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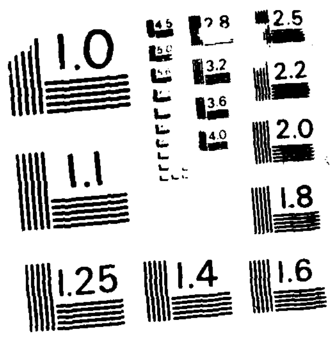

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INSTALLATION RESTORATION PROGRAM
PHASE II--CONFIRMATION/QUANTIFICATION

STAGE 1

Final Report

for

AIR FORCE PLANT 6, COBB COUNTY, GA.

U.S. AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY
Brooks Air Force Base, Tex.

August 1986

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

A Phase II, Stage 1 Installation Restoration Program was conducted for Air Force Plant 6, a Government-owned, contractor-operated facility run by Lockheed-Georgia Co. The objective of this study is to confirm the existence of potential contaminants at former and current disposal and storage sites identified by a Phase I Records Search and by Lockheed-Georgia Co.-sponsored environmental site assessments. Sixteen sites were investigated, including past and current landfills; the industrial waste treatment facility area; trichloroethylene (TCE), sodium dichromate, and fuel gas spill areas; the flightline area, and specific areas of contamination within the industrial facility.

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19. ABSTRACT Continued

Six additional monitoring wells were installed and water quality and soil samples collected and analyzed for various screening parameters, including total organic carbon (TOC), total organic halogens (TOX), oil and grease, pH, and specific conductance. More than 20 reports of past site investigations conducted under Lockheed-Georgia Co. sponsorship have been reviewed and data integrated into this assessment.

INSTALLATION RESTORATION PROGRAM

PHASE II--CONFIRMATION/QUANTIFICATION

Stage 1

AIR FORCE PLANT 6
COBB COUNTY, GA

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This report has been prepared for the United States Air Force by Environmental Science and Engineering, Inc., for the purpose of aiding in the Implementation of the Air Force Installation Restoration Program. It is not an endorsement of any product. The views expressed herein are those of the contractor and do not necessarily reflect the official views of the publishing agency, the United States Air Force, or the Department of Defense.

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LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
Marietta, Georgia

Report On
ENVIRONMENTAL SITE ASSESSMENTS

November 8, 1984

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LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
ENVIRONMENTAL SITE ASSESSMENTS
SUPPLEMENTAL INVESTIGATIONS

SECTION I - EXECUTIVE SUMMARY

On July 23, 1984 Lockheed-Georgia Company authorized The Chester Engineers (Chester) to conduct hydrogeological investigations at three locations identified as having probable groundwater contamination. The three sites are identified as follows:

1. B-58 Wing Test Facility (Industrial Area)
2. B-104 Gas Pump Area (Flight Line)
3. Position 58 Fuel Tank (Flight Line)

Existing monitoring wells at each of these sites had been previously sampled by Chester during the March 1984 reconnaissance investigations of Air Force Plant 6. The objective of the supplemental investigations documented in this report was a determination of the nature and extent of the contaminated groundwater. The emphasis was placed on volatile organic Priority Pollutants.

Groundwater flows radially away from the B-58 facility. Contaminated groundwater potentially is carried off Air Force Plant 6 property in a northeasterly direction under South Cobb Drive. One source of contamination is the historic accumulation of minor spills from solvent drum handling procedures. The possibility of active leakage from within B-58 requires further investigation. Additional investigations are required to further document the extent of contamination. Access off Federal property will be required. Extended pump tests are required to determine the feasibility of pumping as a remedial measure. Long term groundwater monitoring will be required.

The B-104 Gas Pumps are located adjacent to the C-5 Wash Rack ponds. Two small separate areas of contamination are present. The first represents the combined impact of the Wash Rack ponds and unknown historic fuel spillage at two above ground fuel storage tanks. The second area of slight contamination is in the immediate vicinity of the underground gasoline tank at the gas pumps. Since groundwater quality at the gas pumps improved during Chester's study, there may not be any active leakage from the underground tank. Tank pressure testing is recommended. No additional investigations or remedial measures are recommended at this time due to the limited extent of the problem. Groundwater monitoring should be continued in conjunction with the C-5 Wash Rack pond RCRA network.

The Position 58 fuel tank services fueling operations along the Flight Line. There appears to be an active fuel leak at the underground tank. The visible presence of jet fuel is limited but the situation may be deteriorating. In September there was 18 inches of fuel in Well 13 next to the tank. A breakout of fuel seepage into the adjacent stream could occur at any time. A second separate area of more general contamination originates beneath the Flight Line ramp. Immediate remedial actions should include pressure testing the tank and fuel recovery from Well 13. Excavation to locate and repair the leak may be necessary. Additional monitoring wells should be installed along the Flight Line to further define the extent of contamination along the Flight Line ramp. Long term groundwater monitoring is required and groundwater recovery operations may be necessary. Stream quality leaving the area is presently satisfactory and should remain the environmental performance bench mark.

This study provides further documentation that Air Force Plant 6 is a complex industrial site. A comprehensive strategy for groundwater quality management needs to be adopted because the various remedial actions have overlapping program requirements. Fortunately contamination appears to be crossing the property line only at the B-58 Wing Test Facility.

LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
ENVIRONMENTAL SITE ASSESSMENTS
SUPPLEMENTAL INVESTIGATIONS

SECTION VI - SUMMARY OF FINDINGS

A. GENERAL

The present investigation has documented the existence of two additional areas of contaminated groundwater which will require remedial measures. This reinforces the general conclusions stated in the basic report concerning groundwater management requirements. The most important future planning aspect is the need to have an overall management framework which will be able to integrate the various remedial measures. Most projects will have common study elements. For instance, there should only be one study of handling, conveyance, pretreatment, and treatment requirements of water from the sites where groundwater recovery is required. These study elements in turn must phase in with changes required at the Industrial Waste Treatment Plant to affect closure of the B-10 Aeration Basin. As a second example, there should be a single unified study to determine the feasibility of enhanced in-situ biodegradation. There is also the need to coordinate the various sampling programs and to have an information management system capable of handling what will be a rapidly expanding site data base.

B. B-58 WING SEAL FACILITY

The objective of this reconnaissance study was to define the nature and extent of the contaminated groundwater which had been discovered by Chester in MW-7 outside the B-58 Wing Seal facility. Four additional monitoring wells were installed. A fifth well could not be completed due to a bedrock drilling requirement which was not anticipated. The major findings may be summarized as follows:

1. The B-58 facility is situated on a nose of land such that groundwater flows radially away from the site toward the property boundary.

2. Significant solvent contamination exists with 1,1,1-trichloroethane the most significant constituent at concentrations of 10-15 mg/L. This conforms to the major solvent usage at the facility.

3. The present study did not completely define the limits of the contamination at the property line. Additional bedrock wells will be required.

4. Contamination has entered the weathered bedrock. The water table appears to seasonally recede into the weathered bedrock zone.

