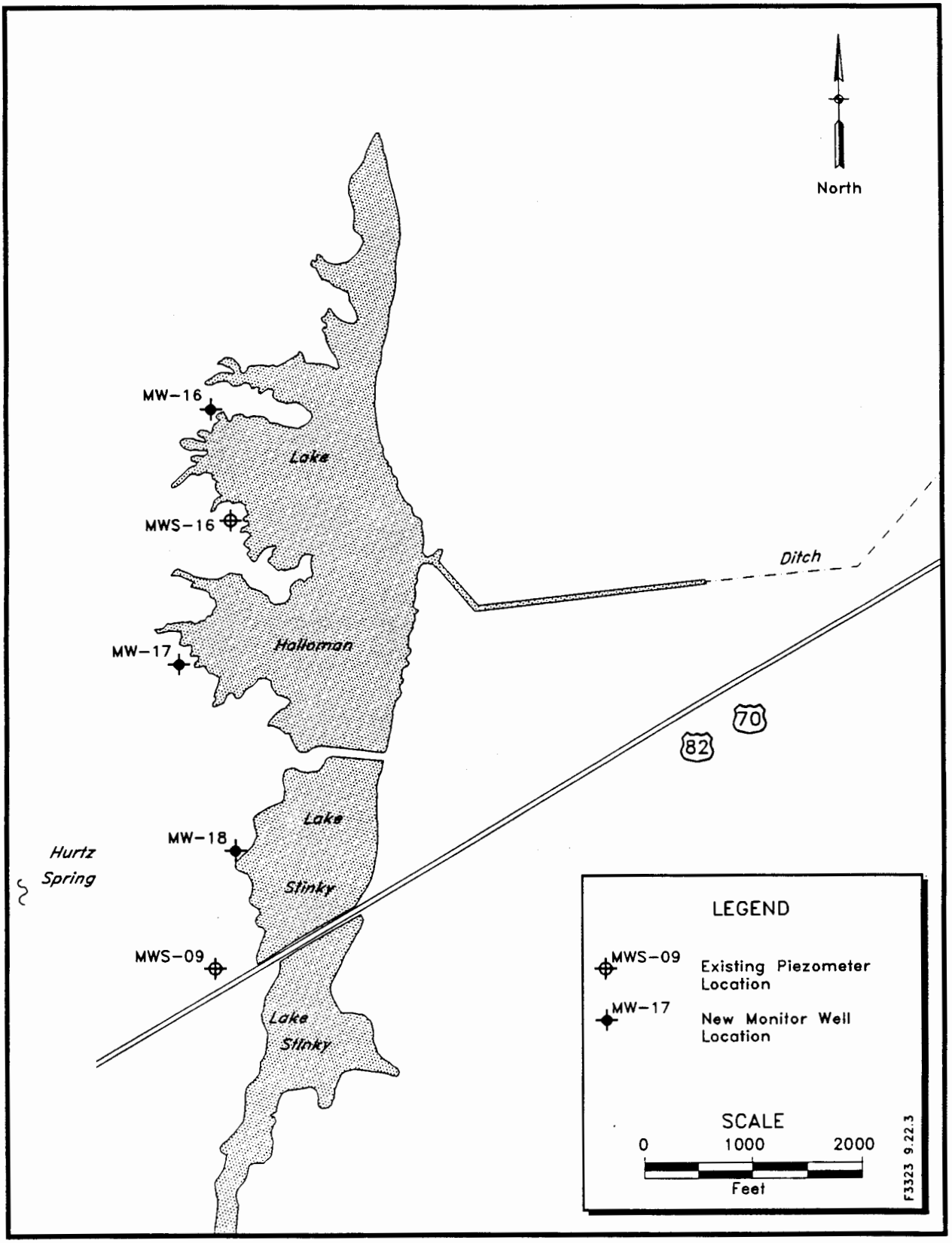

Figure 4-1. Location of Monitor Wells

Table 4-1

Presence Certain, Method 8080 Pesticides

Analyte	Result (µg/L)				
	MW-16	MW-17	MW-18	MWS-09	MWS-16
Aldrin	0.013	0.014			
alpha-BHC	0.051				
beta-BHC	0.027	0.0043J			
delta-BHC		0.021			
4,4'-DDE	0.015	0.0094J			
Dieldrin		0.018			
Endosulfan II	0.013J		0.0019J		
Endosulfan Sulfate	0.016J	0.0049J			
Endrin		0.0043J			
gamma-BHC			0.016		
gamma-Chlordane	0.014				
Heptachlor			0.036		

NOTE: Presence certain indicates that the pesticide was detected on both the primary and secondary columns of the gas chromatogram.

J = Estimated value because the analyte was detected at a concentration less than the reporting limit.

Table 4-2

Presence Unlikely, Method 8080 Pesticides

Analyte	Result (µg/L)				
	MW-16	MW-17	MW-18	MWS-09	MWS-16
Aldrin			0.023G		
alpha-Chlordane		0.0084JX			
beta-BHC			0.012X		
delta-BHC	0.049G				
4,4'-DDD	0.022X	0.016X	0.014X		
4,4'-DDE			0.015X		
4,4'-DDT			0.0096JX		
Dieldrin	0.029X		0.014X		
Endosulfan II	0.03X		0.0079JX		
Endrin	0.011X		0.0083JX		0.0021JX
Endrin Aldehyde			0.012JX		
gamma-BHC	0.02G	0.013G			
gamma-Chlordane		0.012X	0.0038JX		0.0016JX
Heptachlor	0.036X	0.026G		0.0044JX	0.0044JX
Heptachlor epoxide	0.022X	0.023X	0.015X	0.1X	0.0057JX
Isodrin	0.015X	0.018X	0.01X		
Kepone	0.31G	0.75G	0.99X%		

NOTE: Presence questionable indicates pesticide was either less than the reporting limit or the concentration was not confirmed on the second column of the gas chromatogram.

J = Estimated value because the analyte was detected at a concentration less than the reporting limit.
G = Analyte was not confirmed. Analyte was detected using both primary and secondary columns; however, the concentrations differ by more than a factor of two.
X = Analyte was not confirmed. Analyte was detected using primary column only.

Table 4-3

Summary of Statistical Analyses for Metals

Analyte	Conclusion
Monitor Wells Downgradient of Lakes: MW-16, MW-17, MW-18, MWS-09, and MWS-16	
None	**Conclusive Release**--Analytes for which measurements were greater than background.
Antimony, cadmium, cobalt, mercury, and tin	**Inconclusive Release**--Analytes for which statistical comparisons were inconclusive.
Arsenic, barium, beryllium, chromium, copper, lead, nickel, selenium, silver, thallium, vanadium, and zinc.	**No Release**--Analytes for which measurements were not significantly different from background.

monitor wells. Therefore, they are not constituents of concern.

4.2 Comparison of Groundwater Data to Phase 1 RFI Sludge and Soil Data

Groundwater data from the Phase 2 RFI was compared to sludge and soil data from the Phase 1 RFI to determine if constituents detected in the groundwater are consistent with those detected in the soil and sludge from Lakes Holloman and Stinky . Detailed results of the Phase 1 RFI sludge and soil sampling are presented in the *Site Characterization Report* (Radian, 1992).

Many of the Method 8080 pesticides and metals detected in the soil and sludge from Lakes Holloman and Stinky during the Phase I RFI were also detected in the groundwater. Several Method 8080 constituents and metals detected in the groundwater, however, were not detected in the sludge and soil. It is possible that the few sample locations (six) where sludge and soil were collected do not completely reflect all constituents present in the sludge and soil matrices.

During the Phase 1 RFI, a decrease in concentration was observed between constituents detected in the sludge and soil from Lake Holloman and concentrations detected in Lake Stinky. Similar results were found in the groundwater. Fewer constituents and lower concentrations were detected in monitor well MW-18 downgradient of Lake Stinky than in monitor wells MW-16 and MW-17 downgradient of Lake Holloman. This may, in part, be the result of Lake Holloman maintaining a high water level year round while Lake Stinky is dry during portions of the year. Higher surface water increases the hydraulic gradient between surface water and groundwater facilitating migration of constituents in the sludge and soil to enter the groundwater. In all cases, however, the concentrations of constituents detected in the groundwater downgradient of the lakes were several orders of magnitude lower than the concentrations of those same constituents as detected in the sludge and soil.

4.3 Comparison of Groundwater Data to Phase 1 Groundwater Assessment Monitoring Data for the Sewage Lagoons

Different criteria were used to evaluate groundwater data collected from the Phase 2 RFI at Lakes Holloman and Stinky than the Phase 1 assessment monitoring at the sewage lagoons because of the unique sampling and evaluation requirements of each study. Direct comparison of the analytical results of these two investigations is not appropriate. General correlations, however, can be drawn from the results of these two studies, and are useful in estimating concentrations of detected Method 8080 pesticides downgradient of Lakes Holloman and Stinky. A discussion of the criteria used for evaluating Phase 2 RFI groundwater data is presented in Section 3.1 of this document. The *Phase 1 Groundwater Assessment Monitoring Report* (Radian, 1993) provides a detailed discussion of the criteria used to evaluate Phase 1 assessment monitoring results.

Heptachlor epoxide and 4,4'-DDD (detected in MW-03 and MW-04, respectively) are the only two Method 8080 pesticides whose presence is considered to be certain at the sewage lagoons. Monitor wells MW-03 and MW-04 are located immediately downgradient of Ponds C and G, respectively. The presence of Method 8080 pesticides detected further downgradient of these two monitor wells is uncertain or unlikely. Similarly, the concentrations of metals and other organic constituents decrease further downgradient from the sewage lagoons. Using sewage lagoons results for comparison, it is anticipated that concentrations of Method 8080 pesticides decrease downgradient of the lakes and that the presence of pesticides is unlikely further downgradient and will not be reproducible over time.

Section 5
RECOMMENDATIONS

Installation of additional monitor wells is not recommended because the overall nature of contamination is understood. Furthermore, comparison of results to the sewage lagoons groundwater assessment monitoring indicate concentrations decrease and are not reproducible further downgradient. Therefore, the current groundwater monitor wells are sufficient to satisfy the RCRA and HSWA requirements as discussed in the *Site Characterization Report* (Radian, 1993). Continued monitoring is recommended with the following requirements.

- Conduct monitoring in coordination with the existing long-term monitoring program at the Base. Sample monitor wells every other year for a period of ten years.

- Analyze groundwater samples for constituents of concern (Method 8080 pesticides and metals).

- Use the risk assessment establish long-term monitoring criteria.

Future groundwater monitoring requirements may need to be revised because of proposed construction activities for the new wastewater treatment plant at Holloman AFB. Design is currently 35% complete, and the future of the sewage lagoons and the placement of new surface water impoundments is uncertain. When the design of the new plant is completed, these recommendations will be revisited to determine if the existing monitor well network meets the objectives of the proposed groundwater monitoring requirements.

Section 6
REFERENCES

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APPENDIX A

FIELD LOGS AND FORMS

A.1 LITHOLIGIC LOGS

Key to Borehole Drilling Logs

All boreholes were drilled by Southwest Engineering Inc. (SEI) using a CME hollow-stem auger drill rig. Augers were 4-inch I.D./8-inch O.D., and samples were taken with 5-foot continuous core sampler. All boreholes were started and completed on the date listed at the top of the drilling log. The borehole location, and borehole elevation are listed in the surveying data. All measurements are recorded in feet.

GRAIN SIZE:

VF	Very fine
F	Fine
M	Medium
C	Coarse
NA	Not Applicable (ie., for clay and silt)

GRADING:

VP	Very Poorly graded
P	Poorly graded
W	Well graded

MOISTURE:

S	Saturated
W	Wet
M	Moist
D	Dry

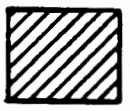
PLASTICITY

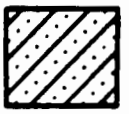
N	Non-plastic
P	Plastic (indeterminable)
L	Low plasticity
H	High plasticity

USCS CLASS (ASTM D 2487):

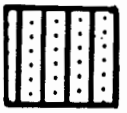
GW	Well-graded gravel
GP	Poorly graded gravel
GM	Silty gravel
GC	Clayey gravel
SW	Well-graded sand
SP	Poorly graded sand
SM	Silty sand
SC	Clayey sand
ML	Silt
MH	Silt (elastic)
CL	Clay (lean)
CH	Clay (fat)

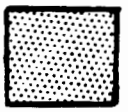
GRAPHIC LOG:


CL


SC

ML


SM


SP/SW

DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet 1 of 3
LAKE & LAGOONS (HOLL_LL)	MW-16	DRR	RADIAN (RAD)	3/07/93	

Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM)	[redacted] (VVL)	Sample Interval	Recovery	Observations and Comments
1, 2, 3		CLAYEY	SILT	V. PALE BROWN	10YR 7/4	NA	P	D	N	ML	STCL	0–4.75	3.8	UPPER 1.2 FEET OF UNIT IS DRY.
4, 5		SANDY	SILT	BRN. YELLOW	10YR6/6	VF	P	D	N	ML	SDSL	0–4.75	3.8	
6, 7, 8, 9		SILTY	SAND	BRN. YELLOW	10YR6/6	F	P	D	N	SM	SDSL	4.75–9.75	3.25	
			SAND	LT. YEL. BROWN	10YR6/4	F	P	M	N	SP	SD	9.75–14.7	5	

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DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet 2 of 3
LAKE & LAGOONS (HOLL_LL)	MW-16	DRR	RADIAN (RAD)	3/07/93	

Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM) [redacted]	[redacted] (VVL)	Sample Interval	Recovery	Observations and Comments
11														
12														
13														
14														
15														WET AT 15.0 FT. SHARP UPPER CONTACT. CONTAINS LARGE GYPSUM CRYSTALS.
16														
17														
18														
19														

F3696

DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet 3 of 3
LAKE & LAGOONS (HOLL_LL)	MW-16	DRR	RADIAN (RAD)	3/07/93	

Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM) [redacted]	[redacted] (VVL)	Sample Interval	Recovery	Observations and Comments
														GEOTECH SAMPLE FROM 20.7-21.6 FT.
21			CLAY	BROWN	7.5YR5/4	NA	P	W	H	CL	CLAY	19.75-23	3.25	
22														
23			SAND	LT BROWN GRAY	10YR6/2	VF	P	W	L	SP	SD	23.0-23.8	.8	TD =23.8 FT.
24														
25														
26														
27														
28														
29														

F3696

DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet
LAKE & LAGOONS (HOLL_LL)	MW-17	DRR	RADIAN (RAD)	3/06/93	1 of 3

Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM) [redacted]	[redacted] (VVL)	Sample Interval	Recovery	Observations and Comments
1, 2		CLAYEY	SILT	V. PALE BROWN	10YR 7/4	NA	P	D	L	ML	STCL	0-4.5	4.1	UPPER 0.8 FEET IS DRY
3, 4, 5, 6, 7			SILT	BRN. YELLOW	10YR 6/6	NA	P	M	N	ML	SILT	0-4.5	4.1	
8, 9			SAND	BRN. YELLOW	10YR 6/6	VF	P	M	N	SP	SD	4.5-9.5	4.8	WET AT 9.0 FT.

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DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet 2 of 3
LAKE & LAGOONS (HOLL_LL)	MW-17	DRR	RADIAN (RAD)	3/06/93	

Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM)	[redacted] (VVL)	Sample Interval	Recovery	Observations and Comments
11														
12		CLAYEY	SILT	PINK	7.5YR 8/4	NA	P	W	L	ML	STCL	9.5-14.5	5	
13														
14														
15														
16														INTERBEDDED SAND LAYER FROM 15.8-16.0.
17		CLAYEY	SAND	PINK	7.5YR 8/4	NA	P	W	L	SC	SDCL	14.5-17.6	3.1	
18			SAND	YEL. BROWN	10YR 5/6	F	P	W	N	SP	SD	17.6-19.5	2.9	GEOTECH SAMPLE FROM 18.3-18.6 FT.
19														

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DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet 3 of 3
LAKE & LAGOONS (HOLL_LL)	MW-17	DRR	RADIAN (RAD)	3/06/93	

Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM) [redacted]	[redacted] (VVL)	Sample Interval	Recovery	Observations and Comments
			SAND	YELLOW	10YR 8/6	F	P	W	N	SP	SD	19.4-24.0	3.6	
21														CALICHE FROM 21-21.8 FT.
22														RUST STAIN (21-24')
23														
24														TD = 24.0 FT.
25														
26														
27														
28														
29														

F3697

DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet 1 of 2
LAKE & LAGOONS (HOLL_LL)	MW-18	DRR	RADIAN (RAD)	3/06/93	

Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM)	(VVL)	Sample Interval	Recovery	Observations and Comments
1, 2, 3		CLAYEY	SILT	V. PALE BROWN	10YR 7/4	NA	P	D	L	ML	STCL	0-4.5	4.5	UPPER 0.5 FEET IS DRY.
4, 5, 6, 7, 8, 9			SAND	LT. BROWN GRAY	10YR 6/2	F	P	M	N	SW	SD	0-4.5	4.5	INTERBEDDED CALICHE FROM 3.0-3.5 FT. SPOTTED RUSTY STAIN FROM 5.0-6.1 AND 6.8-8.5 FT.

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DRILLING LOG

Project (PROJID)	Location (LOCID)	Inspector	Company (LOGCODE)	Date (LOGDATE)	Sheet 2 of 2
LAKE & LAGOONS (HOLL_LL)	MW-18	DRR	RADIAN (RAD)	3/06/93	

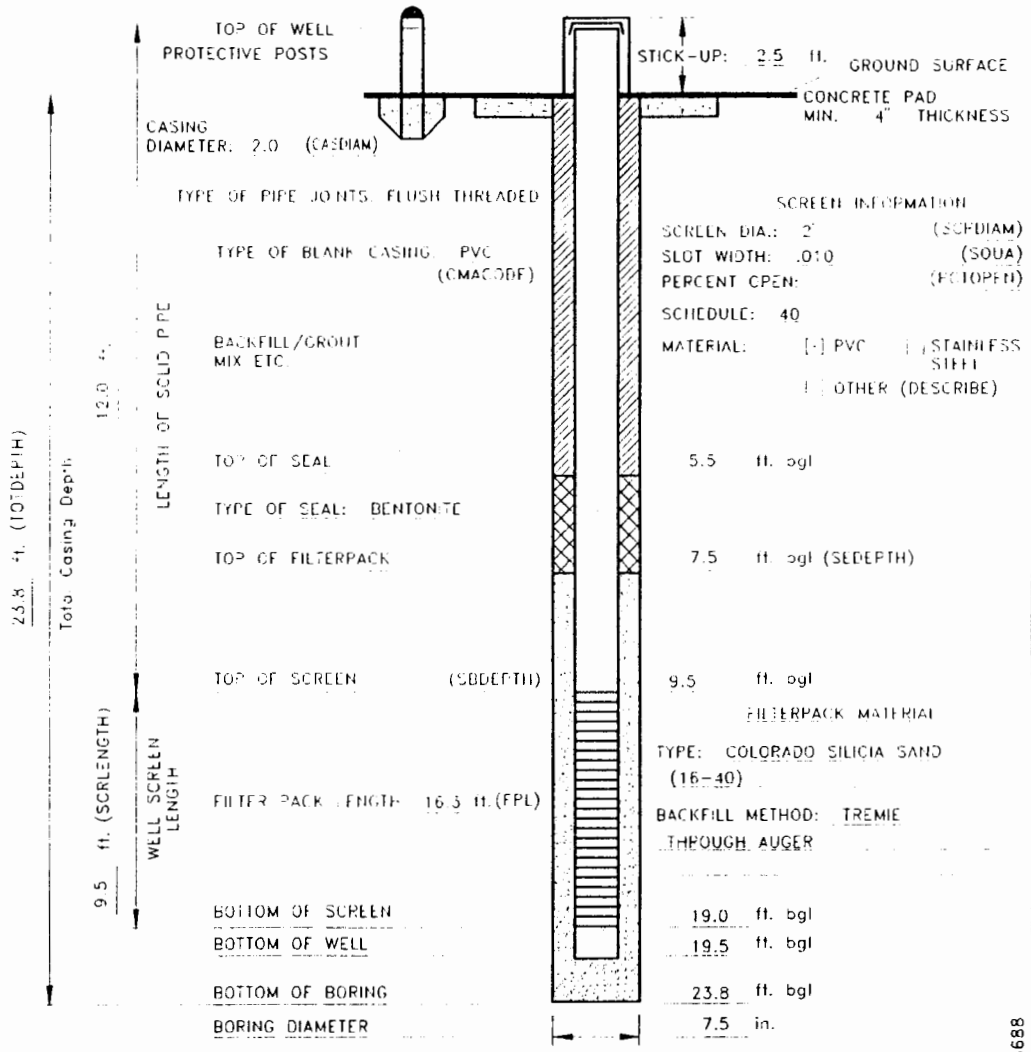
Depth	Graphic Log	Lithologic Description: Main Modifier	Predominant Lithology	Color	Munsell	Grain Size	Grading	Moisture	Plasticity	USCS Class (ASTM)	[redacted] (VVL)	Sample Interval	Recovery	Observations and Comments
11		SILTY	SAND	LT. GRAY	10YR 7/2	VF	P	M	N	SM	SDSL	9.5-14.5	4.3	INTERBEDDED CALICHE FROM 11.0 TO 12.1 FT.
12														
13		SANDY	SILT	LT. GRAY	10YR 7/2	VF	P	M	N	ML	SDSL	9.5-14.5	4.3	
14														
15		SILTY	SAND	LT. GRAY	10YR 7/2	VF	P	M	N	SM	SDSL	14.5-18.3	3.8	
16														
17			SAND	LT. GRAY	10YR 7/2	F	P	M	N	SW	SD	14.5-18.3	3.8	GEOTECH SAMPLE FROM 17.0-18.3 FT.
18														TD = 18.3 FT.
19														