5. It is highly likely that contaminated groundwater has crossed the Air Force Plant 6 property boundary in a northeasterly direction under South Cobb Drive.

6. There may be two sources of contamination. There have almost certainly been historic leaks and spills from the solvent drum handling operations. The possibility of an active leakage source from within the B-58 building requires further investigation.

7. Remedial groundwater measures will be required. Groundwater pumping should be utilized to recover the most significantly contaminated water at least

on a trial basis. In addition, the opportunities for in-situ biodegradation should be evaluated.

8. Additional investigations will be required to further define the causes and extent of the contamination. Off-site property access will likely be necessary.

The requirement for long-term remedial measures will depend upon the extent of off-site contamination. That portion of the contaminant plume which is remaining within the Stormwater Detention Basin No. 2 watershed and not moving off-site is a lower priority environmental concern.

C. B-104 GAS PUMP AREA

The investigation of the B-104 Gas Pump area was triggered by the discovery of contamination during the study of the adjacent C-5 Wash Rack ponds. Potential sources include the underground tank at the gas pumps and the two above ground tanks located by the ponds. Five additional monitoring wells were installed to further assess the extent of contamination in the area. The major findings are as follows:

1. Groundwater flows in a north to northeast direction with probable discharge into the main stream draining the Flight Line area. No volatile Priority Pollutants have been found in this stream as it exits Air Force Plant 6.

2. Moderate contamination is confirmed at MW-32. This well may be impacted both by seepage from the Wash Rack ponds and indeterminate historic spillage at the two storage tanks.

3. Contaminant levels at the Gas Pumps dropped significantly during the study. There is no indication of major leakage from the underground gasoline tank. Some low level solvent sources may also be present.

4. A strong smell of jet fuel was present in the groundwater at the Engine Test Stand facility. No volatile organic Priority Pollutants were detected. There is no visual evidence of fuel in the water.

5. The area of groundwater contaminated with volatile organic Priority Pollutants appears to be limited.

6. The underground storage tanks should be pressure tested for evidence of leakage.

7. It does not appear that any remedial measures other than closure of the Wash Rack ponds are warranted at this time.

8. Continued groundwater monitoring should take place in conjunction with the monitoring of the Wash Rack pond RCRA well network. No further investigations are necessary unless there is a further deterioration of groundwater quality which would indicate the presence of active contaminant mechanisms.

D. POSITION 58 FUEL TANK

The underground jet fuel storage tank at Flight Line Position 58 is a major element in the fueling-defueling operations which occur along the Flight Line. The present investigation was triggered by Chester's observation of fuel in MW-13 adjacent to the tank. Fuel had not been previously observed in this well. Four additional monitoring wells were installed to further define the nature and extent of the problem. The major findings are summarized as follows:

1. There is significant active leakage from the tank or immediately adjacent underground fuel lines. The amount of fuel in the groundwater at MW-13 appeared to increase during the course of Chester's study. There was 18± inches of floating fuel in MW-13 at the time of Chester's last inspection on September 11, 1984.

2. Visible fuel contamination is limited to the immediate area of the tank. There is the definite possibility of a fuel breakout into the stream drainage way located next to the tank.

3. The upgradient well (MW-48) along the patrol road has no visible fuel or chemical odor but exhibits significant concentrations of fuel related parameters. The conclusion is that there are/have been indeterminate fuel leaks or spillages in the fuel handling system in the ramp area.

4. The stream should act as a groundwater discharge point. Stream quality is good with only traces of volatile organics being present.

5. The situation at Position 58 should be treated as an active on-going spill unless proven otherwise. Additional investigations and remedial actions should be accorded the highest environmental priority due to the possibility of fuel seepage into the stream.

6. The underground tank should be pressure tested to determine if it is leaking. Excavation to determine the nature of the leakage may be required.

7. Immediate groundwater recovery measures should be implemented at MW-13 at least on a test basis to determine the amount of fuel which may be recoverable. Groundwater pumping could control the situation if the source cannot be firmly identified or repairs affected immediately.

8. The contamination discovered in MW-48 will represent a longer term groundwater management problem. Additional monitoring wells should be drilled along the patrol road to determine the lateral extent of contamination. The placement of wells on the ramp area is not recommended at this time pending further consideration of the situation.

9. The definition of remedial measures will depend upon the results of further investigations defining the extent of the contamination. The nearest industrial sewer is at the API behind Position 61. The suitability of this sewer (which presently discharges to the C-5 Wash Rack pond headworks) for groundwater recovery operations should be evaluated as part of the recommended overall study

of the capacity of the wastewater handling system to accept a groundwater quality control mission.

10. Long term continued monitoring of groundwater conditions will be required. The final assessment of environmental performance should be stream quality as it crosses the Air Force Plant 6 property line into Dobbins Air Force Base.

E. SUMMARY ASSESSMENT

This study has provided further evidence that Air Force Plant 6 is a complex industrial site where groundwater quality management must be approached in a coordinated manner. The implementation of remedial measures should reflect both regulatory requirements and environmental priorities. Environmental priority should go to situations where there is actual or potential imminent danger. The high danger of fuel seepage into the stream at Position 58 and the possibility of significant contaminant transport off site at the B-58 Wing Seal facility should be considered environmental priorities.

to further define the extent of contamination along the Flight Line ramp. Long term groundwater monitoring is required and groundwater recovery operations may be necessary. Stream quality leaving the area is presently satisfactory and should remain the environmental performance bench mark.

This study provides further documentation that Air Force Plant 6 is a complex industrial site. A comprehensive strategy for groundwater quality management needs to be adopted because the various remedial actions have overlapping program requirements. Fortunately contamination appears to be crossing the property line only at the B-58 Wing Test Facility.

1.1.2 ENVIRONMENTAL SITE ASSESSMENTS SUPPLEMENTAL INVESTIGATIONS

LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
Marietta, Georgia

Report on
ENVIRONMENTAL SITE ASSESSMENTS
SUPPLEMENTAL INVESTIGATIONS

8 NOVEMBER 1984

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LOCKHEED - GEORGIA COMPANY
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ENVIRONMENTAL SITE ASSESSMENTS

SECTION I - EXECUTIVE SUMMARY

On February 27, 1984 Lockheed-Georgia Company authorized The Chester Engineers (Chester) to initiate a series of environmental investigations at three sites considered to have potential groundwater contamination problems. The three sites are identified as follows:

1. Trichloroethylene (TCE) spill at Building 76 (Industrial Area)
2. C-5 Wash Rack ponds (Flight Line area)
3. Position 19 (Flight Line area)

The investigation of the TCE spill was scoped as a reconnaissance investigation of the entire Stormwater Detention Basin No. 2 drainage area. Groundwater flows to the axis of the valley following the topography. Groundwater in the immediate vicinity of the spill is contaminated (TCE >300 mg/L) but limited in areal extent. A broad zone of lesser contamination extends beneath the active landfill. Additional contaminant sources from current and historic maintenance areas appear to be present. The active landfill does not appear to be a significant contaminant source. Groundwater quality downgradient of the landfill is good with only minor concentrations of volatile organics. Groundwater recovery and treatment is recommended for the immediate spill area. Some additional investigation and continued monitoring is recommended. No other major remedial actions are recommended at this time.