F3698

A.2 WELL COMPLETION FORMS

Project (PROJID) HOLLOMAN LAKES AND LAGOONS (HOLL LL)	Well I.D. (LOCID) MW-16
Well Owner (VVL WELCODE) USAF	Well Type (WL WTCODE) MONITOR WELL (MNW)
Installer DRR	Date Started (INSDATE) 3/06/93 — Date Completed 3/07/93
Location Coordinates: (NCORD) (North) 660473.0	(ECORD) (East) 537886.9
Elevation Top of Casing (MPELV) 4031.84	Completion Method (VVL WCMCODE) GRAVEL PACK W/ SCREEN (GS)
Sole Source Aquifer Code (VVL SAQCODE) N/A	
Drilling Method HOLLOW STEM AUGER	Completion Zone (VVL GZCODE) WATER TABLE AQUIFER (W)
Remarks (REMARKS)	

MONITORING WELL CONSTRUCTION DIAGRAM

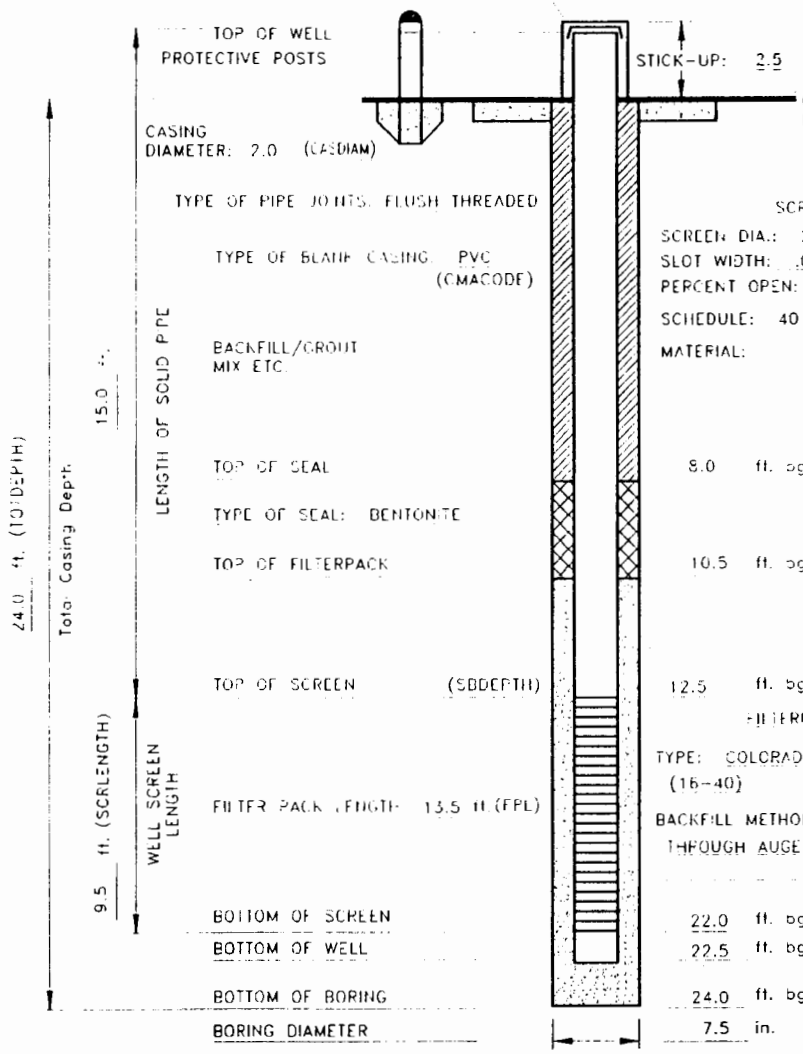


Project (PROJID) HOLLOMAN LAKES AND LAGOONS (HOLL LL)	Well I.D. (LOCID) MW--17
Well Owner (VVL WELCODE) USAF	Well Type (WL WTCODE) MONITOR WELL (MNW)
Installer DRR	Date Started (INSDATE) 3/06/93 — Date Completed 3/06/93
Location Coordinates: (NCORD) (North) 658079.3	(ECORD) (East) 537585.9
Elevation Top of Casing (MPELV) 4032.17	Completion Method (VVL WCMCODE) GRAVEL PACK W/ SCREEN (GS)
Sole Source Aquifer Code (VVL SAQCODE) N/A	
Drilling Method HOLLOW STEM AUGER	Completion Zone (VVL GZCODE) WATER TABLE AQUIFER (W)
Remarks (REMARKS)	

MONITORING WELL CONSTRUCTION DIAGRAM

PROTECTIVE CASING

TYPE OF PROTECTIVE CASING: STEEL LOCK BOX



SCREEN INFORMATION

SCREEN DIA.: 2" (SCRDIAM)

SLOT WIDTH: .010 (SOUA)

PERCENT OPEN: (PCTOPEN)

SCHEDULE: 40

MATERIAL: [-] PVC [ ] STAINLESS STEEL [ ] OTHER (DESCRIBE)

8.0 ft. bgl

10.5 ft. bgl (SEDEPTH)

12.5 ft. bgl

FILTERPACK MATERIAL

TYPE: COLORADO SILICIA SAND (16-40)

BACKFILL METHOD: TREMIE THROUGH AUGER

22.0 ft. bgl

22.5 ft. bgl

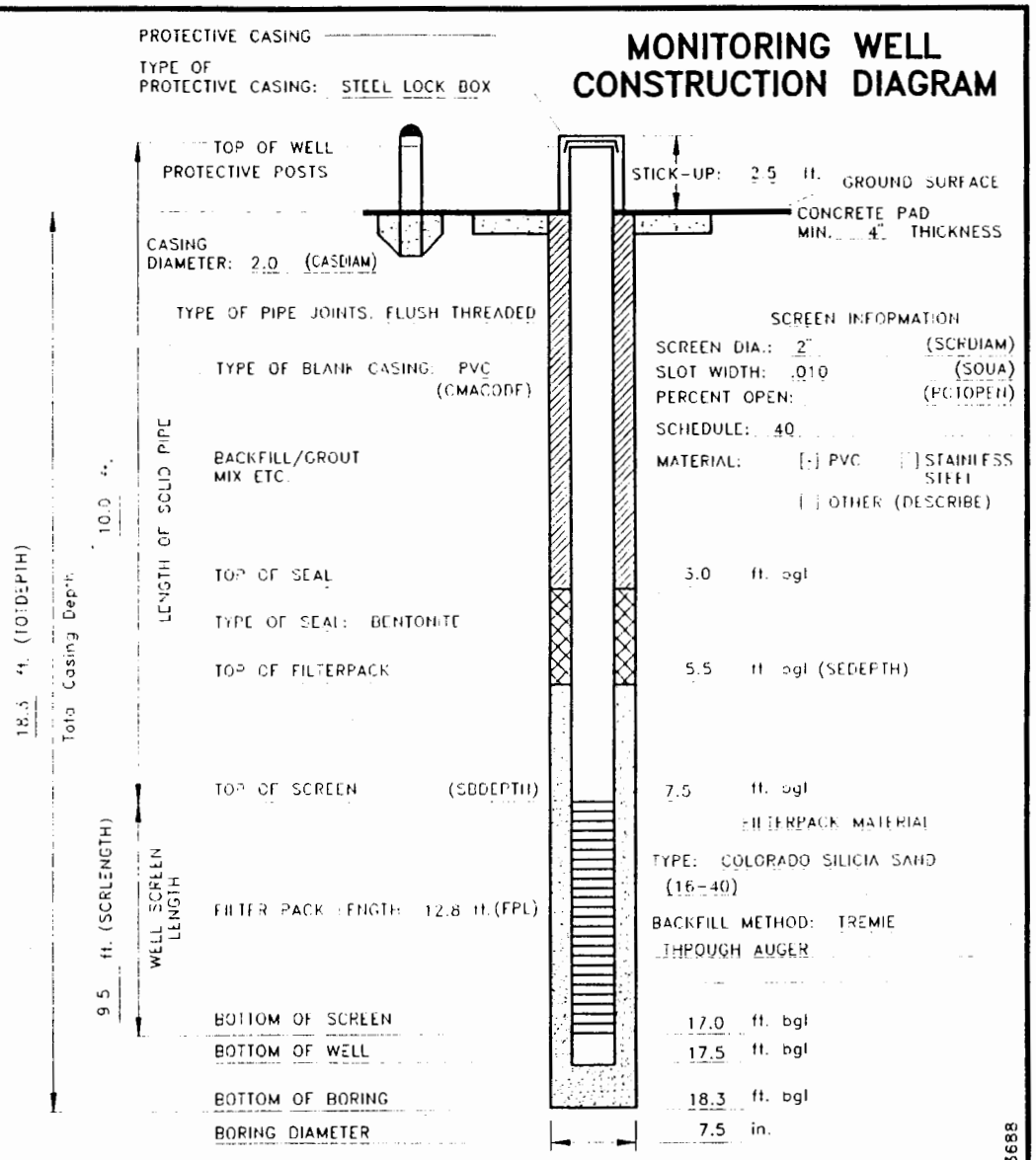
24.0 ft. bgl

7.5 in.

F3688

Project (PROJID) HOLLOMAN LAKES AND LAGOONS (HOLL_LL)	Well I.D. (LOCID) MW-18
Well Owner (VVL WELCODE) USAF	Well Type (WL WTCODE) MONITOR WELL (MNW)
Installer DRR	Date Started (INSDATE) 3/06/93 — Date Completed 3/06/93
Location Coordinates: (NCORD) (North) 656338.2	(ECORD) (East) 538105.1
Elevation Top of Casing (MPELV) 4019.42	Completion Method (VVL WCMCODE) GRAVEL PACK W/ SCREEN (GS)
Sole Source Aquifer Code (VVL SAQCODE) N/A	
Drilling Method HOLLOW STEM AUGER	Completion Zone (VVL GZCODE) WATER TABLE AQUIFER (W)
Remarks (REMARKS)	

MONITORING WELL CONSTRUCTION DIAGRAM



A.3 ROUND 1 GROUNDWATER SAMPLING LOGS

TITLE: IRP Groundwater Sampling Log

PROJECT Lagoons and Lakes **DATE** 17 March 93

SUBJECT **SHEET** 1 **OF** 1 **SHEETS**

INSTALLATION ID (AFID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLMN	MW-16	03-17-93	16:55

PERFORMED BY (LOGCODE)	WATER LEVEL (STATDEP) INITIAL / FINAL	TOTAL DEPTH (SOUNDING) INITIAL / FINAL
RAD	13.18 / 13.38	22.16 / 22.16

SATURATED THICKNESS	WELL VOLUME	AMOUNT TO PURGE
8.98 ft.	1.46 gallons	7.5 gallons

PURGE METHOD: Teflon Bailer

Time (LOGTIME)	Cum. Volume (gal)	Water Quality Temp	pH	Cond.	Turb.	Water Level	Comments
1725	1.5	66.6°F	6.97	24,200			V turbid. Brown/red.
1729	3.0	65.0°F	6.95	22,800			As above
1733	4.5	63.7°F	6.93	22700			
1736	6.0	62.2°F	6.94	22400			Slightly lighter than above
1739	7.5	62.5°F	6.99	21900			
1815		62.0	6.93	22500	1350 NTU		Final ~~sam~~, after sampling
Final Measurements:							Alkalinity = 500 mg/L as CaCO3

SAMPLING METHOD (SMCODE)

Sample ID	(MATRIX)	Preservative	Analysis	Sample Type Code (SACode)	Comments
9303-MW-16-01	L/WG	pH<2 w/ HNO3 and cool 4°C	Metals	N	(Appendix IX)
		cool 4°C	8080		
			8140		
			8150		
			8160.1		
		pH<2 w/ HCl cool 4°C	8240 PT		
			8270		
			8280		
		pH>12 w/ NaOH	9012		
		pH>9 w/ Zn(OAc)2 and NaOH cool 4°C	9030		Minimize NaOH in lab
			8240 DI		

Figure 5-13. IRP Groundwater Sampling Log

TITLE: IRP Groundwater Sampling Log

PROJECT Lakes and Lagoons **DATE** 19 March 1993

SUBJECT **SHEET** 1 **OF** 1 **SHEETS**

INSTALLATION ID (AFID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HCLMN	MW-17	19 Mar 93	9:00

PERFORMED BY (LOGCODE)	WATER LEVEL (STATDEP) INITIAL / FINAL	TOTAL DEPTH (SOUNDING) INITIAL / FINAL
RAD	14.04 / 14.13	25.00 / 25.00

SATURATED THICKNESS	WELL VOLUME	AMOUNT TO PURGE
10.96'	1.754	8.77

PURGE METHOD: Teflon Bailer

Time (LOGTIME)	Cum. Volume (gal)	Water Quality: Temp	pH	Cond.	Turb.	Water Level	Comments
1026	2	19.9°C	6.85	25,200			cloudy - lt. brown
1036	6	19.0°C	6.88	24,600			" " "
1041	8	17.9°C	6.86	25,400			" " "
1045	10	18.0°C	6.86	25,100			" " "
1120		20.0°C	6.94	24,600	64%		AFTER SAMPLING
Final Measurements:							ALKALINITY = 450 mg/L

SAMPLING METHOD (SMCODE)

Sample ID	(MATRIX)	Preservative	Analysis	Sample Type Code (SACode)	Comments
9503-MW5-09	LWG	as required			Appendix IX

Figure 5-13. IRP Groundwater Sampling Log

TITLE: IRP Groundwater Sampling Log

PROJECT Lakes and Lagoons (HLL) **DATE** 17 March 1993

SUBJECT _____ **SHEET** 1 **OF** 1 **SHEETS**

INSTALLATION ID (AFID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLMN	MW-18	17 March 1993	1440

PERFORMED BY (LOGCODE)	WATER LEVEL (STATDEP) INITIAL / FINAL	TOTAL DEPTH (SOUNDING) INITIAL / FINAL
RAD	8.04 / 8.16	19.96 / 19.96

SATURATED THICKNESS	WELL VOLUME	AMOUNT TO PURGE
11.92	1.9 gallons	9.5 gallons

PURGE METHOD:

Bailer (teflon)

Time (LOGTIME)	Cum. Volume (gal)	Water Quality: Temp	pH	Cond.	Turb.	Water Level	Comments
1516	2	64°F	7.4	20,500			cloudy, lt. brown
1522	4	64°F	7.4	21,500			" " "
1526	6	62°F	7.4	20,000			" " "
1530	8	63°F	7.5	19,000			" " "
1535	11	62°F	7.5	19,500			" " "
1540		62.5°F	7.4	18,400	800 NTU	8.16	End of sampling
Final Measurements:	11	62.5°F	7.4	18,400		8.16	alkalinity = 145 mg/l

SAMPLING METHOD (SMCODE)

Sample ID	(MATRIX)	Preservative	Analysis	Sample Type Code (SACode)	Comments
9303 MW-18-01	L/wq	pH<2 w/ HNO_3 pH<2 w/ HCl pH>12 w/ NaOH pH>12 w/ $Zn(CH_3)_2$ and NaOH cool 4°C	Metals 8240PT 9012 9030 8030 8140 8150 E160.1 8270 8250 8240DI	N	Must do NaOH in lab

Figure 5-13. IRP Groundwater Sampling Log

TITLE: IRP Groundwater Sampling Log

PROJECT Lakes and Lagoons

DATE 19 March 1993

SUBJECT

SHEET 1 OF 1 SHEETS

INSTALLATION ID (AFID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLMN	MWS-09	19 Mar 93	1530

PERFORMED BY (LOGCODE)	WATER LEVEL (STATDEP)	TOTAL DEPTH (SOUNDING)
RAD	INITIAL 9.54 FINAL 9.94	INITIAL 16.9 FINAL 16.84

SATURATED THICKNESS	WELL VOLUME	AMOUNT TO PURGE
7.36	1.2 gallons	10 gallons

PURGE METHOD:

Teflon Bailer

Time (LOGTIME)	Cum. Volume (gal)	Water Quality				Water Level	Comments
		Temp	pH	Cond.	Turb.		
	1.5	18.1	7.41	19.5			
	3.0	17.6	7.31	19.8			
	6.0	17.3	7.38	19.7			
	FINAL	18.7	7.24	22.4	195		
Final Measurements:							ALKALINITY = 240 mg/L

SAMPLING METHOD (SMCODE)

Sample ID	(MATRIX)	Preservative	Analysis	Sample Type Code (SACode)	Comments
9315-MWS-09	L/WG	ice required		N	Appendix IX

Figure 5-13. IRP Groundwater Sampling Log

TITLE: IRP Groundwater Sampling Log

PROJECT Lagoons and Lakes

DATE 3-16-93

SUBJECT

SHEET 1 OF 1 SHEETS

INSTALLATION ID (AFID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
	MWS-16	3-16-93	1700

PERFORMED BY (LOGCODE)	WATER LEVEL (STATDEP)	TOTAL DEPTH (SOUNDING)
RAD	INITIAL 10.84 ft FINAL 10.98 ft	INITIAL 15.42 ft FINAL 15.38 ft
SATURATED THICKNESS	**WELL VOLUME**	**AMOUNT TO PURGE**
4.58 ft	0.7 gallons	4 gallons

PURGE METHOD: Bailer

Time (LOGTIME)	Cum. Volume (gal)	°C Water Quality Temp	pH	Cond.	Turb.	Water Level	Comments
1750	1	18	7.08	51,400	–		
1755	2	17	6.71	51,800	–		
1800	3	16.11	6.71	51,600	–		
1805	4	16.11	6.69	51,900	–		
1835	Final	15.55	6.85	52,400	117.8	15.38	ALK = 1050 mg/kg $CaCO_3$
Final Measurements:							

umhos

SAMPLING METHOD (SMCODE)

Sample ID	(MATRIX)	Preservative	Analysis	Sample Type Code (SACode)	Comments
9303-MWS-16-01	L/Wtr	As required		N	Appendix IV

Figure 5-13. IRP Groundwater Sampling Log

A.4 WELL DEVELOPMENT FORMS

WELL DEVELOPMENT LOG

SHEET 1 OF ____

PROJECT (PROJ_ID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLLOMAN LAKES AND LAGOONS (HOLL_LL)	MW - 16	15 Mar 93	0910

PERFORMED BY (LOGCODE)	DEVELOPMENT METHOD	SURGE TECHNIQUE
RAD	Purge Pump	Purge Pump

WATER LEVEL (STATDEP) INITIAL	FINAL	TOTAL DEPTH (SOUNDING) INITIAL	FINAL	LOWEST WATER LEVEL DURING DEVELOPMENT (PUMPDEP)
13.16'	13.24'	22.14'	22.12'	18.0 ft

TOTAL VOL. REMOVED 105 GALLONS - TIME ELAPSED 5/10 HRS = PRODUCTION RATE (PRODRATE) 0.5 - 1.0 gpm

PRODUCTION RATE (PRODRATE)

RECOVERY DEPTH (DEPWAT) N/A

RECOVERY TIME (RECTIME) N/A

Time	Cum. Volume (gal)	Water Quality Temp.	pH	Cond.	Turb.	Comments
1000	0					Very silty water - dk. reddish brn
1050	18	64°F	7.25	24,400	6880	cloudy - dk. brn
1110	24	63°F	6.95	24,300		cloudy - reddish brn. .5 gpm
1145	37	64°F	6.90	24,400	4840	" " " 0.4 gpm
1210	41	64°F	7.07	24,500		pump stopped 12:10
1445	51	68°F	6.98	23,800	1080	cloudy 1 gpm, pump start 14:30
1500	61	66°F	6.86	22,300		cloudy
1520	65	66°F	6.85	23,200	160	clear, 0.75 gpm
1525	—	—	—	—	—	surged - very cloudy
1550	75	66°F	6.89	24,100		slightly cloudy, 0.5 gpm
1600	—	—	—	—	—	slow refill time, 0.5 gpm
1620	83	66°F	6.90	24,100	600	<.5 gpm
1700	97	66°F	6.91	24,800	—	
1730	105	66°F	6.91	24,100	78	turn pump off
Field Measurements:						Time

Remarks (Remarks)

Total Volume Removed 105 gallons

Time for Removal 5/10 hrs/min

D1872B

WELL DEVELOPMENT LOG

SHEET 1 OF ____

PROJECT (PROJ_ID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLLOMAN LAKES AND LAGOONS (HOLL_LL)	MW-17	15 Mar 93	10:30

PERFORMED BY (LOGCODE)	DEVELOPMENT METHOD	SURGE TECHNIQUE
RAD	Purge Pump	Purge Pump

WATER LEVEL (STATDEP) INITIAL	FINAL	TOTAL DEPTH (SOUNDING) INITIAL	FINAL	LOWEST WATER LEVEL DURING DEVELOPMENT (PUMPDEP)
14.00	~~24.75~~ 14.28	24.75	25.00	

TOTAL VOL. REMOVED 116 GALLONS – TIME ELAPSED 4.5 HRS = PRODUCTION RATE (PRODRATE) _____

PRODUCTION RATE (PRODRATE)
RECOVERY DEPTH (DEPWAT) N/A
RECOVERY TIME (RECTIME) N/A

Time	Cum. Volume (gal)	Water Quality Temp.	pH	Cond.	Turb.	Comments
11:15	3.2	18.4	6.66	28.7	3140	water level 15.1' BTC, <.25 gpm
11:45	14.4	18.5	6.80	28.8		water level 16.0', .75 gpm
12:00	19.2	18.5	6.82	28.6	900	water level 16.5', .25 gpm
14:30	24.0	18.9	6.80	29.3		16.1 .25 gpm
14:55	32.0	18.7	6.72	27.7	278	15.2 0.5 gpm
15:15	40.0	18.3	6.75	26.9		16.8 0.75 gpm
15:30	48.0	18.5	6.76	28.2	344	17.5 1.0 gpm
15:40	56.0	18.4	6.77	27.6		16.9 0.75 gpm
15:55	64.0	18.5	6.77	27.7	136	16.5 .75 gpm
16:15	73.0	18.5	6.76	27.5		16.9 0.75 gpm
17:00	100.2	18.3	6.78	27.9		17.7 1.0 gpm
17:20	110.8	18.6	6.76	27.6		18.6 1.25 gpm
17:40	115.8	18.5	6.76	29.6		14.4
Field Measurements:						Time

Remarks (Remarks)
Total Volume Removed 115 gallons

Time for Removal 5/25 hrs/min

D1872B

WELL DEVELOPMENT LOG

SHEET 1 OF 1

PROJECT (PROJ_ID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLLOMAN LAKES AND LAGOONS (HOLL_LL)	MW-18	9 Mar 93	1040

PERFORMED BY (LOGCODE)	DEVELOPMENT METHOD	SURGE TECHNIQUE
RAD	Purge Pump	Purge pump

WATER LEVEL (STATDEP) INITIAL / FINAL	TOTAL DEPTH (SOUNDING) INITIAL / FINAL	LOWEST WATER LEVEL DURING DEVELOPMENT (PUMPDEP)
8.00' / 8.10'	18.9' / 18.9'	

TOTAL VOL. REMOVED 90 GALLONS – TIME ELAPSED 60 HRS = PRODUCTION RATE (PRODRATE) 1.5 gph

PRODUCTION RATE (PRODRATE)

RECOVERY DEPTH (DEPWAT) N/A

RECOVERY TIME (RECTIME) N/A

Time	Cum. Volume (gal)	Water Quality Temp.	pH	Cond.	Turb.	Comments	
1105	5	63°F	7.25	26,500	1280	Greyish brown - cloudy	0.2gpm
1205	27	63°F	7.27	24,200	2460	" " "	0.4gpm
1220	37						0.7gpm
1235	39	63°F	7.30	25,000	1912	lt. grayish brn - cloudy	0.2gpm
1255	43	64°F	7.31	25,600	1460	" " " "	0.5gpm
1320	55	63°F	7.40	23,800	1020	" " " "	0.3gpm
1400	60	64°F	7.34	25,400	1240	" " " "	0.1gpm
1455	64	64°F	7.38	24,900	1000	lt. brown, cloudy	<0.1gpm
1550	69	63°F	7.39	24,900	750	" " "	0.1gpm
1625	80	63°F	7.41	23,700	980	" " "	0.3gpm
1650	85	63°F	7.39	24,500	1000	" " "	0.2gpm
1710	90	63°F	7.35	26,600		" " "	0.25gpm
Field Measurements:						Time	

Remarks (Remarks)

Total Volume Removed 90 gallons

Time for Removal 60 hrs/min

D18728

WELL DEVELOPMENT LOG

SHEET 1 OF 1

PROJECT (PROJ_ID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLLOMAN LAKES AND LAGOONS (HOLL_LL)	MWS-09	3-9-93	1130

PERFORMED BY (LOGCODE)	DEVELOPMENT METHOD	SURGE TECHNIQUE
RAD	Purge pump	Purge pump

WATER LEVEL (STATDEP)	TOTAL DEPTH (SOUNDING)	LOWEST WATER LEVEL DURING DEVELOPMENT (PUMPDEP)
INITIAL 9.5 FINAL 10.25	INITIAL 16.8 FINAL 17.28	

TOTAL VOL. REMOVED 115 GALLONS – TIME ELAPSED 5.5 HRS = PRODUCTION RATE (PRODRATE) 2L__

PRODUCTION RATE (PRODRATE)
RECOVERY DEPTH (DEPWAT) N/A
RECOVERY TIME (RECTIME) N/A

Time	Cum. Volume (gal)	Water Quality Temp.	pH	Cond.	Turb.	Comments
1200	0					Began pumping.
1215	10	19.0	7.08	24400	4000	Tan yellow. @ 0.5 GPM. Clears up in 3-4 gallons after surge
1235	20	19.0	7.25	23200		Tan/brown after surging. Pump @ bottom
1255	30	18.9	7.17	22500	800	Slightly cloudy. Tan/brown after surging. Temp - 18.9
1330	45	19.2	7.11	23000		As above. Pump @ bottom
1345	50	19.2	7.10	22200	2000	Light tan/brown after surging.
1405	55	19.2	7.12	22300		Light tan/brown. Some sediment in water – V. fine sand
1425	59	19.3	7.16	~~20800~~ 22400		As above.
1445	65	19.3	7.16	20800		As above. Pump @ bottom. Conductivity reading fluctuates as sediment falls.
1500	68	19.1	7.16	21000	1440	Light tan brown 0.3 GPM
1520	73	19.3	7.17	21600		As above.
1540	80	19.0	7.12	21900	920	As above. W.L. = 11.0 ft., pump @ bottom. Surged vigorously
1610	84	18.8	7.16	20600		Slightly cloudy; color as above. Still sand in pumped water.
1640	90	18.6	7.16	20400	650	As above.
1715	100	18.6	7.16	20500		Light yellow-tan. Clears up quickly after several pump cycles.
1730	115				400	Turned pump off. Took "after" sample.
Field Measurements:						Time

Remarks (Remarks)
Total Volume Removed 115 gallons

Time for Removal 5 hrs 30 min hrs/min

D1872B

WELL DEVELOPMENT LOG

SHEET 1 OF 1

PROJECT (PROJ_ID)	WELL ID (LOCID)	(LOGDATE)	(LOGTIME)
HOLLOMAN LAKES AND LAGOONS (HOLL_LL)	MW5-16	3-10-93	0530

PERFORMED BY (LOGCODE)	DEVELOPMENT METHOD	SURGE TECHNIQUE
RAD	Purge pump	Purge pump

WATER LEVEL (STATDEP) INITIAL	FINAL	TOTAL DEPTH (SOUNDING) INITIAL	FINAL	LOWEST WATER LEVEL DURING DEVELOPMENT (PUMPDEP)
10.80	10.95	15.41	15.41	

TOTAL VOL. REMOVED 65 GALLONS ÷ TIME ELAPSED 3.17 HRS = PRODUCTION RATE (PRODRATE) 20.5

PRODUCTION RATE (PRODRATE)
RECOVERY DEPTH (DEPWAT) N/A
RECOVERY TIME (RECTIME) N/A

Time	Cum. Volume (gal)	Water Quality Temp.	pH	Cond.	Turb.	Comments
0820/0840	5	15.7	6.83	41000	500	Began pumping; took first measurements
0900	10	16.1	6.87	41300	940	Light tan yellow color. very little sediment after purging. 0.5 GPM
0915	15	16.1	6.87	41300	760	As above; 0.6 GPM
0930	24	16.4	6.88	41600	660	Light tan yellow after surging 0.5 GPM
0945	30	16.6	6.88	41900		Very light tan after surging. 0.5 GPM
1005	33	16.8	6.90	42000	344	Very light tan, clears up very quickly after surging.
1020	45	16.8	6.91	41700	700	as above.
1040	50	17.1	6.91	42300	760	as above. Trouble with ball valve not closing, resulting in decreased rate.
1100	55	16.9	6.92	42100		as above.
1120	63	17.0	6.91	42200	400	Very light tan after surging. Clears up in 1-2 cycles
1130	65					Turned off pump
Field Measurements:						Time

Remarks (Remarks)
Total Volume Removed 65 gallons

Time for Removal 3 hrs 10 min hrs/min

D1872B

MW-16

BEFORE AFTER

MW-17

BEFORE AFTER

MW 18

BEFORE AFTER

MWS - 09

BEFORE AFTER

MWS-16

BEFORE AFTER

A.5 WATER LEVEL SURVEY DATA (MARCH, APRIL, AND AUGUST,1993)

WATER LEVEL SURVEY DATA (March, 1993)

Location id	Easting	Northing	Ground elev.	TOC elev.	GW from TOC	GW above MSL
MWD-01	540864.68	663846.28	4028.34	4030.66	8.39	4022.27
MWD-02	542460.08	658545.00	4021.37	4023.30	5.46	4017.84
MWD-03	547567.44	665970.87	4045.48	4047.41	5.05	4042.36
MWD-04	544323.08	661959.63	4030.19	4031.86	6.84	4025.02
MWD-05	544355.80	664707.96	4036.86	4039.34	6.19	4033.15
MWD-06	537661.05	659274.14	4027.98	4030.20	11.45	4018.75
MWP-01	547500.04	666007.62	4045.09	4047.51	5.16	4042.35
MWS-01	547227.86	664038.39	4038.99	4041.72	5.33	4036.39
MWS-03	544339.44	666310.26	4040.93	4042.66	6.68	4035.98
MWS-04	544926.56	662213.66	4031.49	4034.46	8.72	4025.74
MWS-05	543989.31	662360.64	4031.32	4033.47	9.15	4024.32
MWS-06	539431.65	663611.00	4029.44	4031.52	11.83	4019.69
MWS-07	538199.17	662546.27	4028.22	4030.24	12.02	4018.22
MWS-08	539393.41	660347.18	4031.02	4033.15	14.8	4018.35
MWS-09	537626.78	655436.28	4018.42	4020.67	9.60	4011.07
MWS-10	539545.00	657713.58	4027.85	4030.00	13.65	4016.35
MWS-11	541772.11	660788.59	4025.17	4027.23	9.8	4017.43
MWS-12	547576.02	665999.05	4046.01	4048.31	7.43	4040.88
MWS-13	544352.88	661961.13	4030.05	4032.34	8.53	4023.81
MWS-14	544338.74	661960.52	4030.20	4032.43	8.27	4024.16
MWS-15	544342.86	664406.43	4034.86	4037.71	4.59	4033.12
MWS-16	537775.86	659637.61	4027.46	4029.46	10.92	4018.54
MW-01	548658.60	666311.53	4050.54	4053.42	9.95	4043.47
MW-02	544566.85	663814.83	4037.08	4039.78	5.50	4034.28
MW-03	544469.13	662878.19	4034.71	4037.38	8.06	4029.32
MW-04	545215.83	660699.42	4027.65	4030.30	5.90	4024.40
MW-05	544358.30	664830.97	4036.55	4039.30	5.19	4034.11
MW-06	544970.02	661445.18	4028.45	4031.21	6.98	4024.23
MW-07	544379.85	665147.61	4037.37	4039.88	5.74	4034.14
MW-08	544474.40	664520.54	4037.90	4040.50	6.01	4034.49
MW-09	546285.88	665312.37	4040.34	4042.59	8.00	4034.59
MW-10	546007.93	666135.76	4040.97	4043.39	7.94	4035.45
MW-11	543896.90	665207.00	4037.76	4039.71	7.90	4031.81
MW-12	543686.80	664672.20	4038.36	4040.25	9.85	4030.40
MW-12-01	556211.81	667903.12	4064.54	4066.39	3.74	4062.65
MW-12-02	556217.94	667768.80	4066.22	4068.06	5.48	4062.58
MW-12-03	555883.96	667716.05	4070.44	4069.85	6.70	4063.15
MW-13	543927.90	664216.10	4035.13	4036.49	6.10	4030.39
MW-14	543904.80	662841.70	4031.95	4034.13	7.70	4026.43
MW-15	544403.80	662252.20	4030.85	4032.70	7.66	4025.04
MW-16	537886.90	660473.00	4029.71	4031.84	13.24	4018.60
MW-17	537585.90	658079.30	4030.17	4032.17	14.08	4018.09
MW-18	538105.10	656338.20	4018.60	4019.42	8.13	4011.29

Continued

MW-19-01	548304.90	663965.58	4046.60	4048.74	7.38	4041.36
MW-21-01	542925.39	667762.04	4044.18	4046.59	7.29	4039.30
MW-22-01	540855.91	666347.26	4037.70	4038.99	11.58	4027.41
MW-23-01	540402.02	666077.69	4035.79	4037.11	10.62	4026.49
MW-24-01	538127.51	669683.22	4047.97	4049.39	14.36	4035.03
MW-24-05	538414.96	666973.60	4040.24	4041.24	11.86	4029.38
MW-26-01	543091.72	673624.04	4060.45	4062.28	6.56	4055.72
MW-28-01	548805.65	676265.66	4091.19	4092.94	12.53	4080.41
MW-29-01	549358.09	677999.61	4102.16	4103.37	24.33	4079.04
MW-30&33-01	552710.92	676333.33	4103.31	4104.70	23.48	4081.22
MW-36-01	546510.67	684691.59	4102.13	4105.03	31.24	4073.79
MW-36-03	545646.31	684024.58	4097.34	4099.71	28.07	4071.64
MW-37-01	537843.13	686025.10	4076.08	4077.22	31.53	4045.69
MW-37-03	538441.26	687430.86	4077.62	4079.66	28.69	4050.97
MW-37-06	539149.29	688953.52	4084.13	4085.29	35.76	4049.53
MW-BG-01	554457.10	708995.70	4206.10	4207.73	36.57	4171.16
MW-BG-02	556491.90	703541.40	4197.40	4199.28	43.80	4155.48
MW-BG-03	554937.20	695648.90	4136.14	4138.28	11.83	4126.45
MW-BG-04	546283.20	690009.90	4072.65	4074.51	4.62	4069.89

'WATER LEVEL SURVEY DATA (April, 1993)

Location id	Easting	Northing	Ground Elev.	TOC Elev.	GW from TOC	GW above MSL
MWD-01	540864.68	663846.28	4028.34	4030.66	8.48	4022.18
MWD-02	542460.08	658545.00	4021.37	4023.30	5.52	4017.78
MWD-03	547567.44	665970.87	4045.48	4047.41	5.12	4042.29
MWD-04	544323.08	661959.63	4030.19	4031.86	6.93	4024.93
MWD-05	544355.80	664707.96	4036.86	4039.34	6.24	4033.10
MWD-06	537661.05	659274.14	4027.98	4030.20	11.49	4018.71
MWP-01	547500.04	666007.62	4045.09	4047.51	5.22	4042.29
MWP-02	544350.06	661861.42	4030.25	4032.11	7.06	4025.05
MWS-01	547227.86	664038.39	4038.99	4041.72	5.64	4036.08
MWS-03	544339.44	666310.26	4040.93	4042.66	6.78	4035.88
MWS-04	544926.56	662213.66	4031.49	4034.46	8.72	4025.74
MWS-05	543989.31	662360.64	4031.32	4033.47	9.21	4024.26
MWS-06	539431.65	663611.00	4029.44	4031.52	11.86	4019.66
MWS-07	538199.17	662546.27	4028.22	4030.24	12.05	4018.19
MWS-08	539393.41	660347.18	4031.02	4033.15	14.82	4018.33
MWS-09	537626.78	655436.28	4018.42	4020.67	9.62	4011.05
MWS-10	539545.00	657713.58	4027.85	4030.00	13.68	4016.32
MWS-11	541772.11	660788.59	4025.17	4027.23	9.88	4017.35
MWS-12	547576.02	665999.05	4046.01	4048.31	7.48	4040.83
MWS-13	544352.88	661961.13	4030.05	4032.34	8.62	4023.72
MWS-14	544338.74	661960.52	4030.20	4032.43	8.37	4024.06
MWS-15	544342.86	664406.43	4034.86	4037.71	4.87	4032.84
MWS-16	537775.86	659637.61	4027.46	4029.46	10.97	4018.49
MW-01	548658.60	666311.53	4050.54	4053.42	10.05	4043.37
MW-02	544566.85	663814.83	4037.08	4039.78	5.73	4034.05
MW-03	544469.13	662878.19	4034.71	4037.38	8.24	4029.14
MW-04	545215.83	660699.42	4027.65	4030.30	6.09	4024.21
MW-05	544358.30	664830.97	4036.55	4039.30	5.36	4033.94
MW-06	544970.02	661445.18	4028.45	4031.21	7.33	4023.88
MW-07	544379.85	665147.61	4037.37	4039.88	5.88	4034.00
MW-08	544474.40	664520.54	4037.90	4040.50	6.26	4034.24
MW-09	546285.88	665312.37	4040.34	4042.59	8.06	4034.53
MW-10	546007.93	666135.76	4040.97	4043.39	N/A	N/A
MW-11	543896.90	665207.00	4037.76	4039.71	8.01	4031.70
MW-12	543686.80	664672.20	4038.36	4040.25	9.96	4030.29
MW-13	543927.90	664216.10	4035.13	4036.49	6.26	4030.23
MW-14	543904.80	662841.70	4031.95	4034.13	7.82	4026.31
MW-15	544403.80	662252.20	4030.85	4032.70	7.80	4024.90
MW-16	537886.90	660473.00	4029.71	4031.84	13.27	4018.57
MW-17	537585.90	658079.30	4030.17	4032.17	14.10	4018.07
MW-18	538105.10	656338.20	4018.60	4019.42	8.15	4011.27
MW-19-01	548304.90	663965.58	4046.60	4048.74	7.68	4041.06

WATER LEVEL SURVEY DATA (August, 1993)

Location id	Easting	Northing	Ground Elev.	TOC Elev.	GW from TOC	GW above MSL
MWD-01	540864.68	663846.26	4028.34	4030.66	9.7	4020.96
MWD-02	542460.08	658545.00	4021.37	4023.30	6.62	4016.68
MWD-03	547567.44	665970.87	4045.48	4047.41	5.83	4041.58
MWD-04	544323.08	661959.63	4030.19	4031.86	7.68	4024.18
MWD-05	544355.80	664707.96	4036.86	4039.34	7.19	4032.15
MWD-06	537661.05	659274.14	4027.98	4030.20	13.15	4017.05
MWP-01	547500.04	666007.62	4045.09	4047.51	N/A	N/A
MWP-02	544350.06	661861.42	4030.25	4032.11	7.86	4024.25
MWS-01	547227.86	664038.39	4038.99	4041.72	6.06	4035.66
MWS-03	544339.44	666310.26	4040.93	4042.66	N/A	N/A
MWS-04	544926.56	662213.66	4031.49	4034.46	9.36	4025.10
MWS-05	543989.31	662360.64	4031.32	4033.47	10.03	4023.44
MWS-06	539431.65	663611.00	4029.44	4031.52	12.65	4018.87
MWS-07	538199.17	662546.27	4028.22	4030.24	12.68	4017.56
MWS-08	539393.41	660347.18	4031.02	4033.15	16.03	4017.12
MWS-09	537626.78	655436.28	4018.42	4020.67	10.6	4010.07
MWS-10	539545.00	657713.58	4027.85	4030.00	15.32	4014.68
MWS-11	541772.11	660788.59	4025.17	4027.23	11.42	4015.81
MWS-12	547576.02	665999.05	4046.01	4048.31	8.07	4040.24
MWS-13	544352.88	661961.13	4030.05	4032.34	9.18	4023.16
MWS-14	544338.74	661960.52	4030.20	4032.43	9.97	4022.46
MWS-15	544342.86	664406.43	4034.86	4037.71	5.25	4032.46
MWS-16	537775.86	659637.61	4027.46	4029.46	12.75	4016.71
MW-01	548658.60	666311.53	4050.54	4053.42	10.82	4042.60
MW-02	544566.85	663814.83	4037.08	4039.78	5.92	4033.86
MW-03	544469.13	662878.19	4034.71	4037.38	9.95	4027.43
MW-04	545215.83	660699.42	4027.65	4030.30	6.95	4023.35
MW-05	544358.30	664830.97	4036.55	4039.30	5.94	4033.36
MW-06	544970.02	661445.18	4028.45	4031.21	6.76	4024.45
MW-07	544379.85	665147.61	4037.37	4039.88	6.63	4033.25
MW-08	544474.40	664520.54	4037.90	4040.50	6.63	4033.87
MW-09	546285.88	665312.37	4040.34	4042.59	8.63	4033.96
MW-10	546007.93	666135.76	4040.97	4043.39	8.56	4034.83
MW-11	543896.90	665207.00	4037.76	4039.71	9.91	4029.80
MW-12	543686.80	664672.20	4038.36	4040.25	10.73	4029.52
MW-13	543927.90	664216.10	4035.13	4036.49	7.45	4029.04
MW-14	543904.80	662841.70	4031.95	4034.13	9.3	4024.83
MW-15	544403.80	662252.20	4030.85	4032.70	8.63	4024.07
MW-16	537886.90	660473.00	4029.71	4031.84	14.9	4016.94
MW-17	537585.90	658079.30	4030.17	4032.17	15.42	4016.75
MW-18	538105.10	656338.20	4018.60	4019.42	9.48	4009.94
MW-21-01	542925.39	667762.04	4044.18	4046.59	8.28	4038.31

APPENDIX B

STATISTICAL ANALYSIS OF METALS DATA FOR PHASE 2 RCRA FACILITY INVESTIGATION

1.0 INTRODUCTION

One objective of the Phase 2 RFI was to determine if metallic elements from sludges and soils in the lakes had migrated to groundwater. This objective was met by collecting groundwater samples from wells downgradient of the lakes, analyzing samples for total metals, and statistically determining if metals were detected at concentrations that indicated migration to groundwater.