The C-5 Wash Rack ponds were studied to determine whether the facility should be a RCRA regulated unit. Sampling of the pond water, sediments and soils indicated high concentrations of organics, chiefly methylene chloride. A monitoring well system revealed the downgradient presence of organics other than those found in the Wash Rack ponds. The adjacent gasoline storage tank area is a potential contaminant source. The Wash Rack ponds should be closed in accordance with RCRA requirements. No other remedial measures are recommended at this time pending continuing monitoring information.

The study at Position 19 was designed to determine the extent of jet fuel contamination at two underground storage tanks. Additional monitoring wells indicated that the presence of jet fuel is limited to the immediate tank area and that the groundwater discharges directly into the adjacent drainage way. Some fuel seepage is present at the stream bank but is not degrading the stream. Evidence of solvent contamination was also discovered. This could result from either historic usage or a leaking industrial sewer. This site is considered to be a low level environmental priority. Recommended remedial measures include tank testing, fuel recovery, and continued monitoring to determine the source of the solvents.

One of the most significant project findings is the need to coordinate all groundwater remedial activities. It may be possible to place some contaminated soil and sediments into the waste disposal basin prior to its final closure. The operations of the Industrial Waste Treatment plant need to be reviewed as to its capacity to accept groundwater from various remedial action areas. This assessment should include conveyance requirements.

This project has concluded that Air Force Plant 6 is a complex industrial site with a wide variety of groundwater problems. All problems may not yet have been discovered. While there are many areas of contaminated groundwater. There does not appear to be any offsite impact at the conclusions of this phase of investigation. The presently planned groundwater projects should lead to significant long term improvements in groundwater quality.

LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
ENVIRONMENTAL SITE ASSESSMENTS

SECTION VII - SUMMARY OF FINDINGS

A. GENERAL

One of the objectives of this project was the development of a comprehensive overview of the groundwater quality management problem at Air Force Plant 6. The following general conclusions have been developed during the course of this investigation.

1. Air Force Plant 6 is a complex industrial site with many overlapping groundwater quality concerns. The historic wide variety of open air maintenance activities and the numerous fuel and solvent handling operations have created a situation where some measure of impaired groundwater quality is presently documented or could be found in most areas of the Air Force Plant 6/Dobbins complex.

2. There does not appear to be any known condition which is creating offsite contamination.

3. While all groundwater contamination represents an unacceptable condition, not all situations represent equal threats to the environment or to groundwater use. Environmental action priority must be established and those situations causing the greatest threat pursued first.

4. The remedial action program must be coordinated with the overall operation of the water and solid waste treatment programs. This will require consideration of both conveyance systems and the ability of the B-10 treatment plant to accept raw wastewater from the C-5 Wash Rack and solvent contaminated groundwater. Some temporary treatment procedures or facilities may be required.

5. It presently appears that an in-place closure of the industrial waste sludge disposal basin should be environmentally acceptable. There does not

appear to be any technical reason why some of the contaminated soil and C-5 Wash Rack pond sediments could not be placed into the disposal basin as part of the closure operation.

6. The number of groundwater monitoring points will continue to increase with impending Groundwater Quality Assessment Plans at the B-10 Aeration Basin and TCE spill area. The sampling schedules for all continuing monitoring purposes should be coordinated. Thus, for example, all quarterly samples should be taken at the same time. This will facilitate basewide comparisons of conditions.

7. The large number of sample points will create an information management problem. A Data Base Management System should be established for the various ground and surface water sampling points. This should include a uniform monitoring well identification code which eliminates present duplicate designations.

B. TRICHLOROETHYLENE SPILL AREA Site G9

The investigation of the trichloroethylene spill was scoped so as to provide a reconnaissance survey of the entire Stormwater Detention Basin 2 drainage area. Chester has documented the existence of numerous containment sources or apparent sources all of which appear to have overlapping impact areas. The entire Basin No. 2 drainage basin should be investigated and managed as a single environmental unit. The major project findings include the following: Site G5

1. Basin No. 2 appears to be a closed basin with the major axis of groundwater flow in a northeasterly direction down the center of the valley. Groundwater flow from the basin perimeter flows to the valley axis. Site G-2

2. Significant TCE contamination (>100 mg/L) is limited to the immediate area of the spill. Site G9

3. The TCE plume follows the major axis of groundwater flow down the valley.

4. Only minor amounts of organic contaminants are crossing the Air Force Plant 6 property line at Basin No. 2.

5. Contaminated infiltration into the storm sewer is a long term problem. Present planning should consider the aeration of Basin No. 2 a permanent requirement.

6. The active landfill does not appear to be a significant source of either organic or inorganic contamination. Some additional documentation is required.

7. Other presently indeterminate sources of organic contamination may be present. These include historic and present maintenance operations and chemical storage areas.

8. Only minor soil contamination is present in the empty drum area at the B-96 slosh test building.

9. The Groundwater Quality Assessment Plan should include a pilot test of the recovery of contaminated groundwater at the TCE spill site.

C. C-5 WASH RACK PONDS Site 67

The investigation at the C-5 Wash Rack ponds provided for an extensive documentation of the wastes present in the ponds and an assessment of potential groundwater quality contamination. The following conclusions have been established.

1. The ponds could possibly represent a future environmental hazard due to the presence of high concentrations of organics in the pond waters and sediments.

2. Groundwater flows to the north discharging to the easterly flowing stream which is the main drain for the Flight Line area.

3. The ponds appear to have a minimal impact on groundwater quality.

4. The area downgradient of the ponds does exhibit organic contamination but may not be related to the ponds. The gasoline storage tank area adjacent to the ponds may be an environmental factor.

5. The four wells around the perimeter of the ponds may be used for RCRA monitoring purposes.

6. The C-5 Wash Rack ponds should be closed as soon as possible according to RCRA procedures.

D. POSITION 19

Flight Line Position 19 was investigated to determine probable sources and environmental impacts of jet fuel observed in the groundwater. Significant project findings are as follow:

1. Groundwater in the vicinity of Position 19 discharges into the drainage ditch.

2. The area impacted by the jet fuel is restricted to the immediate vicinity of the two underground tanks.

3. Solvents were found in the groundwater in wells not affected by the jet fuel. A separate solvent source is indicated.

4. Solvent usage in this area has not been determined. Leakage from the industrial waste sewer is a possibility.

5. The fuel tanks should be pressure tested for evidence of leakage.

6. Fuel recovery should be attempted to limit seepage into the stream.

7. If either the fuel tanks or the industrial waste sewer are shown to be leaking, corrective measures might entail severe disruption of Position 19 operations. A modest fuel recovery program should

provide an adequate level of environmental protection unless the rate of leakage increases.