Metallic elements are naturally-occurring constituents of uncontaminated soils and of groundwater. Therefore, when investigating suspected metals contamination in soils or groundwater, any conclusions regarding the presence/absence or nature and extent of contamination must consider the naturally-occurring background concentrations of the metals of interest. Conclusions regarding metals contamination presented in this report are based on statistical comparisons of metals samples collected from background sampling locations to samples from areas of potential concern. For the Phase 2 RFI for Lake Holloman and Lake Stinky, this involved comparison of data from monitor wells downgradient of the lakes to data collected in a Base-wide background study.

The measurement data has been grouped to represent two potentially different populations. One population is background, represented by metals results for the 50 samples collected in the Base-wide background study. The other population is a group of the downgradient monitor wells. For the purposes of this investigation, the downgradient monitor wells were grouped into a cluster: MW-16, MW-17, MW-18, MWS-16 and MWS-09 (named Group 16). Since only one sample was collected from each monitor well during this assessment, this grouping allows the calculation of summary statistics and comparisons of average concentrations. Average comparisons are a more powerful type of comparison than comparisons of individuals as explained later in this appendix.

2.0 SUMMARY OF RESULTS

Two types of statistical comparisons were used to compare background metals results from the monitor wells downgradient of Lakes Holloman and Stinky--means comparisons and individuals comparisons. Table 2-1 summarizes the conclusions reached in the statistical comparisons. As shown in the table, the measurement data indicate that mercury concentrations in downgradient wells are higher than background concentrations. Although all results were within the range of background concentrations, at least one result exceeded the upper tolerance limit (UTL). These results indicate migration may have occurred; however, additional downgradient data would be helpful in determining whether or not migration has conclusively occurred. Comparisons for antimony, cadmium, cobalt, mercury, and tin also were not conclusive. The average concentrations downgradient were not higher than average background concentrations; however, several individual values exceeded the UTLs for background. Table 2-2 summarizes the number of times individual measurements for analytes exceeded the UTL for background in the downgradient wells. Additional downgradient data would also help determine if migration has conclusively occurred.

Tables 2-3 through 2-5 present additional results of statistical analyses. Table 2-3 presents a summary of the results for chemical analyses. Table 2-4 presents a summary of the conclusions reached from the tests of central tendency. Table 2-5 presents a summary of the individual measurements which exceeded warning limits and UTLs for background. The figures in Attachment 1 graphically depict the measurements for total metals in downgradient samples, upgradient (i.e., background) samples, equipment blanks collected during the program, and laboratory blanks analyzed throughout the program as part of the ongoing QA program.

Table 2-1

Summary of Statistical Analyses

Group	Analyte	Method	Conclusion
16	Antimony	SW6010	Means comparison indicated the average downgradient concentration was not greater than the average background concentration. However, the result from MW-17 exceeded the UTL. It is not conclusive that antimony has or has not migrated to downgradient monitor wells.
16	Arsenic	SW7060	Not significantly different than background.
16	Barium	SW6010	Not significantly different than background.
16	Beryllium	SW6010	Not significantly different than background.
16	Cadmium	SW6010	Means comparison indicated the average downgradient concentration was not greater than the average background concentration. However, the result from MW-16, MW-17, and MWS-16 exceeded the UTL. The means comparison conclusion may be a false-negative and cadmium may have migrated to the downgradient monitor wells.
16	Chromium	SW6010	Not significantly different than background.
16	Cobalt	SW6010	Means comparison indicated the average downgradient concentration was not greater than the average background concentration. However, the result from MW-16 exceeded the UTL. It is not conclusive that cobalt has or has not migrated to downgradient monitor wells.
16	Copper	SW6010	Not significantly different than background.
16	Lead	SW7421	Not significantly different than background.

Table 2-1

(Continued)

Group	Analyte	Method	Conclusion
16	Mercury	SW7470	Means comparison indicated the average conc. downgradient was greater than the average background conc. Also, one result at MW-18 exceeded the UTL. However, all downgradient results were within the range of background and laboratory blank results. Thus, mercury may have migrated downgradient, but this investigation is not conclusive.
16	Nickel	SW6010	Not significantly different than background.
16	Selenium	SW6010	Not significantly different than background.
16	Silver	SW6010	Not significantly different than background.
16	Thallium	SW7841	Not significantly different than background.
16	Tin	SW6010	One result at MW-16 exceeded the UTL, however, the means comparison concluded that the average concentration downgradient was not greater than the average background concentration. Thus, it is not conclusive that tin has migrated downgradient to the new wells.
16	Vanadium	SW6010	Not significantly different than background.
16	Zinc	SW6010	Not significantly different than background.

Table 2-2

Locations with Analytes Exceeding Warning Limits and UTLs

Group	Well ID	Number of Analytes With Concentration Exceeding Warning Limit	Number of Analytes with Concentration Exceeding UTL
16	MW-16	11	3
16	MW-17	5	2
16	MW-18	2	1
16	MWS-09	1	0
16	MWS-16	2	1

Table 2-3

Summary Statistics for Downgradient and Background Measurements

Group	Analyte	Method	Number of Site Samples	Site Mean	Site Std. Dev.	Site Median	Min. RL	Max. RL	Number of Background Samples	Background Mean	Background Std. Dev.	Background Median
16	Antimony	SW6010	5	-0.26800	0.49982	-0.35000	0.100	1.000	71	0.00841	0.04096	0.00240
16	Arsenic	SW7060	5	0.00388	0.01856	0.00240	0.004	0.016	14	-0.00541	0.02971	-0.00600
16	Barium	SW6010	5	0.24920	0.21339	0.26000	0.010	0.010	14	0.14607	0.12985	0.11000
16	Beryllium	SW6010	5	0.00129	0.00169	0.00110	0.002	0.002	14	0.00098	0.00107	0.00066
16	Cadmium	SW6010	5	0.00914	0.00865	0.01100	0.005	0.005	14	0.00451	0.00144	0.00505
16	Chromium	SW6010	5	0.00988	0.02353	0.00850	0.010	0.010	14	0.02670	0.02749	0.01600
16	Cobalt	SW6010	5	0.00826	0.01808	0.00290	0.010	0.010	74	0.00137	0.00498	0.00114
16	Copper	SW6010	5	0.00081	0.00777	-0.00120	0.020	0.020	14	0.01448	0.00922	0.01050
16	Lead	SW7421	5	-0.00120	0.00965	-0.00200	0.006	0.012	13	0.00119	0.00700	0.00000
16	Mercury	SW7470	5	0.00001	0.00001	0.00001	0.00018	0.00036	50	-0.00006	0.00004	-0.00006
16	Nickel	SW6010	5	-0.00247	0.00927	-0.00580	0.020	0.020	14	0.00944	0.01308	0.00615
16	Selenium	SW7740	5	-0.00240	0.01596	-0.01300	0.005	0.010	12	0.00888	0.02575	0.00760
16	Silver	SW6010	5	-0.00682	0.00493	-0.00620	0.010	0.010	67	0.00030	0.00351	0.00022
16	Thallium	SW7841	5	-0.00030	0.00300	0.00080	0.005	0.020	13	0.00079	0.00158	0.00080
16	Tin	SW6010	5	-0.02756	0.07579	-0.01800	0.600	0.600	74	0.00026	0.01554	-0.00113
16	Vanadium	SW6010	5	0.03200	0.03418	0.02100	0.020	0.020	14	0.08986	0.06074	0.05650
16	Zinc	SW6010	5	0.06100	0.05923	0.05700	0.020	0.020	14	0.04679	0.04042	0.03100

Table 2-4

Conclusions for Statistical Tests of Central Tendency

Group	Analyte	Method	Statistical Comparison	P value	Conclusion
16	Antimony	SW6010	Student's t-Test	0.858	NS
16	Arsenic	SW7060	Student's t-Test	0.2626	NS
16	Barium	SW6010	Wilcoxon Rank Test	0.1831	NS
16	Beryllium	SW6010	Student's t-Test	0.32165	NS
16	Cadmium	SW6010	Student's t-Test	0.14955	NS
16	Chromium	SW6010	Wilcoxon Rank Test	0.80515	NS
16	Cobalt	SW6010	Wilcoxon Rank Test	0.3045	NS
16	Copper	SW6010	Student's t-Test	0.988	NS
16	Lead	SW7421	Student's t-Test	0.68145	NS
16	Mercury	SW7470	Student's t-Test	0.0001	S
16	Nickel	SW6010	Student's t-Test	0.96225	NS
16	Selenium	SW7740	Wilcoxon Rank Test	0.80835	NS
16	Silver	SW6010	Student's t-Test	0.98365	NS
16	Thallium	SW7841	Student's t-Test	0.8395	NS
16	Tin	SW6010	Student's t-Test	0.77085	NS
16	Vanadium	SW6010	Wilcoxon Rank Test	0.9821	NS
16	Zinc	SW6010	Wilcoxon Rank Test	0.4275	NS

NS = Not significant

S = Significant

Table 2-5

Downgradient Measurements Which Exceed Background Warning Limits and UTL

Group	Well ID	Analyte	Method	Sample Measurement	Background Warning Limit	Background UTL
16	MW-16	Cadmium	SW6010	0.014000	0.005804	0.008272
16	MW-16	Cobalt	SW6010	0.040000	0.006190	0.020000
16	MW-16	Tin	SW6010	0.055000	0.013509	0.030957
16	MW-17	Antimony	SW6010	0.570000	0.043341	0.089630
16	MW-17	Cadmium	SW6010	0.019000	0.005804	0.008272
16	MW-18	Mercury	SW7470	0.000030	-0.000021	0.000027
16	MWS-16	Cadmium	SW6010	0.011000	0.005804	0.008272

3.0 TECHNICAL APPROACH

As previously mentioned, two types of statistical comparisons were used to compare background metals data to results from the monitor wells downgradient of Lakes Holloman and Stinky. Means comparisons were used to compare the average background concentration of each of the metals to the corresponding average concentration reported for the group of downgradient monitor wells. Additionally, individual results from each of the wells were compared to calculated UTLs for background concentrations. Since both Type I and Type II errors (see any standard statistics textbook for descriptions of these error types) may occur in both means and individuals comparisons, all statistical conclusions were confirmed or qualified by a graphical analysis of the results.

3.1 Means Comparisons

Tests of central tendency are the preferred approach to testing whether or not measurement results indicate a difference between two "sample populations" of interest. In this investigation, as in other similar studies, the sample populations are "background" and "downgradient." Conceptually, a means comparison tests the measurement results to determine the likelihood that they actually came from a single parent population rather than from two different populations. The test assumes that there is no difference between the two populations (i.e., that downgradient is not different from background) as long as the observed difference between their averages is within the range that could be attributed to chance.

The amount of difference attributable to chance in a means comparison is a function of variability in the sample data and the number of sample results available. The difference attributable to chance reflects the uncertainty in the statistical test and becomes smaller as the sample size increases. It also becomes smaller as the variability among results within each of the two populations decreases. The uncertainty due to sample size and variability directly affects what is known as the power of the statistical comparison. As

the power increases, it becomes possible to detect smaller and smaller differences between the true population means. Thus, with increased power there is less risk of failing to detect a difference that actually exists. This should not be confused with the confidence level of the test, which is related to the probability of erroneously concluding that a difference exists between the population means, when in fact the population means are not different. (As the confidence level increases, the probability of incorrectly indicating a difference decreases.)

3.2 Individual Comparisons

The comparison of individual results to UTLs of a given population is another way of testing the difference between two sample populations. The UTL represents an estimate of the upper 95th percentile of the true background concentration of the analyte of interest. Thus, there is a relatively small chance, on the order of one in twenty, of a sample of uncontaminated groundwater (i.e., groundwater that is no different from background) having a metal concentration greater than the UTL. When individual sample results are compared to UTLs, they are interpreted to indicate the presence of contamination when they exceed the UTLs. On the other hand, samples are considered not to be different from background as long as they do not exceed the UTL. The UTL calculation in Appendix B.1 of this report were used for the comparisons of individual results in this analysis.

3.3 Advantages/Disadvantages and Use of Each Statistical Comparison

Both types of comparisons are useful and provide different information about the data and the parent populations. However, in most cases, means comparisons offer significant advantages over comparisons of individual results to UTLs because they offer greater statistical power than comparisons based on the UTL. Thus, means comparisons can detect smaller differences between two populations. When used to compare monitor well results to background data, means comparisons can detect lower levels of contamination and

are less likely to fail to detect contamination when it actually exists. Comparisons using individual results compared to UTLs are less sensitive and more likely to fail to detect contamination because of the inherent uncertainty in individual measurements. Much of this uncertainty is attributable to random measurement error, which is effectively "averaged out" in means comparisons where multiple results are considered together as a set.

The strength of means comparisons can also be their weakness. In the same way that random measurement error gets averaged out in the calculation of a sample mean, so can actual, non-random effects be diluted and overlooked. For example, four wells might be grouped together based on available hydrogeologic information. Whereas comparing average results for the four wells offers more power, it is important to not overlook cases in which results from one member of the initial group stand out as appreciably different from the others. When this occurs, the single anomalous result should be compared to the UTL for background to evaluate it separately and to decide if the initial well grouping should be reconsidered. Comparisons based on the UTL are also useful when only one result is available for comparison. However, a conclusion that a downgradient well is not different from background based on a single downgradient result must acknowledge the significant risk that there actually is a difference that was not detected simply because of the paucity of downgradient data.

3.4 Statistical Tests Used

For this program, the Student's t-Test and the Wilcoxon Test were used to compare the central tendency of downgradient and background sample sets (i.e., were used for means comparisons). The Student's t-Test was used when both the downgradient and background sample data sets were normally distributed. This test explicitly compares the means of the two data sets. The Wilcoxon Test was used when the data sets were not normally distributed and effectively compares the medians of the data sets rather than the means. Additional detail about these two methods and their application in statistical comparisons may be found in Snedecor and Cochran, 1989.

4.0 REFERENCES

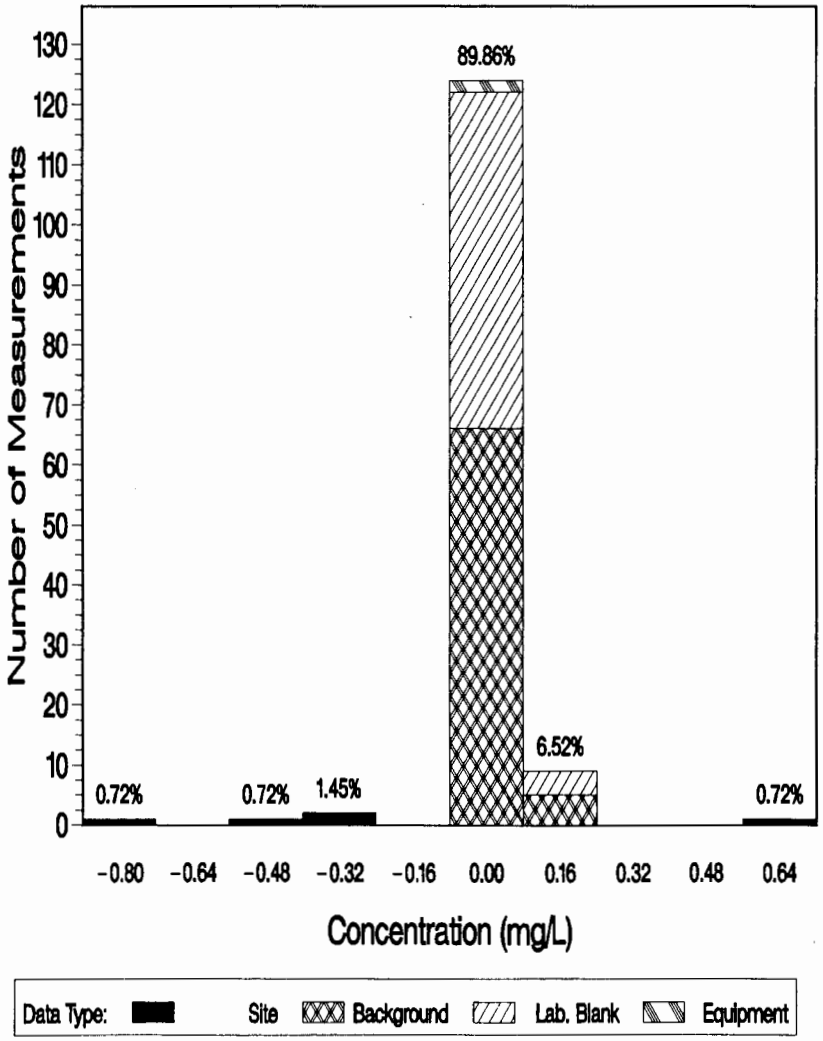
Snedecor, G.W. and W.G. Cochran, *Statistical Methods*, Iowa State University Press, Ames, Iowa, 1989, Chapters 6 and 8.