8. Continued monitoring is required.

9. The Position 19 situation is a low level priority in comparison to other groundwater problems.

E. SUMMARY ASSESSMENT

Groundwater quality management at Air Force Plant 6 will be as complex as the varied industrial activities which have occurred on the facility. Chester's present study and the Assessment Plan at the Industrial Waste Disposal Basin have each provided evidence of additional previously unknown groundwater problems. This is not unexpected considering the nature of the facility. Other old or newly developed problems will almost certainly be documented in the future.

The contamination at individual sites extends across a broad range of concentrations. Fortunately, there appear to be only minor amounts of contaminants leaving the Federal property and no known or anticipated groundwater use has been affected. The ongoing programs of continuing investigation and recommended remedial actions should be adequate to protect and restore the environment. The programs should be managed in a comprehensive and timely fashion to permit proper consideration of wastewater, groundwater recovery, and solid waste handling requirements. The cost-effectiveness of remedial action programs must be balanced against actual environmental threats.

1.1.3 TECHNICAL REVIEW OF INSTALLATION RESTORATION PROGRAM PHASE II WORK PLAN

LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
Marietta, Georgia

Report on
TECHNICAL REVIEW OF
INSTALLATION RESTORATION PROGRAM
PHASE II WORK PLAN

NOVEMBER 16, 1984

Prepared By: S. G. McGuire

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MARIETTA, GEORGIA

TECHNICAL REVIEW OF
INSTALLATION RESTORATION PROGRAM
PHASE II WORK PLAN

A. INTRODUCTION

The Air Force Installation Restoration Program (IRP) was initiated with the objective of identifying locations where historic waste disposal practices or spills may have created adverse environmental conditions. At Air Force Plant 6 Phase I of the IRP was completed by CH2M-Hill. Twelve potential locations of contaminated groundwater were identified. These are listed in Table 1 and located on Figure 1. The work plan for Phase II of the IRP has been prepared by Environmental Science and Engineers and is currently undergoing agency review. Lockheed provided Chester with the June 14, 1984 version of the Phase II work plan and requested that Chester review that document as Lockheed-Georgia's hydrogeological consultant.

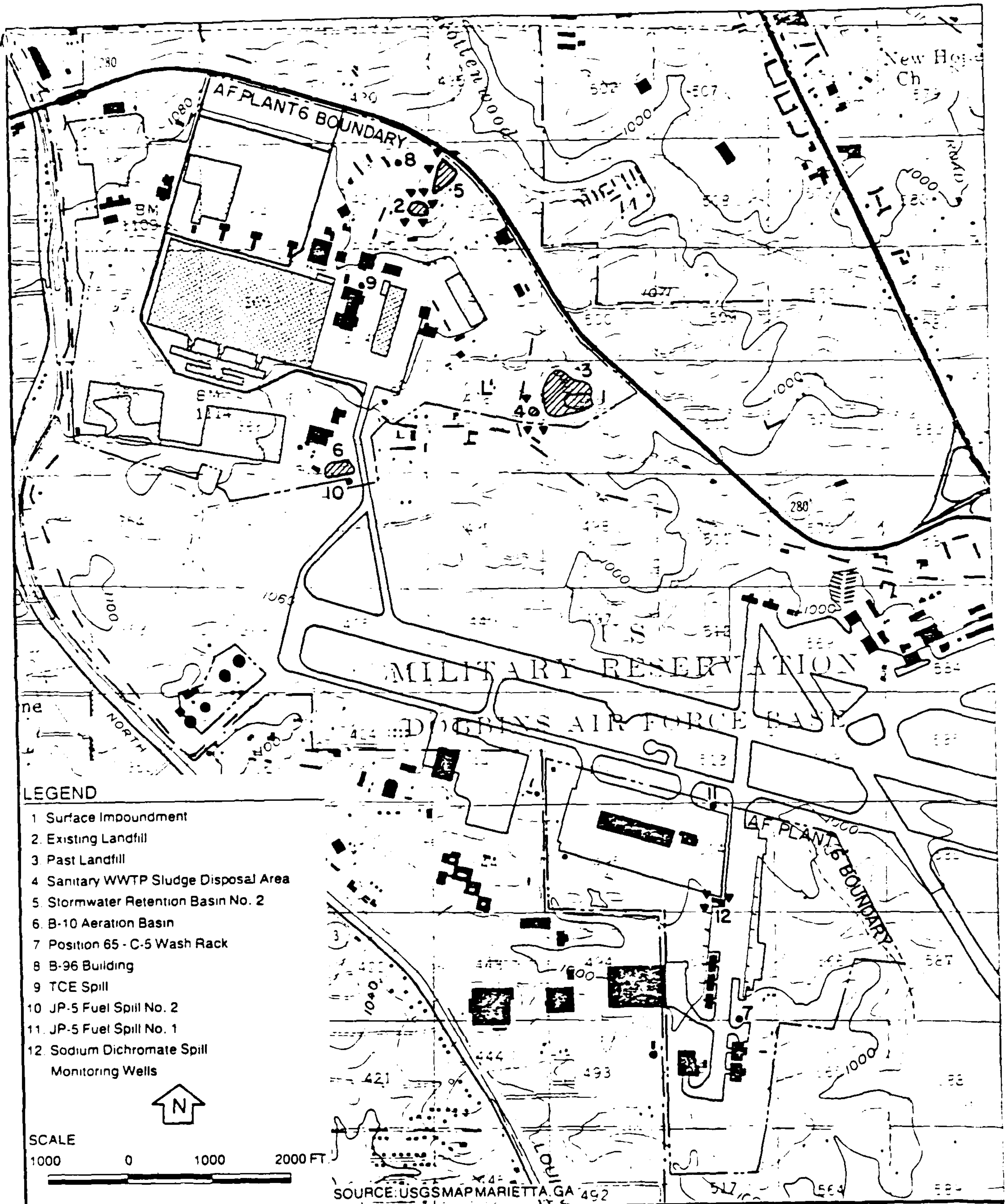
Within the last year Chester has undertaken a series of investigations for Lockheed at a number of the IRP sites. Chester's studies have represented an initiative by Lockheed to accelerate the IRP process to meet and anticipate regulatory requirements. Chester has been involved at the following IRP sites.

<u>Site 1 - Industrial Waste Disposal Basin</u>. Chester prepared the RCRA Groundwater Quality Assessment Plan, has monitored its implementation by Wilson and Company, and is responsible for recommending final closure measures.

TABLE 1

INSTALLATION RESTORATION PROGRAM
STUDY LOCATIONS

1. Industrial Waste Sludge Disposal Basin
2. Existing Landfill
3. Oil Landfill
4. Sanitary WWTP Sludge Disposal Area
5. Stormwater Retention Basin No. 2
6. B-10 Aeration Basin
7. Position 65 - C-5 Wash Rack Ponds
8. B-96 Slosh Test Building
9. Trichloroethylene Spill
10. JP-5 Fuel Spill No. 2
11. JP-5 Fuel Spill No. 1
12. Sodium Dichromate Spill



TheChesterEngineers		SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6
DWN.BY:	SCALE:	DATE	DWG. NO.	
CHK'D.BY:	APPR.BY:		FIGURE 1	INSTALLATION RESTORATION PROGRAM TENATIVE WELL LOCATIONS

Site 2 - Existing Landfill. The Landfill is within the area studied by Chester as part of the IRP Site 9 Trichloroethylene Spill.

Site 3 - Past Landfill. Chester has reviewed the status of this site because of the overlap with the Industrial Waste Disposal Basin study area.

Site 4 - Sanitary WWTP Sludge Disposal Area. Chester has provided laboratory analyses of sludge samples and has reviewed the information generated on this site as a tangential investigation of the Waste Disposal Basin.

Site 5 - Stormwater Retention Basin No. 2. Chester has investigated this site as part of the IRP Site 9 Trichloroethylene Spill.

Site 6 - B-10 Aeration Basin. Chester has performed the RCRA groundwater monitoring and is currently preparing a RCRA Groundwater Quality Assessment Plan for this facility.

Site 7 - C-5 Wash Rack Basin. Chester has completed an environmental assessment of this site in a report dated November 8, 1984.

Site 8 - B-96 Building. Chester has partially investigated soil conditions in this area.

Site 9 - Trichloroethylene Spill. Chester has completed an environmental assessment of this site in a report dated November 8, 1984.

Site 10 - JP-5 Fuel Spill No. 2. Chester has performed limited sampling on wells in this area as part of the B-10 Aeration Basin studies.

Chester has not been requested to consider IRP sites 11 and 12 and has no operating knowledge of environmental conditions in those areas. The remaining sections of this report comment on the proposed IRP Phase II activities in light of Chester's recent investigations.

B. SITE 1 - INDUSTRIAL WASTE DISPOSAL BASIN

The Groundwater Quality Assessment Program implemented by Wilson and Company appears to have satisfactorily determined the horizontal and vertical extent of contamination. Quality problems are related to the presence of common inorganic salts and organic solvents. Toxic heavy metals are not a significant factor in the groundwater.

The Phase II work program proposes a Geonics EM-31 Terrain Conductivity Survey and vertical electrical resistivity soundings. An electrical resistivity survey has already been performed on this site. Additional field investigations are not required as they would be redundant to that already executed.

C. SITE 2 - EXISTING LANDFILL

As part of Chester's study of the TCE spill one shallow well (MW-29) was placed in a downgradient position from the active landfill. Conductivity is at background levels. Some organic contamination is present but the impact of the landfill is obscured by the many other possible organic contaminant sources identified by Chester as being present in upgradient areas. Chester has recommended that the entire Stormwater Basin No. 2 watershed be considered a single integrated study unit.

The IRP [redacted] The two upgradient locations shown in the work plan might be located within the fill material. Operations in the area obscure the actual upgradient extent of landfill material. Two somewhat further upgradient wells are already present, i.e., MW-5 and MW-27. Both of these wells have organic contamination. Upgradient conditions from the landfill are therefore reasonably defined within the shallow aquifer. The one downgradient well installed by Chester is not sufficient to firmly identify downgradient conditions.

The site information developed by Chester suggests that the active landfill is not a significant source or organic or inorganic contamination especially considering the surrounding environmental factors. Chester has recommended additional monitoring of the landfill as part of the Georgia EPD required Groundwater Quality Assessment Plan triggered by the trichloroethylene spill. The components of that study which would further define landfill conditions are [redacted]

D. SITE 3 - PAST LANDFILL

The past landfill has been extensively studied as part of the Waste Disposal Basin study. Chester does not believe that any further field investigations are required in this area. The IRP work plan calls for an EM-31 Terrain Conductivity Survey.

E. SITE 4 - SANITARY WWTP SLUDGE DISPOSAL AREA

The IRP work plan calls for an EM-31 survey and four shallow monitoring wells. The Wilson Waste Disposal Basin study was forced to investigate the sanitary sludge landfill area because of its interactions with the waste basin contaminant plume. Resistivity profiles were run along the perimeter of the site. Monitoring wells D-3, E-5, and E-6 were drilled at the locations presently being recommended by the IRP. Extensive analyses have indicated the presence of some organic contamination.

[redacted] Chester recommends that no further work at this site be performed until Georgia EPD has had an opportunity to review the existing information. This site appears to be a relatively low level environmental priority.

F. SITE 5 - STORMWATER RETENTION BASIN NO. 2

The IRP program calls for the placement of three monitoring wells around the basin. Two would be downgradient and one would be a lateral influent position from the B-96 area. Chester placed MW-30 through the basin dike to monitor groundwater as it exits Air Force Plant 6 property. Relatively minor traces of organic contaminants are present and the basin sediments do not appear to be a reservoir of contaminants. Basin water quality is determined by the storm sewer quality. [redacted]

G. SITE 6 - B-10 AERATION BASIN

The IRP does not recommend any additional field studies since the B-10 basin is under active study by Lockheed. At Lockheed direction, Chester is presently preparing a Groundwater Quality Assessment Plan for this area.

H. SITE 7 - C-5 WASH RACK PONDS

Chester has completed an extensive study of the C-5 Wash Rack Ponds and the downgradient area. Pond closure is required and Georgia EPD has indicated that a further RCRA Assessment Plan will be required. The IRP work program calls for a review of current study information.

I. SITE 8 - B-96 SLOSH TEST BUILDING

The IRP work plan calls for a review of current study information. Chester has performed a limited amount of soil sampling in the empty drum storage area. Minor soil contamination is present. Chester has not recommended further study of the area because of its relative unimportance. Chester has [redacted]

J. SITE 9 - TRICHLOROETHYLENE SPILL

Chester has completed an initial study of this area and determined that it is only a part of a very complex groundwater management situation that is present in the Basin 2 watershed. Chester has determined that TCE is present in concentrations greater than 100 mg/L beneath the spill area [redacted] Chester has prepared an outline for this plan. The proposed work program includes shallow and bedrock monitoring wells, field analysis of soils using photoionization or organic vapor analysis to be followed by laboratory GC/MS analyses of selected samples, and test recovery of highly contaminated groundwater. The location of contaminated soil will require test drilling since the entire area is either asphalt or concrete.

The IRP work plan for an OVA soil survey does not mention any test boring requirements.

K. SITE 10 - JP-4 FUEL SPILL NO. 2

The spill area is located just south of the B-10 Aeration Basin. Chester's work to date has indicated that the contaminated plume from the B-10 basin moves under part of the fuel spill area. The IRP work plan calls for an OVA soil survey but no test borings.