Holloman AFB L&L Site and Background Data

Frequency Distribution

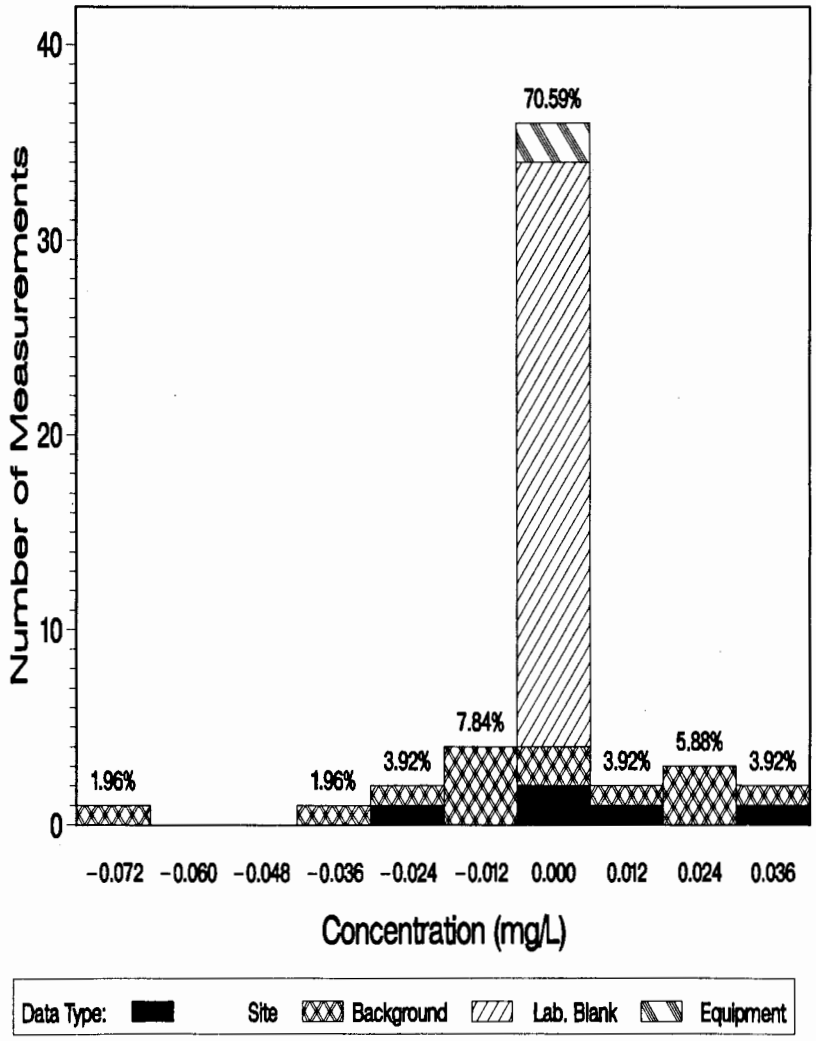
Group 16 -- Antimony -- SW6010

Groundwater -- Total Metals



Group 16 -- Arsenic -- SW7060

Groundwater -- Total Metals

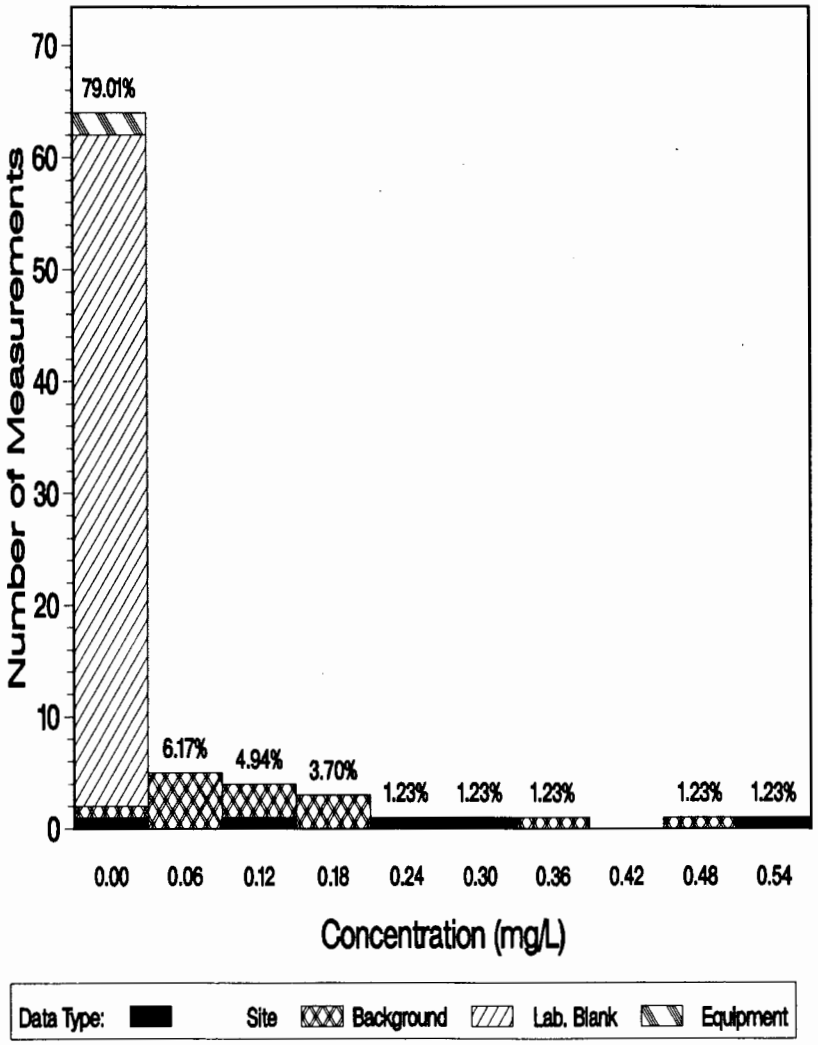


Holloman AFB L&L Site and Background Data

Frequency Distribution

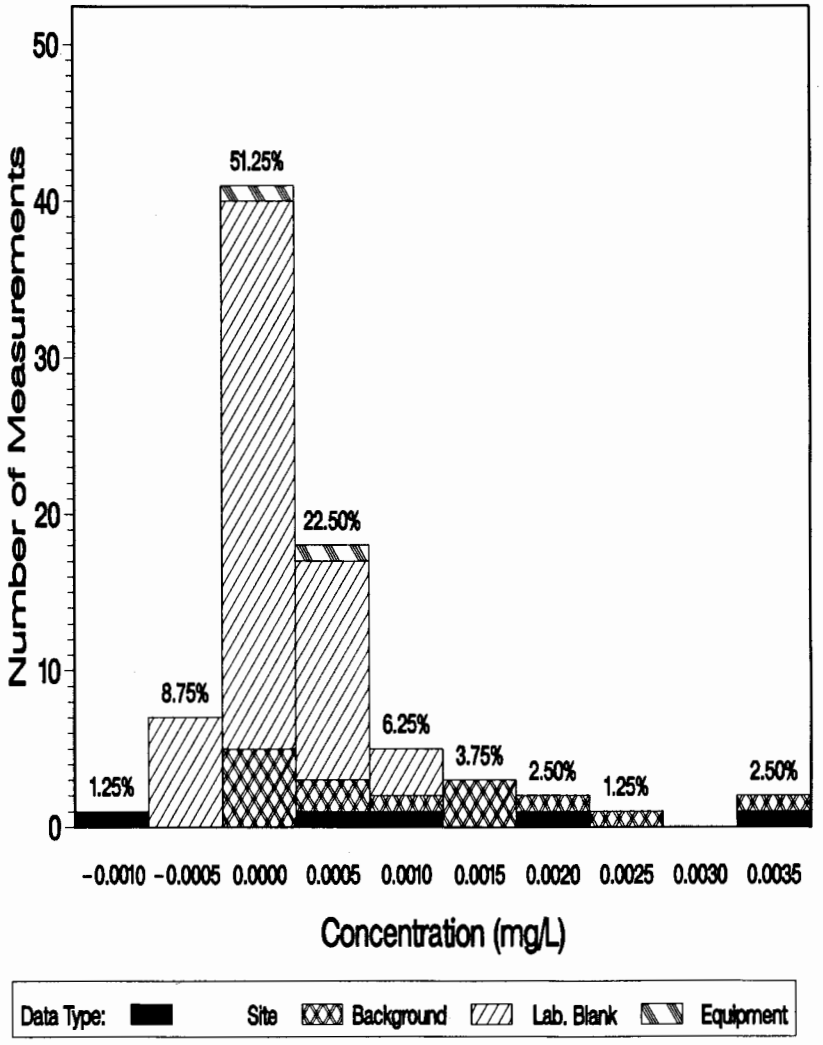
Group 16 -- Barium -- SW6010

Groundwater -- Total Metals



Group 16 -- Beryllium -- SW6010

Groundwater -- Total Metals

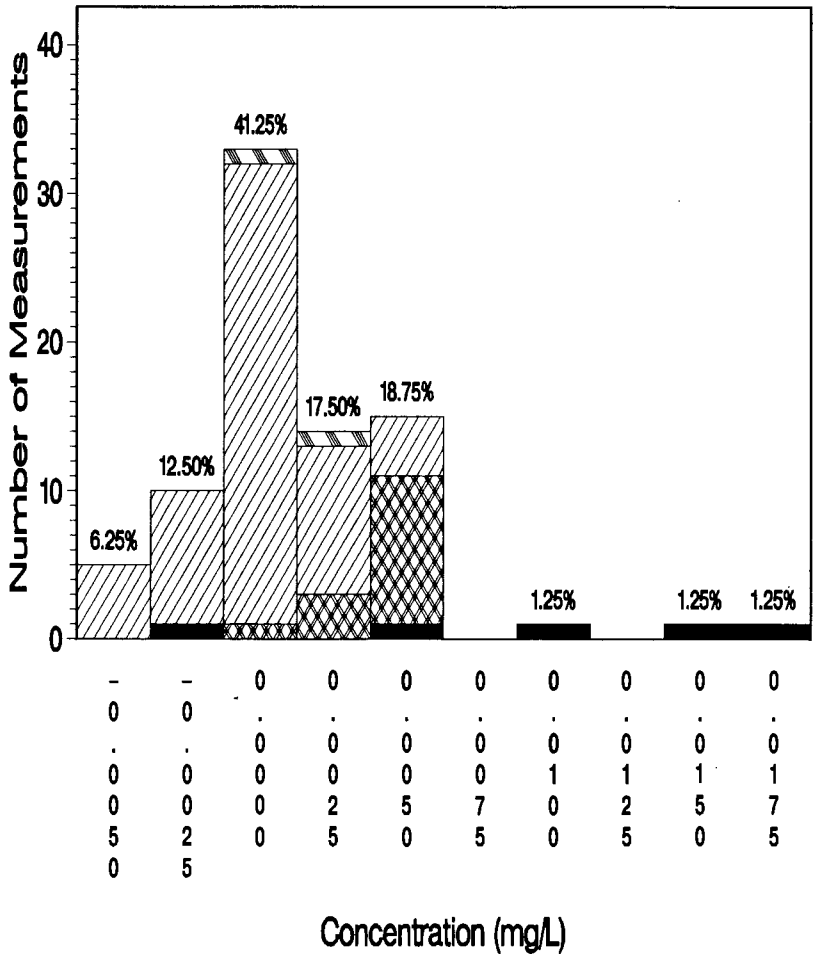


Holloman AFB L&L Site and Background Data

Frequency Distribution

Group 16 -- Cadmium -- SW6010

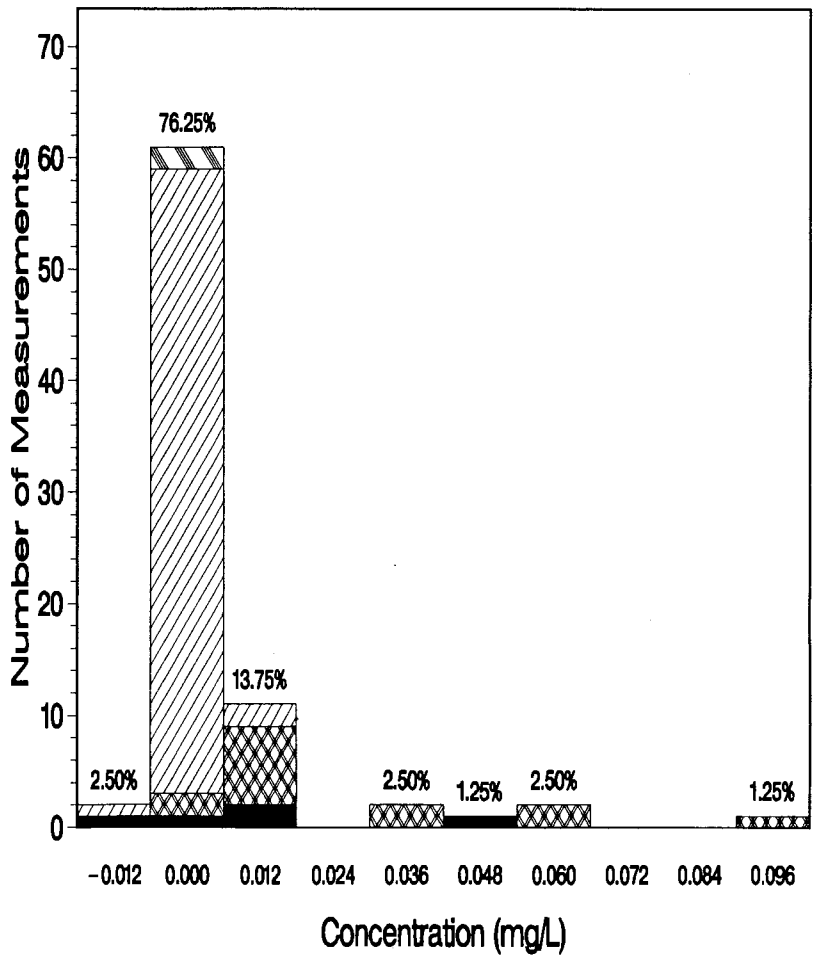
Groundwater -- Total Metals



Data Type: Site Background Lab. Blank Equipment

Group 16 -- Chromium -- SW6010

Groundwater -- Total Metals



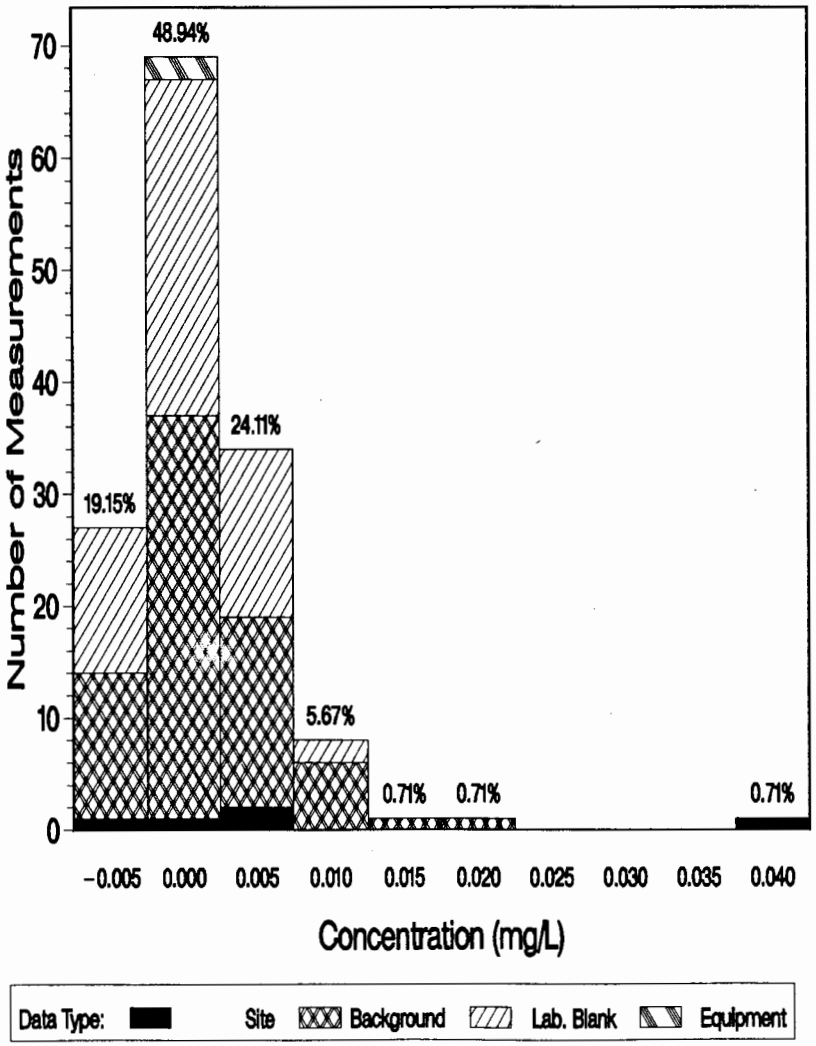
Data Type: Site Background Lab. Blank Equipment