The RCRA Assessment Plan presently being prepared by Chester for the B-10 Basin necessarily includes consideration of the existing wells in the fuel spill area. The existing wells would be sampled for volatile organic Priority Pollutants with the scan extended to include fuel related volatiles. If fuel components are found in the fuel farm wells and are not traceable back to the B-10 Basin then further soil borings and laboratory analyses are indicated. If fuel components are not found in the groundwater, this would indicate that the fuel has successfully been held in place, possibly degraded, an not an apparent environmental factor. The B-10 Aeration Basin study will, therefore, provide adequate consideration of this fuel spill area.

L. SITE 11 - JP-5 FUEL SPILL NO. 1

Chester is not familiar with the details of this situation but the IRP proposal to collect a composite surface soil sample seems reasonable. Due to the possible wide spread occurrence of solvent contamination along the Flight Line area, the soil sample should also be analyzed for volatile Priority Pollutants. Chester also recommends the placement of a shallow monitoring well with analyses for volatile Priority Pollutants. This well would be useful in the overall evaluation of Flight Line conditions.

M. SITE 12 - SODIUM DICHROMATE SPILL

Chester has not performed any investigations in this area. The IRP investigation program appears to be reasonable, but Chester recommends several additions to the program as follows:

1. Stream water samples should be collected at the same points as the stream sediment samples.

2. Leachable chromium in the sediments should also be determined using the ASTM Method "A" water leachate method.

3. The monitoring wells should be analyzed for volatile organic Priority Pollutants. This would help extend knowledge of overall conditions along the Flight Line area.

N. GENERAL COMMENTS

The overall IRP approach to Air Force Plant 6 should be updated to account for the information presented by Chester in our November 8, 1984 report and Georgia EPD regulatory requirements. Particular attention is drawn to the fact that the most significant environmental concerns are related to organic solvents, not toxic metals. In this respect, the total organic halogen (TOX) test has not proven to be particularly useful as a screening mechanism. Chester believes that given our current knowledge about Air Force Plant 6 it is much more pragmatic to go directly to a GC/MS volatile scan rather than use the TOX test. At best, the TOX results will likely be ambiguous enough that confirmation testing will be required. The delay and cost of resampling would likely be more costly and certainly less efficient than running the GC/MS analysis in the first place.

1.1.4 GROUND WATER QUALITY ASSESSMENT PLAN INDUSTRIAL WASTE TREATMENT FACILITY B-10 AERATION BASIN

LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
Marietta, GA

Report on
GROUNDWATER QUALITY ASSESSMENT PLAN
INDUSTRIAL WASTE TREATMENT FACILITY
B-10 AERATION BASIN

NOVEMBER 30, 1984

	Steve
Prepared by:	S. G. McGuire, Hydrologist
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LOCKHEED-GEORGIA COMPANY
AIR FORCE PLANT 6
B-10 AERATION BASIN
GROUNDWATER QUALITY ASSESSMENT PLAN

SECTION I - EXECUTIVE SUMMARY

This Groundwater Quality Assessment Plan has been prepared in accordance with the requirements of Chapter 391-3-11-10 of the Georgia Rules for Hazardous Waste Management which adopt and incorporate by reference 40 CFR Part 265.93(d)(3) Interim Status of groundwater quality monitoring regulations. The initial quarterly samples obtained on April 23, 1984 and verified by samples obtained on June 6 and August 10, 1984, indicated significant differences between the upgradient and downgradient monitoring wells at the Industrial Waste Treatment Facility B-10 Aeration Basin.

The Georgia Environmental Protection Department (EPD) was informed of the finding of groundwater contamination at an Environmental Briefing held on September 10, 1984. Lockheed subsequently requested permission from EPD to implement a groundwater quality assessment program at this facility. By letter dated October 3, 1984 EPD encouraged Lockheed to pursue early implementation of an assessment program. This document represents the work plan for an assessment program.

The assessment program must be capable of determining:

1. Whether hazardous waste or hazardous waste constituents have entered the groundwater,

2. The rate and extent of migration of hazardous waste or hazardous waste constituents in the groundwater, and

3. The concentrations of the hazardous waste or hazardous waste constituents in the groundwater.

The work plan presented in this document is broken down into five investigative phases comprising 18 separate task elements. Many of the task elements represent concurrent investigations.

The detailed investigative elements outlined in this document should not be taken as a definitive scope. The plan execution should have some degree of flexibility so as to be able to respond to the development of site information. Groundwater investigations inherently involve an iterative process of forming a conceptual model of site hydrogeologic mechanisms, projecting expected conditions at various points, and then confirming those expectations. Within this framework, it is extremely important that all interested parties to this study be kept informed as to study progress and findings. This is required to permit the timely implementation of any necessary modifications to this plan.

LOCKHEED-GEORGIA COMPANY
A DIVISION OF LOCKHEED CORPORATION
MARIETTA, GEORGIA

Report for
SOLID WASTE MANAGEMENT

AIR FORCE PLANT NO. 6
Marietta, Georgia

REGISTER NO. B5454
APPENDIX "A" NO. 478
AIR FORCE MAJOR PROJECT NO. 1-83-04
FACILITIES CONTRACT F33657-81-E-2185

MARCH 26, 1984
REVISED MAY 4, 1984

PREPARATION APPROVAL BY: ______________________ DATE 4 MAY 1984
The Chester Engineers, Inc.

RECOMMENDED FOR APPROVAL BY: ______________________ DATE ________
Lockheed Chief Facilities Engineer

RECOMMENDED FOR APPROVAL BY: ______________________ DATE ________
Lockheed Director of Safety Assurance

APPROVED BY: ______________________ DATE ________
Air Force Supervisory Engineer

APPROVED BY: ______________________ DATE ________
Air Force Facilities Contracting Officer

FINAL

VIII CONCLUSION AND RECOMMENDATION

A. Conclusion

Our investigations based on plant operating data, our analyses, treatability studies and cost analyses demonstrate the following:

1. Each of the two existing vacuum filtration system is sized to produce 17,500 pounds per day of cake containing 15 percent solid.

2. The proposed filter press would produce a drier cake (40% solid). The system is sized to produce two batches per day, five days per week and fifty-two weeks per year, and will generate about 145 cubic feet of sludge per day. The cost of the dewatering facility, including the building modifications, is estimated at $369,000.

3. It will cost approximately $80 per cubic yard to dispose of the filter press sludge in an on-site secure landfill. The landfill facility is sized for a disposal capacity of 28,000 cubic yard, which will be adequate to handle industrial waste treatment plant sludge for 20 years. The cost includes an estimate of operating manpower and is presented in 1983 dollars.

4. It will cost abour $120 per cubic yard to dispose of the filter press sludges in an off-site secure landfill. The estimate includes the cost of disposal, transportation and handling at the Lockheed Plant.

5. Lockheed disposes of the paint booth sludge as a hazardous waste off-site in a landfill. The sludge can be chemically treated to render it nonhazardous, but the overall process was found to be uneconomical.