Holloman AFB L&L Site and Background Data

Frequency Distribution

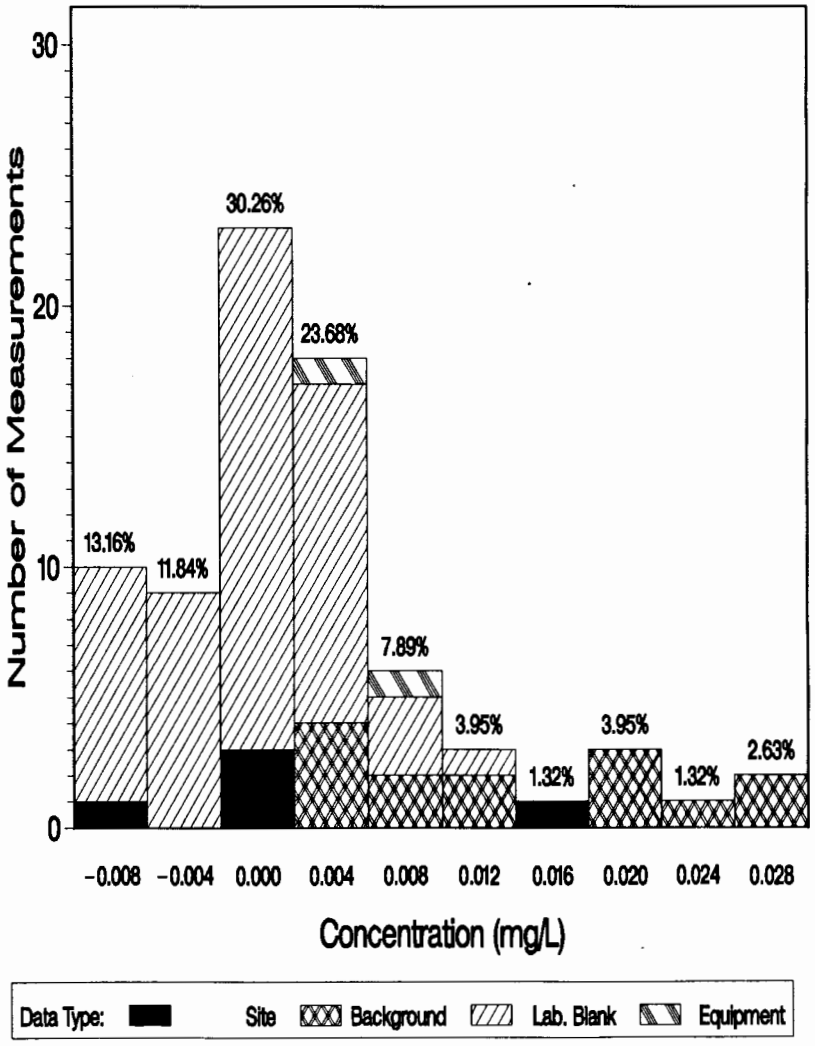
Group 16 -- Cobalt -- SW6010

Groundwater -- Total Metals



Group 16 -- Copper -- SW6010

Groundwater -- Total Metals

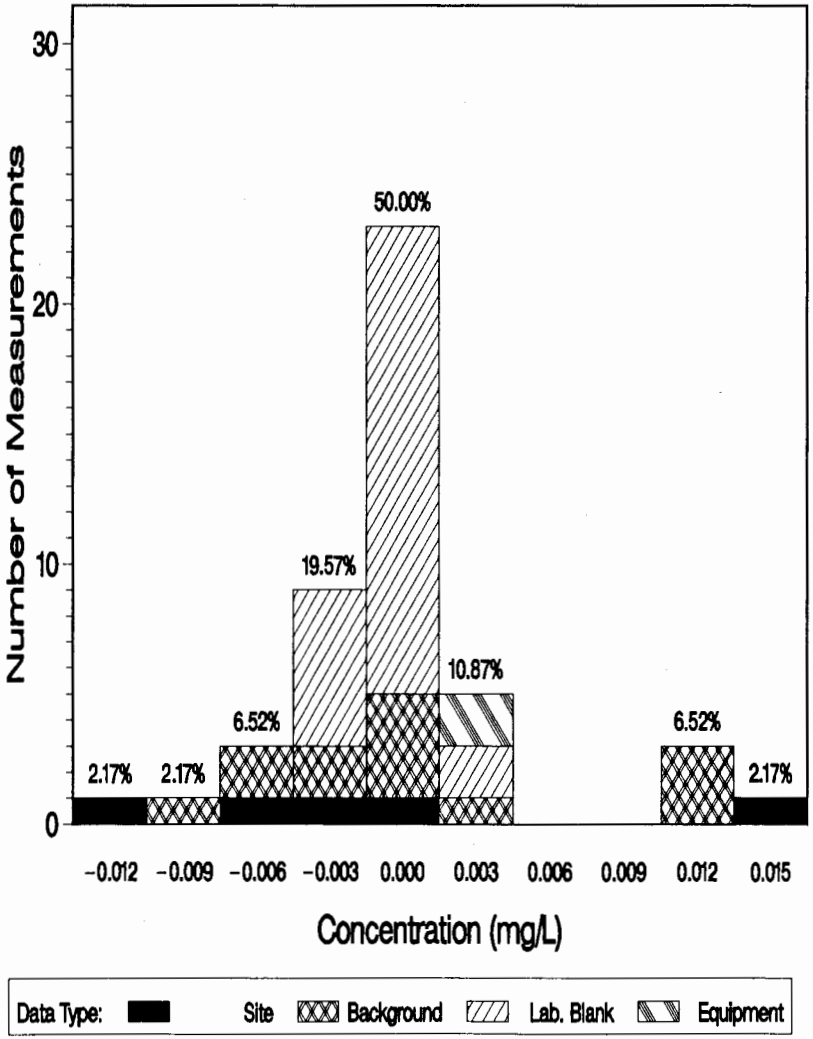


Holloman AFB L&L Site and Background Data

Frequency Distribution

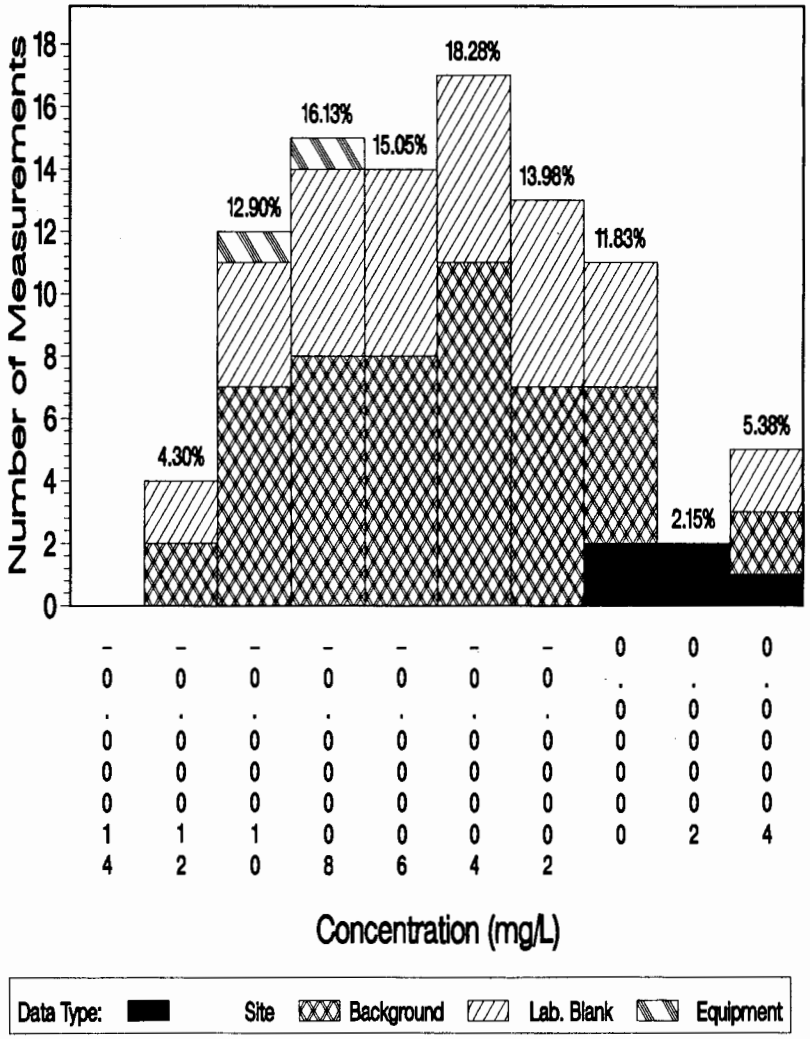
Group 16 -- Lead -- SW7421

Groundwater -- Total Metals



Group 16 -- Mercury -- SW7470

Groundwater -- Total Metals

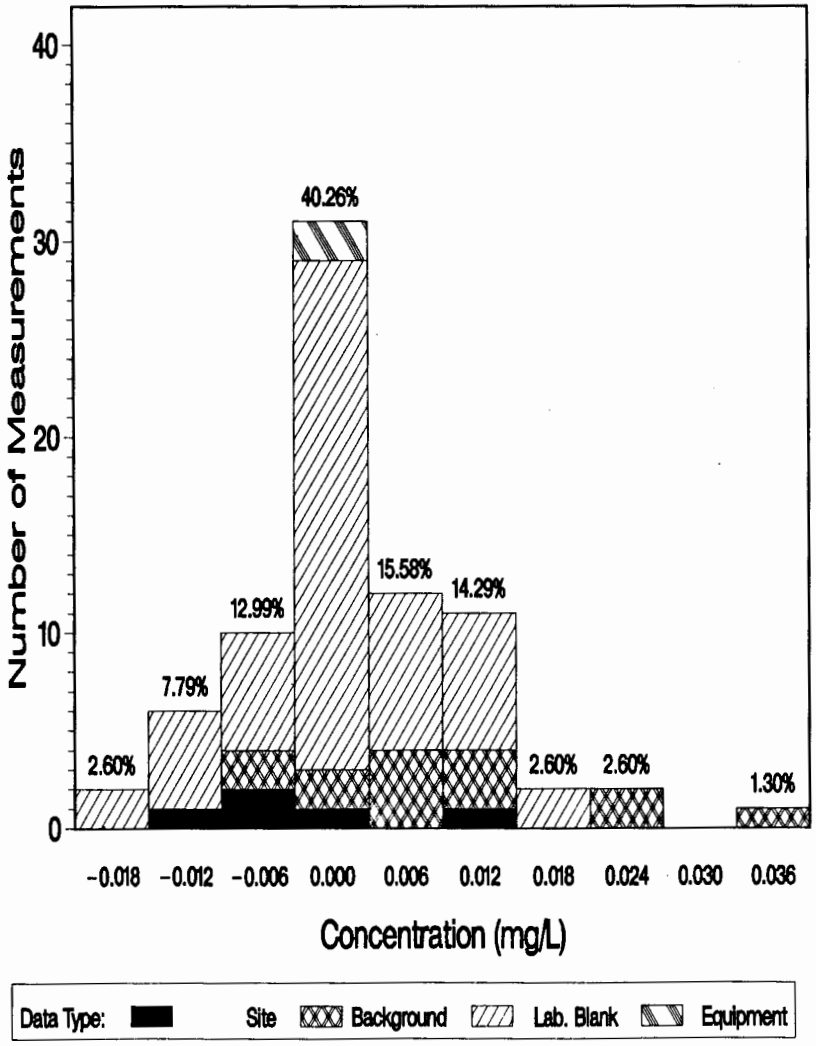


Holloman AFB L&L Site and Background Data

Frequency Distribution

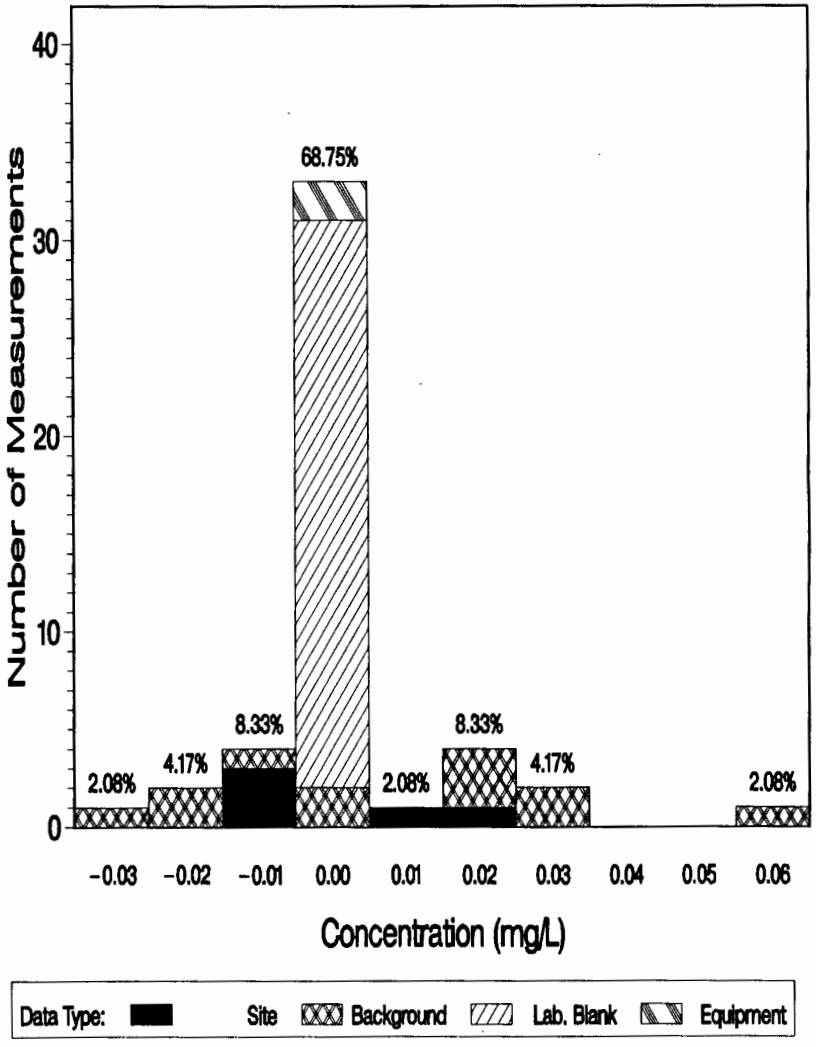
Group 16 -- Nickel -- SW6010

Groundwater -- Total Metals



Group 16 -- Selenium -- SW7740

Groundwater -- Total Metals

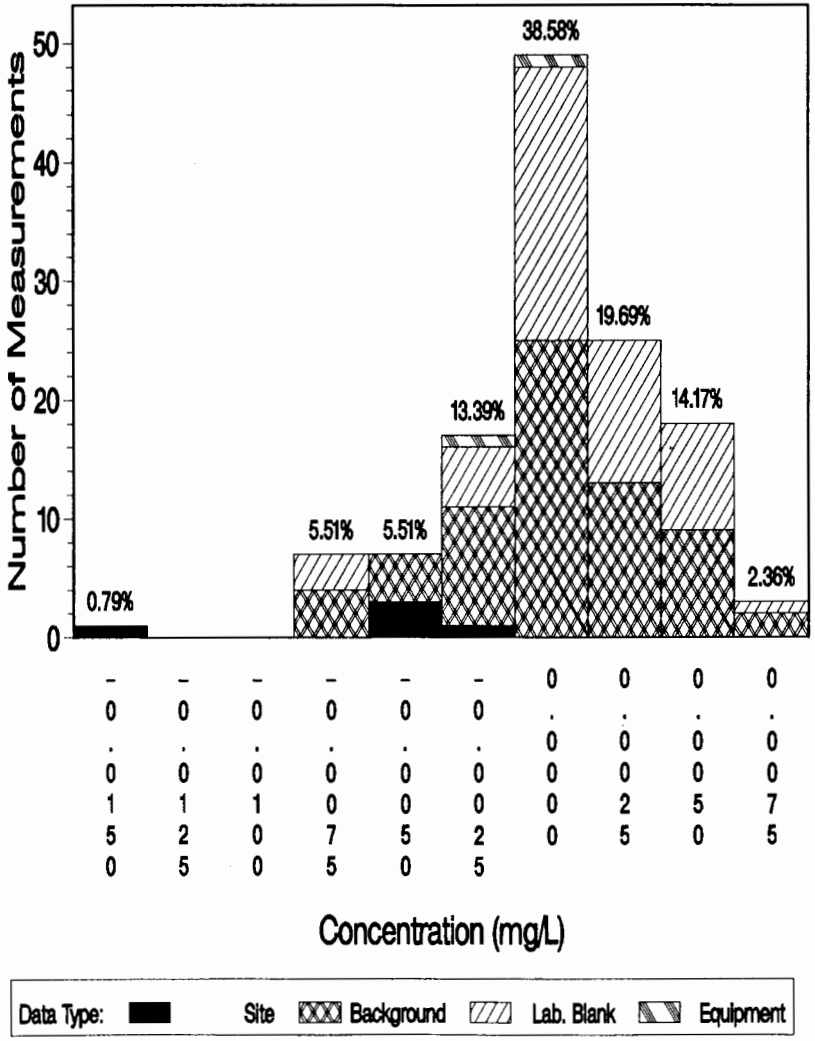


Holloman AFB L&L Site and Background Data

Frequency Distribution

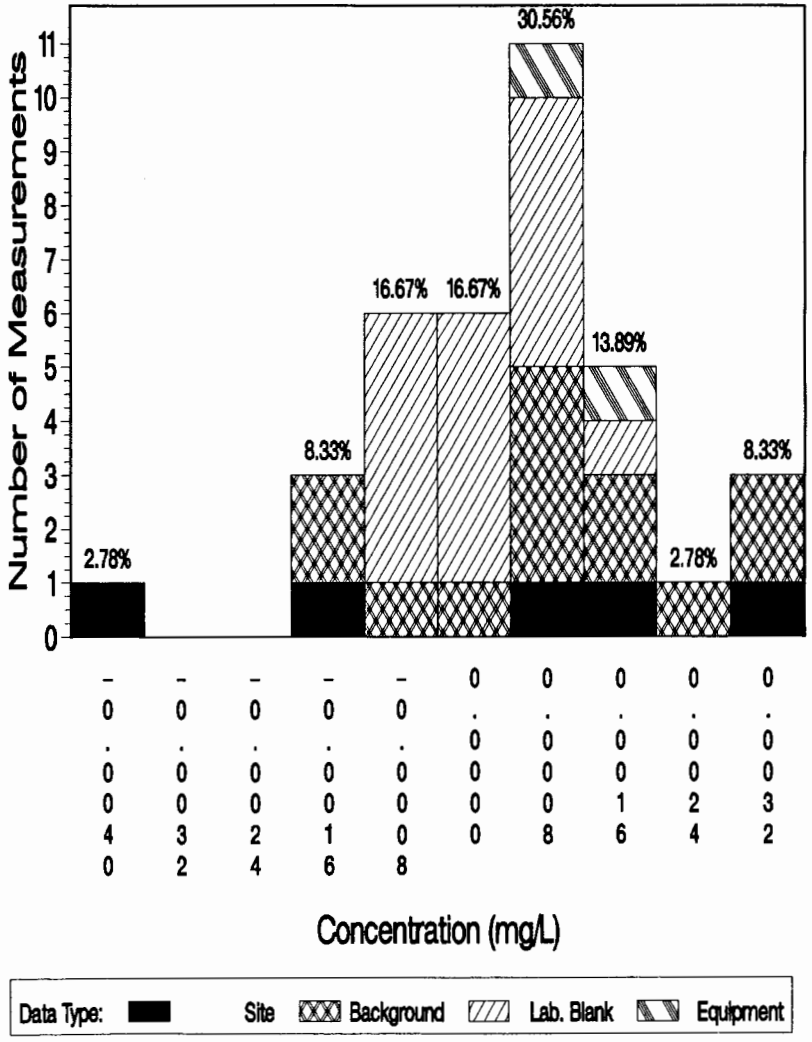
Group 16 -- Silver -- SW6010

Groundwater -- Total Metals



Group 16 -- Thallium -- SW7841

Groundwater -- Total Metals

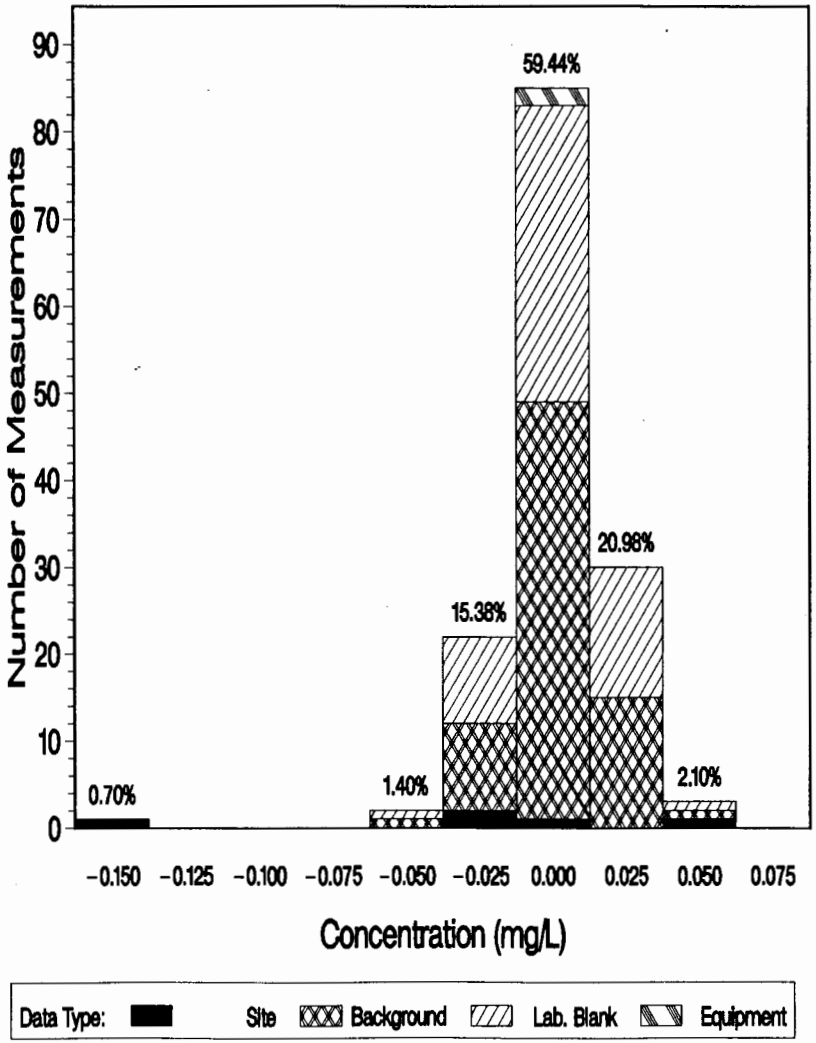


Holloman AFB L&L Site and Background Data

Frequency Distribution

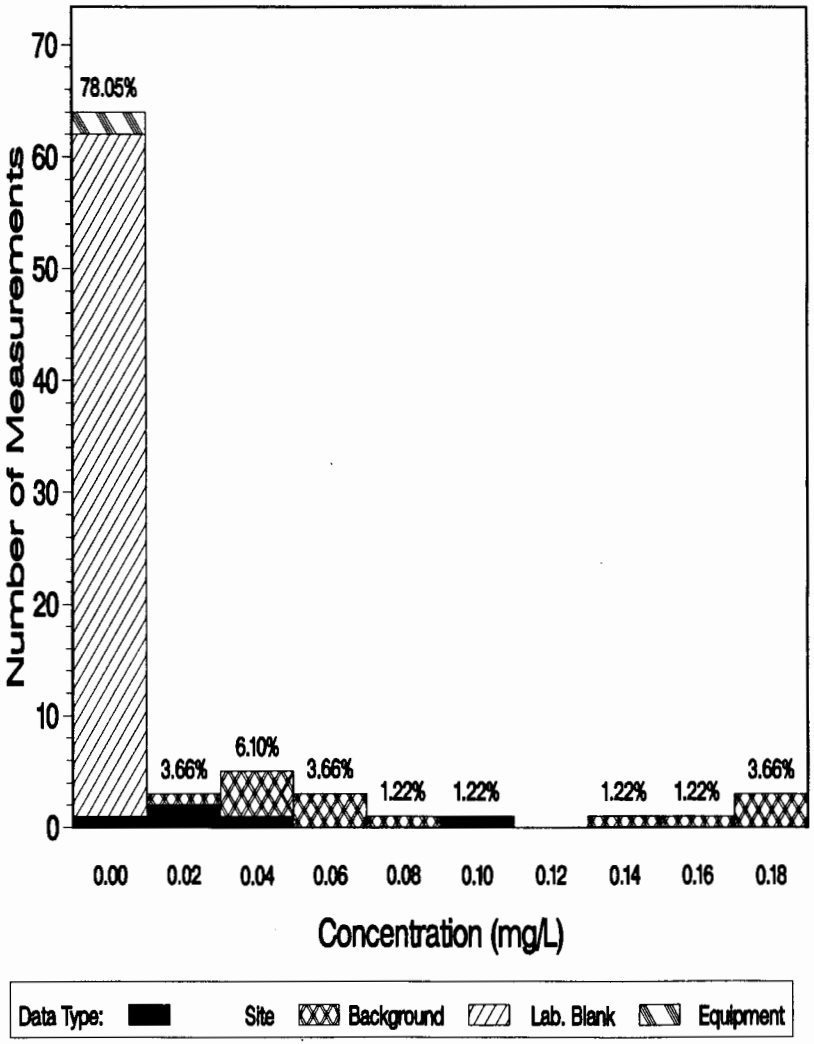
Group 16 -- Tin -- SW6010

Groundwater -- Total Metals



Group 16 -- Vanadium -- SW6010

Groundwater -- Total Metals

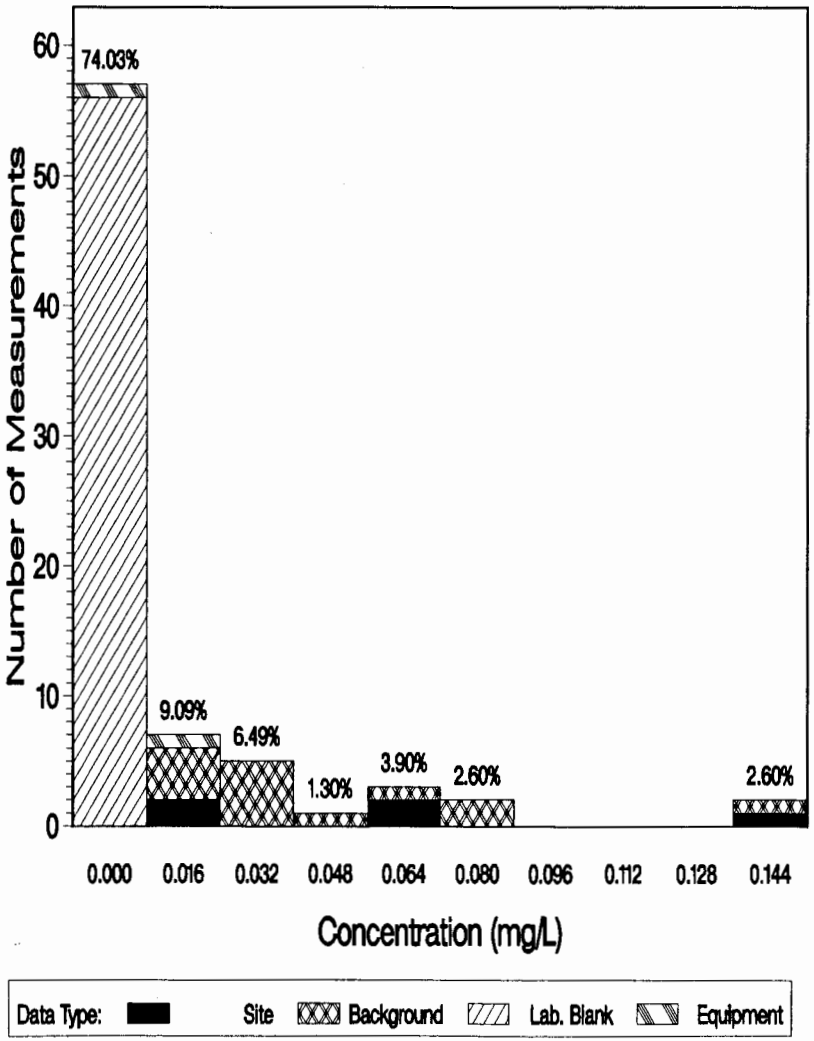


Holloman AFB L&L Site and Background Data

Frequency Distribution

Group 16 -- Zinc -- SW6010

Groundwater -- Total Metals



APPENDIX C

ANALYTICAL RESULTS

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	MW-16 9303-MW-16-01				MW-17 9303-MW-17-01				MW-18 9303-MW-18-01				MWS-09 9303-MWS-09-01			
SW8080 - Organochlorine Pesticides and PCBs (ug/L)																
4,4'-DDD	0.022	X@	(0.0095)	[0.952380]	0.016	X@	(0.0095)	[0.952380]	0.014	X@	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
4,4'-DDE	0.015	@	(0.0095)	[0.952380]	0.0094	J	(0.0095)	[0.952380]	0.015	X@	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
4,4'-DDT	ND		(0.019)	[0.952380]	ND		(0.019)	[0.952380]	0.0096	JX	(0.019)	[0.952380]	ND		(0.019)	[0.970873]
Aldrin	D.013	@	(0.0095)	[0.952380]	0.014	@	(0.0095)	[0.952380]	ND		(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
Dieldrin	0.029	X@	(0.0095)	[0.952380]	0.018	@	(D.0095)	[0.952380]	0.014	X@	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
Endosulfan I	0.03	X@	(0.0095)	[0.952380]	ND		(0.0095)	[0.952380]	0.0079	JX	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
Endosulfan II	0.013	J	(0.029)	[0.952380]	ND		(0.029)	[0.952380]	0.0019	J	(0.029)	[0.952380]	ND		(0.029)	[0.970873]
Endosulfan Sulfate	0.016	J	(0.048)	[0.952380]	0.0049	J	(0.048)	[0.952380]	ND		(0.048)	[0.952380]	ND		(0.049)	[0.970873]
Endrin	0.011	X@	(0.0095)	[0.952380]	0.0043	J	(0.0095)	[0.952380]	0.0083	JX	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
Endrin Aldehyde	ND		(0.019)	[0.952380]	ND		(0.019)	[0.952380]	0.012	JX	(0.019)	[0.952380]	ND		(0.019)	[0.970873]
Heptachlor	0.036	X@	(0.0095)	[0.952380]	0.026	G@	(0.0095)	[0.952380]	0.036	@	(0.0095)	[0.952380]	0.0044	JX	(0.0097)	[0.970873]
Heptachlor epoxide	0.022	X@	(0.0095)	[0.952380]	0.023	X@	(0.0095)	[0.952380]	0.015	X@	(0.0095)	[0.952380]	0.1	X	(0.0097)	[0.970873]
Isodrin	0.015	X@	(0.0095)	[0.952380]	0.018	X@	(0.0095)	[0.952380]	0.01	X@	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
Kepone	0.31	G	(0.0095)	[0.952380]	0.75	G	(0.0095)	[0.952380]	0.99	X	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
Methoxychlor	ND		(0.048)	[0.952380]	ND		(0.048)	[0.952380]	ND		(0.048)	[0.952380]	ND		(0.049)	[0.970873]
PCB-1016	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND		(0.097)	[0.970873]
PCB-1221	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.970873]
PCB-1232	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.970873]
PCB-1242	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND		(0.097)	[0.970873]
PCB-1248	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND		(0.097)	[0.970873]
PCB-1254	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.970873]
PCB-1260	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.970873]
Toxaphene	ND		(0.48)	[0.952380]	ND		(0.48)	[0.952380]	ND		(0.48)	[0.952380]	ND		(0.49)	[0.970873]
alpha-BHC	0.051		(0.0095)	[0.952380]	ND		(0.0095)	[0.952380]	0.023	G@	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
alpha-Chlordane	ND		(0.0095)	[0.952380]	0.0084	JX	(0.0095)	[0.952380]	ND		(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
beta-BHC	0.027	@	(0.0095)	[0.952380]	0.0043	J	(0.0095)	[0.952380]	0.012	X@	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
delta-BHC	0.049	G	(0.0095)	[0.952380]	0.021	@	(0.0095)	[0.952380]	ND		(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]
gamma-BHC	0.02	G@	(0.0095)	[0.952380]	0.013	G@	(0.0095)	[0.952380]	0.016	@	(0.0095)	[0.952380]	ND		(0.0097)	[0.970873]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	MW-16 9303-MW-16-01				MW-17 9303-MW-17-01				MW-18 9303-MW-18-01				MWS-09 9303-MWS-09-01		
gamma-Chlordane	0.014	@	(0.0095)	[0.952380]	0.012	X@	(0.0095)	[0.952380]	0.0038	JX	(0.0095)	[0.952380]	ND	(0.0097)	[0.970873]
SW8140 - Organophosphorus Pesticides (ug/L)															
Dimethoate	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND	(0.19)	[0.952380]
Disulfoton	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND	(0.19)	[0.952380]
Ethyl parathion	ND		(0.14)	[0.952380]	ND		(0.14)	[0.952380]	ND		(0.14)	[0.952380]	ND	(0.14)	[0.952380]
Famphur	ND		(0.48)	[0.952380]	ND		(0.48)	[0.952380]	ND		(0.48)	[0.952380]	ND	(0.48)	[0.952380]
Methyl parathion	ND		(0.029)	[0.952380]	ND		(0.029)	[0.952380]	ND		(0.029)	[0.952380]	ND	(0.029)	[0.952380]
Phorate	ND		(0.14)	[0.952380]	ND		(0.14)	[0.952380]	ND		(0.14)	[0.952380]	ND	(0.14)	[0.952380]
Sulfotepp	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND		(0.095)	[0.952380]	ND	(0.095)	[0.952380]
Thionazin	ND		(0.95)	[0.952380]	ND		(0.95)	[0.952380]	ND		(0.95)	[0.952380]	ND	(0.95)	[0.952380]
o,o,o-Triethylphosphorthioate	ND		(0.95)	[0.952380]	ND		(0.95)	[0.952380]	ND		(0.95)	[0.952380]	ND	(0.95)	[0.952380]
SW8150 - Chlorinated Herbicides (ug/L)															
2,4,5-T	ND		(0.19)	[0.952380]	ND		(0.19)	[0.952380]	ND		(0.19)	[0.934579]	ND	(0.19)	[0.952380]
2,4,5-TP (Silvex)	ND		(0.16)	[0.952380]	ND		(0.16)	[0.952380]	ND		(0.16)	[0.934579]	ND	(0.16)	[0.952380]
2,4-D	ND		(1.1)	[0.952380]	ND		(1.1)	[0.952380]	ND		(1.1)	[0.934579]	ND	(1.1)	[0.952380]
Dinoseb	ND		(0.14)	[0.952380]	ND		(0.14)	[0.952380]	ND		(0.14)	[0.934579]	ND	(0.14)	[0.952380]
SW8240 - Volatile Organics (ug/L)															
1,1,1,2-Tetrachloroethane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,1,1-Trichloroethane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,1,2,2-Tetrachloroethane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,1,2-Trichloroethane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,1-Dichloroethane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,1-Dichloroethene	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,2,3-Trichloropropane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,2-Dibromo-3-chloropropane	ND		(20)	[1]	ND		(20)	[1]	ND		(20)	[1]	ND	(20)	[1]
1,2-Dibromoethane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,2-Dichloroethane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
1,2-Dichloropropane	ND		(5)	[1]	ND		(5)	[1]	ND		(5)	[1]	ND	(5)	[1]
2-Chloro-1,3-butadiene	ND		(25)	[1]	ND		(25)	[1]	ND		(25)	[1]	ND	(25)	[1]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID / LOCATION ID / SAMPLE ID: MW-16 9303-MW-16-01			MW-17 9303-MW-17-01			MW-18 9303-MW-18-01			MWS-09 9303-MWS-09-01		
2-Hexanone	ND	(50)	[1]	ND	(50)	[1]	ND	(50)	[1]	ND	(50)	[1]
3-Chloropropene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
4-Methyl-2-pentanone(MIBK)	ND	(50)	[1]	ND	(50)	[1]	ND	(50)	[1]	ND	(50)	[1]
Acetone	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]
Acetonitrile	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]
Acrolein	ND	(75)	[1]	ND	(75)	[1]	ND	(75)	[1]	ND	(75)	[1]
Acrylonitrile	ND	(50)	[1]	ND	(50)	[1]	ND	(50)	[1]	ND	(50)	[1]
Benzene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Bromodichloromethane	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Bromomethane	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Carbon disulfide	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Carbon tetrachloride	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Chlorobenzene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Chloroethane	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Chloroform	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Chloromethane	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Dibromochloromethane	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Dibromomethane	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Dichlorodifluoromethane	ND	(20)	[1]	ND	(20)	[1]	ND	(20)	[1]	ND	(20)	[1]
Ethyl benzene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Ethyl methacrylate	ND	(15)	[1]	ND	(15)	[1]	ND	(15)	[1]	ND	(15)	[1]
Iodomethane	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Methyl ethyl ketone	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]
Methyl methacrylate	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Methylene chloride	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Propanenitrile	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]	ND	(100)	[1]
Styrene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Tetrachloroethene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Toluene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	MW-16 9303-MW-16-01			MW-17 9303-MW-17-01			MW-18 9303-MW-18-01			MWS-09 9303-MWS-09-01		
Tribromomethane(Bromoform)	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Trichloroethene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Trichlorofluoromethane	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Vinyl acetate	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
Vinyl chloride	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Xylenes	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
cis-1,3-Dichloropropene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
trans-1,2-Dichloroethene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
trans-1,3-Dichloropropene	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]	ND	(5)	[1]
trans-1,4-Dichloro-2-butene	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
SW8240DI - Volatile Organics, Direct Injection (ug/mL)												
1,4-Dioxane	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Isobutanol	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
Methacrylonitrile	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]	ND	(10)	[1]
SW8270 - Semivolatile Organics (ug/L)												
1,2,4,5-Tetrachlorobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
1,2,4-Trichlorobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
1,2-Dichlorobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
1,3-Dichlorobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
1,3-Dinitrobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
1,4-Dichlorobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
1,4-Napthoquinone	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
1-Naphthylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,3,4,6-Tetrachlorophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,4,5-Trichlorophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,4,6-Trichlorophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,4-Dichlorophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,4-Dimethylphenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,4-Dinitrophenol	ND	(19)	[0.952380]	ND	(19)	[0.952380]	ND	(19)	[0.961538]	ND	(19)	[0.952380]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID / LOCATION ID / SAMPLE ID: MW-16 9303-MW-16-01			MW-17 9303-MW-17-01			MW-18 9303-MW-18-01			MWS-09 9303-MWS-09-01		