6. Incineration of the paint booth sludge would be a preferred method of disposal. Based on our past experience with similar wastes, incineration of the paint booth sludge would be technically feasible. The cost for off-site incineration is estimated at $66.36 per 35 gallon drum.

7. Some 11% of the purchased solvent are resold as spent solvents. A prepackaged, completely automated solvent recovery system rated at 110 gallons per day would cost about $18,000 and will recover at least 85% of the spent solvents presently sold for reclamation. Further testing and field investigations to determine which of the waste (solvents) can be profitably recovered must be made. These investigations would also help in finding increased volume and type of solvents which can be recovered and improve the pay back period for the on-site solvent recovery system.

8. A 125,000 gallon fuel oil storage facility will enable the plant to burn all of the waste aviation fuel in the Flight Line boilers. The facility will cost $181,900 and save $57,700 per year in fuel cost.

9. If acceptable to the regulatory agencies, capping of the existing surface impoundment by installing an impervious liner would be the most cost effective means to close the facility. The capping will minimize the surface run-on and precipitation from entering the impoundment, reduce the quantity of leachate from the impoundment, and thereby minimize the potential contamination of the groundwater. The estimated cost for capping the impoundment is $171,000. In addition, $66,650 will be required for engineering and construction management of the capping operation.

10. The next feasible option to close the surface impoundment would be to physically stabilize the sludge. Before a final recommendation is made, however, the cementation process must be further investigated. This would entail leachate analyses of the stabilized sludge as well as a more thorough charcterization of the sludge itself. An order of magnitude cost estimate shows, the cost of stabilizing the sludge with on-site disposal would be $2,091,000. A cost of $94,500 for engineering and construction management will be required for the implementation of this option.

11. The last option to close the impoundment would be to dispose of the material in a secure landfill. The cost for hauling, off-site secure landfilling and restoration of the impoundment is estimated at $3,540,000. This option would require an additional expenditure of $38,000 for engineering and supervising the sludge removal activity.

B. Recommendation

1. The existing vacuum filtration system should be replaced with a filter press dewatering facility. The vacuum filters may be maintained to provide back-up for the filter press.

2. On-site land disposal of the currently generated wastewater treatment plant sludge is slightly less than off-site disposal. However, over the long run it will be more advantageous for the plant to dispose the waste off-site.

3. Continue to dispose of the paint booth sludge off-site, but contract an incineration company rather than landfill company for its disposal. This will reduce the long range liability.

4. Install 125,000 gallon waste aviation fuel tank to enable to burn the waste fuel on-site.

5. Implement the hazardous waste drum handling procedures so that the waste drums are moved off the site in less than 90 days.

6. Upgrade the B-32 drum storage site so that it can handle the hazardous waste drums without any adverse environmental impacts.

7. Install a spent solvent recovery system even though some of the spent solvents would be required to be disposed off-site.

8. Send spent salt baths to off-site disposal facilities.

9. Capping of the existing impoundment would be the most cost effective method for closing the operation. As previously indicated, however, a final recommendation for closing the facility must await the results of the groundwater assessment plan.

1.2 CH2M HILL

1.2.1 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH 1982

INSTALLATION RESTORATION
PROGRAM RECORDS SEARCH

For
DOBBINS AIR FORCE BASE, GEORGIA

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
DOBBINS AIR FORCE BASE, GEORGIA

By

CH2M HILL
Gainesville, Florida

April 1982

Contract No. F08637 80 G0010 0008

EXECUTIVE SUMMARY

A. Introduction

1. CH2M HILL was retained by the Air Force Engineering and Services Center (AFESC) on August 27, 1981 to conduct the Dobbins AFB Records Search under Contract No. F08637 80 G0010 0008.

2. The Department of Defense (DoD) policy was directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5 dated 11 December 1981 and implemented by Air Force message dated 21 January 1982 as a positive action to ensure compliance of military installations with existing environmental regulations. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program. The purpose of the DoD policy is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DoD facilities, to control the migration of hazardous contamination from such facilities, and to control hazards to health and welfare that may have resulted from these past operations.

3. To implement the DoD policy, a four-phase Installation Restoration Program has been directed. Phase I, the records search phase, is the identification of potential problems. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase IIa consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants. If the Phase IIa work confirms the presence and/or migration

EXECUTIVE SUMMARY

of contaminants, then Phase IIb field work would be conducted to determine the extent and magnitude of the contaminant migration. Phase III (not part of this contract) consists of a technology base development study to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

4. The Dobbins AFB Records Search included a detailed review of pertinent installation records, contacts with 12 other agencies for documents relevant to the records search effort, and an onsite base visit conducted by CH2M HILL during the week of December 7 through December 11, 1981. Activities conducted during the onsite base visit included interviews with 45 past and present base employees, ground tours of base facilities, and a helicopter overflight to identify past disposal areas.

5. The installations addressed in this records search include Dobbins AFB and Naval Air Station Atlanta. Past or present disposal practices at Air Force Plant #6 (AFP #6), operated by the Lockheed-Georgia Company, have not been addressed by this report.

B. Major Findings

1. The primary activities at Dobbins AFB/NAS Atlanta, excluding AFP #6, which generate industrial wastes include routine aircraft and vehicle maintenance, weapons repair and maintenance, and minor laboratory operations. There have never been any large-scale "depot"-type activities, nor any significant aircraft corrosion control, stripping, or painting operations.

2. Interviews with 45 past and present base employees and a review of base records indicate that the major wastes generated at Dobbins AFB/NAS Altanta have included a total of about 7,500 gallons per year of waste oils and hyraulic fluids, 1,000 gallons per year of paint strippers and thinners, 1,500 gallons per year of contaminated fuels, and 8,000 gallons per year of PD 680 dry cleaning solvent.

3. Originally, these wastes were collected in drums and transported to the past fire training burn pit where most of the wastes were consumed during fire training exercises. Since about 1975, most of the waste POL and paint strippers and thinners have been either picked up by a private contractor and removed off-base, or sent to the DPDO at Ft. Gillem, Georgia, for further disposition. Waste fuels are collected by AFRES Fuels Management Branch to be recycled, whenever possible, or sold to a private contractor off-base.

   Waste solvents were originally combined with waste POL for disposal. Since 1971, PD 680 solvent has been recycled at the ANG washrack, which is used by most ANG and AFRES shops. Likewise, in 1975, an industrial waste sewer system was installed to collect waste solvents from several areas at the Naval Air Station; this system ties into a treatment plant operated by Lockheed-Georgia Company at Air Force Plant #6.

4. The records search resulted in the identification of six sites at Dobbins AFB which indicated a potential for environmental impact.

In general, these six sites are not adjacent to populated areas, critical environments, or major water supply wells, and the residual soils and rock formations underlying the base are relatively low in permeability. However, many of the sites are within 1 mile of the installation boundary and adjacent to surface streams.

C. Conclusions

1. No direct evidence indicates migration of hazardous contamination beyond Dobbins AFB/NAS Atlanta, although interviews with past and present base personnel suggest that hazardous wastes have been disposed of or deposited on-base in the past.