2,4-Dinitrotoluene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,6-Dichlorophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2,6-Dinitrotoluene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Acetylaminofluorene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Chloronaphthalene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Chlorophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Methylnaphthalene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Methylphenol(o-cresol)	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Naphthylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Nitroaniline	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Nitrophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
2-Picoline	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
3,3'-Dichlorobenzidine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
3,3'-Dimethylbenzidine	ND	(19)	[0.952380]	ND	(19)	[0.952380]	ND	(19)	[0.961538]	ND	(19)	[0.952380]
3-Methylcholanthrene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
3-Methylphenol(m-cresol)	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
3-Nitroaniline	ND	(19)	[0.952380]	ND	(19)	[0.952380]	ND	(19)	[0.961538]	ND	(19)	[0.952380]
4,6-Dinitro-2-methylphenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
4-Aminobiphenyl	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
4-Bromophenyl phenyl ether	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
4-Chloro-3-methylphenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
4-Chlorophenyl phenyl ether	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
4-Methylphenol(p-cresol)	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
4-Nitroaniline	ND	(19)	[0.952380]	ND	(19)	[0.952380]	ND	(19)	[0.961538]	ND	(19)	[0.952380]
4-Nitrophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
4-Nitroquinoline-N-oxide	ND	(76)	[0.952380]	ND	(76)	[0.952380]	ND	(77)	[0.961538]	ND	(76)	[0.952380]
5-Nitro-o-toluidine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
7,12-Dimethylbenz(a)anthracene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Acenaphthene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID / LOCATION ID / SAMPLE ID: MW-16 / 9303-MW-16-01			MW-17 / 9303-MW-17-01			MW-18 / 9303-MW-18-01			MWS-09 / 9303-MWS-09-01		
Acenaphthylene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Acetophenone	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Aniline	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Anthracene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Aramite	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Benzo(a)anthracene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Benzo(a)pyrene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Benzo(b)fluoranthene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Benzo(g,h,i)perylene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Benzo(k)fluoranthene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Benzyl alcohol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Butylbenzylphthalate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Chlorobenzilate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Chrysene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Di-n-octylphthalate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Diallate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Dibenz(a,h)anthracene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Dibenzofuran	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Dibutylphthalate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Diethylphthalate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Dimethylphenethylamine	ND	(110)	[0.952380]	ND	(110)	[0.952380]	ND	(120)	[0.961538]	ND	(110)	[0.952380]
Dimethylphthalate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Diphenylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Ethyl methanesulfonate	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Fluoranthene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Fluorene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Hexachlorobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Hexachlorobutadiene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Hexachlorocyclopentadiene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	MW-16 9303-MW-16-01			MW-17 9303-MW-17-01			MW-18 9303-MW-18-01			MWS-09 9303-MWS-09-01		
Hexachloroethane	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Hexachlorophene	ND	(1900)	[0.952380]	ND	(1900)	[0.952380]	ND	(1900)	[0.961538]	ND	(1900)	[0.952380]
Hexachloropropene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Indeno(1,2,3-cd)pyrene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Isophorone	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Isosafrole	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Methapyriline	ND	(48)	[0.952380]	ND	(48)	[0.952380]	ND	(48)	[0.961538]	ND	(48)	[0.952380]
Methyl methanesulfonate	ND	(48)	[0.952380]	ND	(48)	[0.952380]	ND	(48)	[0.961538]	ND	(48)	[0.952380]
N-Nitroso-di-n-butylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
N-Nitrosodiethylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
N-Nitrosodimethylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
N-Nitrosodiphenylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
N-Nitrosodipropylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
N-Nitrosomethylethylamine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
N-Nitrosomorpholine	ND	(19)	[0.952380]	ND	(19)	[0.952380]	ND	(19)	[0.961538]	ND	(19)	[0.952380]
N-Nitrosopiperidine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
N-Nitrosopyrrolidine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Naphthalene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Nitrobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Pentachlorobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Pentachloroethane	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Pentachloronitrobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Pentachlorophenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Phenacetin	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Phenanthrene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Phenol	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Pronamide	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Pyrene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Pyridine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID / LOCATION ID / SAMPLE ID											
	MW-16 9303-MW-16-01			MW-17 9303-MW-17-01			MW-18 9303-MW-18-01			MWS-09 9303-MWS-09-01		
Safrole	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
Unknown	4.8	()	[0.952380]	6.7	()	[0.952380]	8.6	()	[0.961538]	4.8	()	[0.952380]
Unknown 2	17	()	[0.952380]	20	()	[0.952380]	4.8	()	[0.961538]	NA		
Unknown 3	17	()	[0.952380]	21	()	[0.952380]	6.7	()	[0.961538]	NA		
Unknown 4	3.8	()	[0.952380]	21	()	[0.952380]	NA			NA		
Unknown 5	4.8	()	[0.952380]	4.8	()	[0.952380]	NA			NA		
Unknown 6	NA			50	()	[0.952380]	NA			NA		
Unknown 7	NA			6.7	()	[0.952380]	NA			NA		
Unknown 8	NA			8.5	()	[0.952380]	NA			NA		
Unknown C6 hydroxyketone	NA			NA			4.8	()	[0.961538]	NA		
bis(2-Chloroethoxy)methane	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
bis(2-Chloroethyl)ether	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
bis(2-Chloroisopropyl)ether	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
bis(2-Ethylhexyl)phthalate	2.3 J	(9.5)	[0.952380]	0.6 J	(9.5)	[0.952380]	5 J	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
o-Toluidine	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
p-Chloroaniline	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
p-Dimethylaminoazobenzene	ND	(9.5)	[0.952380]	ND	(9.5)	[0.952380]	ND	(9.6)	[0.961538]	ND	(9.5)	[0.952380]
p-Phenylenediamine	ND	(110)	[0.952380]	ND	(110)	[0.952380]	ND	(120)	[0.961538]	ND	(110)	[0.952380]
SW8280 - Dioxins and Furans (ng/L)												
2,3,7,8-TCDD	ND	(1.9)	[0.952380]	ND	(2)	[0.990099]	ND	(1.9)	[0.952380]	ND	(1.9)	[0.952380]
HpCDD	ND	(2.9)	[0.952380]	ND	(3)	[0.990099]	ND	(4.8)	[0.952380]	ND	(2.9)	[0.952380]
HpCDF	ND	(1.9)	[0.952380]	ND	(2)	[0.990099]	ND	(2.9)	[0.952380]	ND	(1.9)	[0.952380]
HxCDD	ND	(1.9)	[0.952380]	ND	(2)	[0.990099]	ND	(2.9)	[0.952380]	ND	(1.9)	[0.952380]
HxCDF	ND	(1.9)	[0.952380]	ND	(2)	[0.990099]	ND	(1.9)	[0.952380]	ND	(1.9)	[0.952380]
OCDD	ND	(4.8)	[0.952380]	ND	(4)	[0.990099]	ND	(6.7)	[0.952380]	ND	(3.8)	[0.952380]
OCDF	ND	(2.9)	[0.952380]	ND	(3)	[0.990099]	ND	(4.8)	[0.952380]	ND	(2.9)	[0.952380]
PeCDD	ND	(1.9)	[0.952380]	ND	(2)	[0.990099]	ND	(2.9)	[0.952380]	ND	(1.9)	[0.952380]
PeCDF	ND	(1.9)	[0.952380]	ND	(2)	[0.990099]	ND	(1.9)	[0.952380]	ND	(1.9)	[0.952380]
TCDD	ND	(1.9)	[0.952380]	ND	(2)	[0.990099]	ND	(1.9)	[0.952380]	ND	(1.9)	[0.952380]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

	SITE ID							
	LOCATION ID							
	SAMPLE ID							
PARAMETER	MW-16 9303-MW-16-01		MW-17 9303-MW-17-01		MW-18 9303-MW-18-01		MWS-09 9303-MWS-09-01	
TCDF	ND	(1.9) [0.952380]	ND	(3) [0.990099]	ND	(1.9) [0.952380]	ND	(1.9) [0.952380]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID LOCATION ID SAMPLE ID MWS-16 9303-MWS-16-01			
SW8080 - Organochlorine Pesticides and PCBs (ug/L)				
4,4'-DDD	ND		(0.0097)	[0.970873]
4,4'-DDE	ND		(0.0097)	[0.970873]
4,4'-DDT	ND		(0.019)	[0.970873]
Aldrin	ND		(0.0097)	[0.970873]
Dieldrin	ND		(0.0097)	[0.970873]
Endosulfan I	ND		(0.0097)	[0.970873]
Endosulfan II	ND		(0.029)	[0.970873]
Endosulfan Sulfate	ND		(0.049)	[0.970873]
Endrin	0.0021	JX	(0.0097)	[0.970873]
Endrin Aldehyde	ND		(0.019)	[0.970873]
Heptachlor	0.0044	JX	(0.0097)	[0.970873]
Heptachlor epoxide	0.0057	JX	(0.0097)	[0.970873]
Isodrin	ND		(0.0097)	[0.970873]
Kepone	ND		(0.0097)	[0.970873]
Methoxychlor	ND		(0.049)	[0.970873]
PCB-1016	ND		(0.097)	[0.970873]
PCB-1221	ND		(0.19)	[0.970873]
PCB-1232	ND		(0.19)	[0.970873]
PCB-1242	ND		(0.097)	[0.970873]
PCB-1248	ND		(0.097)	[0.970873]
PCB-1254	ND		(0.19)	[0.970873]
PCB-1260	ND		(0.19)	[0.970873]
Toxaphene	ND		(0.49)	[0.970873]
alpha-BHC	ND		(0.0097)	[0.970873]
alpha-Chlordane	ND		(0.0097)	[0.970873]
beta-BHC	ND		(0.0097)	[0.970873]
delta-BHC	ND		(0.0097)	[0.970873]
gamma-BHC	ND		(0.0097)	[0.970873]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

	SITE ID			
	LOCATION ID			
	SAMPLE ID			
PARAMETER	MWS-16 9303-MWS-16-01			
gamma-Chlordane	0.0016	JX	(0.0097)	[0.970873]
SW8140 - Organophosphorus Pesticides (ug/L)				
Dimethoate	ND		(0.19)	[0.952380]
Disulfoton	ND		(0.19)	[0.952380]
Ethyl parathion	ND		(0.14)	[0.952380]
Famphur	ND		(0.48)	[0.952380]
Methyl parathion	ND		(0.029)	[0.952380]
Phorate	ND		(0.14)	[0.952380]
Sulfotepp	ND		(0.095)	[0.952380]
Thionazin	ND		(0.95)	[0.952380]
o,o,o-Triethylphosphorthioate	ND		(0.95)	[0.952380]
SW8150 - Chlorinated Herbicides (ug/L)				
2,4,5-T	ND		(0.19)	[0.934579]
2,4,5-TP (Silvex)	ND		(0.16)	[0.934579]
2,4-D	ND		(1.1)	[0.934579]
Dinoseb	ND		(0.14)	[0.934579]
SW8240 - Volatile Organics (ug/L)				
1,1,1,2-Tetrachloroethane	ND		(5)	[1]
1,1,1-Trichloroethane	ND		(5)	[1]
1,1,2,2-Tetrachloroethane	ND		(5)	[1]
1,1,2-Trichloroethane	ND		(5)	[1]
1,1-Dichloroethane	ND		(5)	[1]
1,1-Dichloroethene	ND		(5)	[1]
1,2,3-Trichloropropane	ND		(5)	[1]
1,2-Dibromo-3-chloropropane	ND		(20)	[1]
1,2-Dibromoethane	ND		(5)	[1]
1,2-Dichloroethane	ND		(5)	[1]
1,2-Dichloropropane	ND		(5)	[1]
2-Chloro-1,3-butadiene	ND		(25)	[1]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGODNS AND LAKES INVESTIGATION.

	SITE ID		
	LOCATION ID		
	SAMPLE ID		
PARAMETER	MWS-16 9303-MWS-16-01		
2-Hexanone	ND	(50)	[1]
3-Chloropropene	ND	(5)	[1]
4-Methyl-2-pentanone(MIBK)	ND	(50)	[1]
Acetone	ND	(100)	[1]
Acetonitrile	ND	(100)	[1]
Acrolein	ND	(75)	[1]
Acrylonitrile	ND	(50)	[1]
Benzene	ND	(5)	[1]
Bromodichloromethane	ND	(5)	[1]
Bromomethane	ND	(10)	[1]
Carbon disulfide	ND	(5)	[1]
Carbon tetrachloride	ND	(5)	[1]
Chlorobenzene	ND	(5)	[1]
Chloroethane	ND	(10)	[1]
Chloroform	ND	(5)	[1]
Chloromethane	ND	(10)	[1]
Dibromochloromethane	ND	(5)	[1]
Dibromomethane	ND	(5)	[1]
Dichlorodifluoromethane	ND	(20)	[1]
Ethyl benzene	ND	(5)	[1]
Ethyl methacrylate	ND	(15)	[1]
Iodomethane	ND	(5)	[1]
Methyl ethyl ketone	ND	(100)	[1]
Methyl methacrylate	ND	(10)	[1]
Methylene chloride	ND	(5)	[1]
Propanenitrile	ND	(100)	[1]
Styrene	ND	(5)	[1]
Tetrachloroethene	ND	(5)	[1]
Toluene	ND	(5)	[1]

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NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID LOCATION ID SAMPLE ID MWS-16 9303-MWS-16-01		
Tribromomethane(Bromoform)	ND	(5)	[1]
Trichloroethene	ND	(5)	[1]
Trichlorofluoromethane	ND	(10)	[1]
Vinyl acetate	ND	(5)	[1]
Vinyl chloride	ND	(10)	[1]
Xylenes	ND	(5)	[1]
cis-1,3-Dichloropropene	ND	(5)	[1]
trans-1,2-Dichloroethene	ND	(5)	[1]
trans-1,3-Dichloropropene	ND	(5)	[1]
trans-1,4-Dichloro-2-butene	ND	(10)	[1]
SW8240DI - Volatile Organics, Direct Injection (ug/mL)			
1,4-Dioxane	ND	(10)	[1]
Isobutanol	ND	(10)	[1]
Methacrylonitrile	ND	(10)	[1]
SW8270 - Semivolatile Organics (ug/L)			
1,2,4,5-Tetrachlorobenzene	ND	(9.6)	[0.961538]
1,2,4-Trichlorobenzene	ND	(9.6)	[0.961538]
1,2-Dichlorobenzene	ND	(9.6)	[0.961538]
1,3-Dichlorobenzene	ND	(9.6)	[0.961538]
1,3-Dinitrobenzene	ND	(9.6)	[0.961538]
1,4-Dichlorobenzene	ND	(9.6)	[0.961538]
1,4-Napthoquinone	ND	(9.6)	[0.961538]
1-Naphthylamine	ND	(9.6)	[0.961538]
2,3,4,6-Tetrachlorophenol	ND	(9.6)	[0.961538]
2,4,5-Trichlorophenol	ND	(9.6)	[0.961538]
2,4,6-Trichlorophenol	ND	(9.6)	[0.961538]
2,4-Dichlorophenol	ND	(9.6)	[0.961538]
2,4-Dimethylphenol	ND	(9.6)	[0.961538]
2,4-Dinitrophenol	ND	(19)	[0.961538]

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TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

	SITE ID		
	LOCATION ID		
	SAMPLE ID		
PARAMETER	MWS-16 9303-MWS-16-01		
2,4-Dinitrotoluene	ND	(9.6)	[0.961538]
2,6-Dichlorophenol	ND	(9.6)	[0.961538]
2,6-Dinitrotoluene	ND	(9.6)	[0.961538]
2-Acetylaminofluorene	ND	(9.6)	[0.961538]
2-Chloronaphthalene	ND	(9.6)	[0.961538]
2-Chlorophenol	ND	(9.6)	[0.961538]
2-Methylnaphthalene	ND	(9.6)	[0.961538]
2-Methylphenol(o-cresol)	ND	(9.6)	[0.961538]
2-Naphthylamine	ND	(9.6)	[0.961538]
2-Nitroaniline	ND	(9.6)	[0.961538]
2-Nitrophenol	ND	(9.6)	[0.961538]
2-Picoline	ND	(9.6)	[0.961538]
3,3'-Dichlorobenzidine	ND	(9.6)	[0.961538]
3,3'-Dimethylbenzidine	ND	(19)	[0.961538]
3-Methylcholanthrene	ND	(9.6)	[0.961538]
3-Methylphenol(m-cresol)	ND	(9.6)	[0.961538]
3-Nitroaniline	ND	(19)	[0.961538]
4,6-Dinitro-2-methylphenol	ND	(9.6)	[0.961538]
4-Aminobiphenyl	ND	(9.6)	[0.961538]
4-Bromophenyl phenyl ether	ND	(9.6)	[0.961538]
4-Chloro-3-methylphenol	ND	(9.6)	[0.961538]
4-Chlorophenyl phenyl ether	ND	(9.6)	[0.961538]
4-Methylphenol(p-cresol)	ND	(9.6)	[0.961538]
4-Nitroaniline	ND	(19)	[0.961538]
4-Nitrophenol	ND	(9.6)	[0.961538]
4-Nitroquinoline-N-oxide	ND	(77)	[0.961538]
5-Nitro-o-toluidine	ND	(9.6)	[0.961538]
7,12-Dimethylbenz(a)anthracene	ND	(9.6)	[0.961538]
Acenaphthene	ND	(9.6)	[0.961538]

Compiled: 14 September 1993 () = Reporting Limit [] = Factor ND = Not Detected NA = Not Applicable * - Value considered suspect, Refer to QC Report

NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID LOCATION ID SAMPLE ID MWS-16 9303-MWS-16-01		
Acenaphthylene	ND	(9.6)	[0.961538]
Acetophenone	ND	(9.6)	[0.961538]
Aniline	ND	(9.6)	[0.961538]
Anthracene	ND	(9.6)	[0.961538]
Aramite	ND	(9.6)	[0.961538]
Benzo(a)anthracene	ND	(9.6)	[0.961538]
Benzo(a)pyrene	ND	(9.6)	[0.961538]
Benzo(b)fluoranthene	ND	(9.6)	[0.961538]
Benzo(g,h,i)perylene	ND	(9.6)	[0.961538]
Benzo(k)fluoranthene	ND	(9.6)	[0.961538]
Benzyl alcohol	ND	(9.6)	[0.961538]
Butylbenzylphthalate	ND	(9.6)	[0.961538]
Chlorobenzilate	ND	(9.6)	[0.961538]
Chrysene	ND	(9.6)	[0.961538]
Di-n-octylphthalate	ND	(9.6)	[0.961538]
Diallate	ND	(9.6)	[0.961538]
Dibenz(a,h)anthracene	ND	(9.6)	[0.961538]
Dibenzofuran	ND	(9.6)	[0.961538]
Oibutylphthalate	ND	(9.6)	[0.961538]
Diethylphthalate	ND	(9.6)	[0.961538]
Dimethylphenethylamine	ND	(120)	[0.961538]
Oimethylphthalate	ND	(9.6)	[0.961538]
Diphenylamine	ND	(9.6)	[0.961538]
Ethyl methanesulfonate	ND	(9.6)	[0.961538]
Fluoranthene	ND	(9.6)	[0.961538]
Fluorene	ND	(9.6)	[0.961538]
Hexachlorobenzene	ND	(9.6)	[0.961538]
Hexachlorobutadiene	ND	(9.6)	[0.961538]
Hexachlorocyclopentadiene	ND	(9.6)	[0.961538]

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TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

	SITE ID		
	LOCATION ID		
	SAMPLE ID		
PARAMETER	MWS-16 9303-MWS-16-01		
Hexachloroethane	ND	(9.6)	[0.961538]
Hexachlorophene	ND	(1900)	[0.961538]
Hexachloropropene	ND	(9.6)	[0.961538]
Indeno(1,2,3-cd)pyrene	ND	(9.6)	[0.961538]
Isophorone	ND	(9.6)	[0.961538]
Isosafrole	ND	(9.6)	[0.961538]
Methapyriline	ND	(48)	[0.961538]
Methyl methanesulfonate	ND	(48)	[0.961538]
N-Nitroso-di-n-butylamine	ND	(9.6)	[0.961538]
N-Nitrosodiethylamine	ND	(9.6)	[0.961538]
N-Nitrosodimethylamine	ND	(9.6)	[0.961538]
N-Nitrosodiphenylamine	ND	(9.6)	[0.961538]
N-Nitrosodipropylamine	ND	(9.6)	[0.961538]
N-Nitrosomethylethylamine	ND	(9.6)	[0.961538]
N-Nitrosomorpholine	ND	(19)	[0.961538]
N-Nitrosopiperidine	ND	(9.6)	[0.961538]
N-Nitrosopyrrolidine	ND	(9.6)	[0.961538]
Naphthalene	ND	(9.6)	[0.961538]
Nitrobenzene	ND	(9.6)	[0.961538]
Pentachlorobenzene	ND	(9.6)	[0.961538]
Pentachloroethane	ND	(9.6)	[0.961538]
Pentachloronitrobenzene	ND	(9.6)	[0.961538]
Pentachlorophenol	ND	(9.6)	[0.961538]
Phenacetin	ND	(9.6)	[0.961538]
Phenanthrene	ND	(9.6)	[0.961538]
Phenol	ND	(9.6)	[0.961538]
Pronamide	ND	(9.6)	[0.961538]
Pyrene	ND	(9.6)	[0.961538]
Pyridine	ND	(9.6)	[0.961538]

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TABLE B6 RESULTS OF ORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

	SITE ID		
	LOCATION ID		
	SAMPLE ID		
PARAMETER	MWS-16 9303-MWS-16-01		
Safrole	ND	(9.6)	[0.961538]
Unknown	11	()	[0.961538]
Unknown 2	12	()	[0.961538]
bis(2-Chloroethoxy)methane	ND	(9.6)	[0.961538]
bis(2-Chloroethyl)ether	ND	(9.6)	[0.961538]
bis(2-Chloroisopropyl)ether	ND	(9.6)	[0.961538]
bis(2-Ethylhexyl)phthalate	ND	(9.6)	[0.961538]
o-Toluidine	ND	(9.6)	[0.961538]
p-Chloroaniline	ND	(9.6)	[0.961538]
p-Dimethylaminoazobenzene	ND	(9.6)	[0.961538]
p-Phenylenediamine	ND	(120)	[0.961538]
SW8280 - Dioxins and Furans (ng/L)			
2,3,7,8-TCDD	ND	(1.9)	[0.952380]
HpCDD	ND	(3.8)	[0.952380]
HpCDF	ND	(2.9)	[0.952380]
HxCDD	ND	(2.9)	[0.952380]
HxCDF	ND	(1.9)	[0.952380]
OCDD	ND	(5.7)	[0.952380]
OCDF	ND	(3.8)	[0.952380]
PeCDD	ND	(2.9)	[0.952380]
PeCDF	ND	(1.9)	[0.952380]
TCDD	ND	(1.9)	[0.952380]
TCDF	ND	(1.9)	[0.952380]

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TABLE B6 RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	MW-16 9303-MW-16-01				MW-17 9303-MW-17-01				MW-18 9303-MW-18-01				MWS-09 9303-MWS-09-01			
E130.2 - Hardness (mg/L)																
Hardness, as CaCO3	7300		(250)	[25.00000]	0	@	(10)	[1.000000]	3800		(250)	[25.00000]	4400		(50)	[5]
E160.1 - Residue, Filterable (TDS) (mg/L)																
Total dissolved solids	18000		(10)	[1.000000]	24000		(10)	[1.000000]	15000		(10)	[1.000000]	18000		(10)	[1.000000]
SW6010 - Metals (mg/L)																
Antimony	-0.34	@	(1)	[10]	0.57	@	(1)	[10]	-0.35	@	(1)	[10]	-0.77	@	(1)	[10]
Barium	0.58		(0.01)	[1]	0.28		(0.01)	[1]	0.26		(0.01)	[1]	0.097		(0.01)	[1]
Beryllium	0.0036	@	(0.002)	[1]	0.0021	@	(0.002)	[1]	0.00057	@	(0.002)	[1]	0.0011	@	(0.002)	[1]
Cadmium	0.014	@	(0.005)	[1]	0.019	@	(0.005)	[1]	-0.0035	@	(0.005)	[1]	0.0052	@	(0.005)	[1]
Chromium	0.043	@	(0.01)	[1]	0.0085	@	(0.01)	[1]	0.017	@	(0.01)	[1]	0.0029	@	(0.01)	[1]
Cobalt	0.04	@	(0.01)	[1]	0.0042	@	(0.01)	[1]	0.0029	@	(0.01)	[1]	-0.0012	@	(0.01)	[1]
Copper	0.014	@	(0.02)	[1]	-0.0013	@	(0.02)	[1]	-0.00076		(0.02)	[1]	-0.0067	@	(0.02)	[1]
Nickel	0.012	@	(0.02)	[1]	-0.012	@	(0.02)	[1]	0.00066	@	(0.02)	[1]	-0.0058	@	(0.02)	[1]
Silver	-0.0062	@	(0.01)	[1]	-0.0062	@	(0.01)	[1]	-0.0017	@	(0.01)	[1]	-0.005	@	(0.01)	[1]
Thallium	0.048	@	(0.1)	[1]	0.3	@	(0.1)	[1]	0.22	@	(0.1)	[1]	0.2	@	(0.1)	[1]
Tin	0.055	@	(0.6)	[1]	-0.018	@	(0.6)	[1]	-0.03	@	(0.6)	[1]	0.0052	@	(0.6)	[1]
Vanadium	0.091	@	(0.02)	[1]	0.03	@	(0.02)	[1]	0.021	@	(0.02)	[1]	0.007	@	(0.02)	[1]
Zinc	0.16		(0.02)	[1]	0.057	@	(0.02)	[1]	0.057	@	(0.02)	[1]	0.021	@	(0.02)	[1]
SW7060 - Arsenic (mg/L)																
Arsenic	0.032	@	(0.016)	[4]	-0.0032	@	(0.016)	[4]	0.0024	@	(0.016)	[4]	0.0072	@	(0.016)	[4]
SW7421 - Lead (mg/L)																
Lead	0.014	@	(0.006)	[2]	-0.002	@	(0.006)	[2]	0	@	(0.006)	[2]	-0.006	@	(0.006)	[2]
SW7470 - Mercury (mg/L)																
Mercury	0.00002		(0.00018)	[1]	0	@	(0.00036)	[2]	0.00003		(0.00018)	[1]	0	@	(0.00018)	[1]
SW7740 - Selenium (mg/L)																
Selenium	-0.014	@	(0.01)	[2]	0.013	@	(0.01)	[2]	-0.013	@	(0.01)	[2]	0.017	@	(0.01)	[2]
SW7841 - Thallium (mg/L)																
Thallium	0.0028	@	(0.02)	[4]	0.0014	@	(0.01)	[2]	0.0008	@	(0.02)	[4]	-0.0017	@	(0.005)	[1]
SW9012 - Total Cyanide (mg/L)																

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TABLE B6 RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGODNS AND LAKES INVESTIGATION.

	SITE ID LOCATION ID SAMPLE ID											
PARAMETER	MW-16 9303-MW-16-01				MW-17 9303-MW-17-01				MW-18 9303-MW-18-01				MWS-09 9303-MWS-09-01			
Cyanide	0.0031	@	(0.01)	[1.000000]	0.0048	@	(0.01)	[1.000000]	0.0021	@	(0.01)	[1.000000]	0.0016	@	(0.01)	[1.000000]
SW9030 - Total Sulfide (mg/L)																
Sulfide	0.34	@	(1)	[1.000000]	-0.22	@	(1)	[1.000000]	-0.048	@	(1)	[1.000000]	0.1	@	(1)	[1.000000]

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NOTE: Reported results for sample IDs ending with a 'D' represent dissolved metals concentrations.

TABLE B6 RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

	SITE ID			
	LOCATION ID			
	SAMPLE ID			
PARAMETER	MWS-16 9303-MWS-16-01			
E130.2 - Hardness (mg/L)				
Hardness, as CaC03	12000		(250)	[25.00000]
E160.1 - Residue, Filterable (TDS) (mg/L)				
Total dissolved solids	40000		(10)	[1.000000]
SW6010 - Metals (mg/L)				
Antimony	-0.45	@	(0.1)	[1]
Barium	0.029	@	(0.01)	[1]
Beryllium	-0.00092		(0.002)	[1]
Cadmium	0.011	@	(0.005)	[1]
Chromium	-0.022	@	(0.01)	[1]
Cobalt	-0.0046	@	(0.01)	[1]
Copper	-0.0012	@	(0.02)	[1]
Nickel	-0.0072	@	(0.02)	[1]
Silver	-0.015	@	(0.01)	[1]
Thallium	-0.063	@	(0.1)	[1]
Tin	-0.15	@	(0.6)	[1]
Vanadium	0.011	@	(0.02)	[1]
Zinc	0.01	@	(0.02)	[1]
SW7060 - Arsenic (mg/L)				
Arsenic	-0.019	@	(0.004)	[1]
SW7421 - Lead (mg/L)				
Lead	-0.012	@	(0.012)	[4]
SW7470 - Mercury (mg/L)				
Mercury	0.00001		(0.00018)	[1]
SW7740 - Selenium (mg/L)				
Selenium	-0.015	@	(0.005)	[1]
SW7841 - Thallium (mg/L)				
Thallium	-0.0048	@	(0.02)	[4]
SW9012 - Total Cyanide (mg/L)				

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TABLE B6 RESULTS OF INORGANIC ANALYSES FOR WATER SAMPLES, HOLLOMAN SEWAGE LAGOONS AND LAKES INVESTIGATION.

PARAMETER	SITE ID LOCATION ID SAMPLE ID MWS-16 9303-MWS-16-01			
Cyanide	0.0077	@	(0.01)	[1.000000]
SW9030 - Total Sulfide (mg/L)				
Sulfide	-0.0096	@	(1)	[1.000000]

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