2. The potential for ground-water migration is low due to the presence of low-permeability soils. The potential for surface-water migration is high due to the closeness of the sites to streams and to the relatively high net precipitation, rainfall intensity, runoff, and erosion potential.

3. Three sites (shown on Figure 9) were identified as having greater potential for contaminant migration relative to other sites:

   o Site No. 1, the Past Base Landfill, due primarily to its proximity to Poorhouse Creek and to off-base properties, a high erosion potential, and the presence of large quantities of hazardous wastes, including carbon remover, paints and paint thinners, waste solvents, AVGAS sludge, and fuel-saturated dirt and foam.

- Site No. 2, the Past Fire Training Area, due primarily to the burning of large quantities of hazardous wastes for more than 20 years and to the suspected presence of buried wastes in drums.

- Site No. 4, Big Lake, due primarily to the closeness of the Navy Dispensary to the lake, the direct seepage of water from the lake to the ground water, the past discharge of unknown types and quantities of chemicals from AFP #6 into the lake, and the accumulation of sediments of unknown thickness and chemical composition.

3. No other identified site on Dobbins AFB or NAS Atlanta is considered to pose a hazard for environmental impact.

D. <u>Recommendations</u>

1. Since this records search did not include Air Force Plant #6, the potential environmental impact of disposal activities at Dobbins AFB cannot be adequately evaluated. A Phase I records search should be conducted for AFP #6 before implementing the following recommendations.

2. To verify that hazardous contaminant migration is not a problem at the Past Base Landfill, the Past Fire Training Area, or Big Lake, it is recommended that a program be developed that includes the following:

   - Ground-water monitoring at the Past Base Landfill, including installation of at least three wells to a depth of about 15 feet below the ground-water level, collection of ground-water samples, and analysis of the samples for pH, COD, TOC, oil and grease, lead, chromium (total and hexavalent), nickel, cadmium, mercury, iron, phenol, and volatile organic compounds.

- Monitoring of the Past Fire Training Area, including a field survey (such as a magnetometer or ground-penetrating radar survey) to determine whether any buried drums are present, and installation of at least one well to a depth of about 15 feet below the ground-water table. At least one sample should be collected and analyzed for pH, COD, TOC, oil and grease, phenol, and volatile organic compounds.

- Analysis of the sediment at Big Lake prior to any dredging or development, including determination of the depth of sediment, collection of sediment samples from various locations and depths, and analysis of the samples for pH, arsenic, barium, cadimum, chromium, copper, cyanide, lead, mercury, phenol, selenium, silver, and zinc.

3. Details of this program should be finalized by the Phase II contractor at the time the work is performed. Since no imminent hazard is apparent, the above program can be implemented as financial resources become available. In the event that contaminants are detected in either the sediment or ground-water samples, a more extensive field survey program should be implemented.

1.2.2 INSTALLATION RESTORATION PROGRAM RECORDS SEARCH 1984

INSTALLATION RESTORATION
PROGRAM RECORDS SEARCH

FOR

AIR FORCE PLANT 6, GEORGIA

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403

AND

AIR FORCE SYSTEMS COMMAND
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CH2M HILL

January 1984

Contract No. F08637-80-G0010-5008

EXECUTIVE SUMMARY

A. INTRODUCTION

1. CH2M HILL was retained on August 17, 1983, to conduct the Air Force (AF) Plant 6 records search under Contract No. F08637-80-G0010-5008, with funds provided by Aeronautical Systems Division (ASD).

2. Department of Defense (DoD) policy, directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5, is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DoD facilities, control the migration of hazardous contamination from such facilities, and control hazards to health and welfare that may have resulted from these past operations.

3. To implement the DoD policy, a four-phase Installation Restoration Program has been directed. Phase I, the records search, is the identification of potential problems. Phase II (not part of this contract) consists of follow-on field work to determine the extent and magnitude of contaminant migration. Phase III (not part of this contract) consists of technology base development to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

4. The AF Plant 6 records search included a detailed review of pertinent installation records, contacts with 12 government organizations for documents

relevant to the records search effort, and an onsite installation visit conducted by CH2M HILL during the week of November 14 through November 18, 1983. Activities conducted during the onsite visit included interviews with 29 installation employees, ground tours of installation facilities, a detailed search of installation records, and a helicopter overflight to identify past disposal areas.

B. MAJOR FINDINGS

1. AF Plant 6 was constructed in 1941 for the sole purpose of manufacturing large aircraft in support of the war effort. The Bell Aircraft Corporation operated AF Plant 6 until 1946 where they produced the B-29 aircraft. From 1946 to 1951, AF Plant 6 was occupied by the Tumpane Company which was engaged in process preservation and storage of machine tools. In 1951, the Lockheed-Georgia Company reopened AF Plant 6 under contract with the Air Force to modify B-29 aircraft for the Korean Conflict. After the B-29 aircraft modification program ended, the Lockheed-Georgia Company continued to operate AF Plant 6. Since their work ended on B-29 aircraft modification, the Lockheed-Georgia Company has manufactured B-47, C-130, JetStar, C-141, and C-5 aircraft. They have also modified the C-141 aircraft during the "stretch" program and C-5 aircraft during the wing modification program.

   The major industrial operations at AF Plant 6 include tooling, cutting, shaping, forming, cleaning, treating, and painting aircraft parts; subassembly of aircraft components; major assembly of aircraft sections; final assembly of entire aircraft; aircraft cleaning and painting; maintenance of building, aircraft, and aircraft-support equipment; and operations and support services; These industrial operations generate varying quantities of waste oils, recovered fuels, spent solvents and cleaners, plating sludge, paint sludges from water-wash paint booths, and heat-treatment salt wastes. The total quantity of waste oils, recovered fuels, and spent solvents and cleaners is approximately 135,000 gallons per year. This includes approximately 75,000 gpy of waste oils and recovered fuels and 60,000 gpy of spent solvents and cleaners. Spent salt baths (20 tons per year [tpy]), plating sludges (3,500 tpy), and sealants (1 tpy) are also generated. This represents the total current estimated quantity of wastes generated at AF Plant 6.

Wastes quantities are dependent upon the workload of AF Plant 6 and vary greatly from one period to the next. Total waste quantities generated are believed to have been at their peak in the late 1960s.

2. In general, the standard procedures for past and present industrial waste disposal practices have been as follows: (1) waste oils and recovered fuels have generally been recycled or used to produce energy, (2) spent solvents and cleaners have been collected by contractors for offsite disposal (1951 to present), (3) concentrated plating baths have been treated prior to surface discharge, (4) dilute plating rinsewater wastes and oily wastewaters have been discharged to the sanitary WWTP (1951 to 1972) or to the Industrial Waste Treatment Plant (IWTP) (1972 to present), and (5) plating sludges have been discharged to an earthen basin in the B-10 area (1951 to 1972) or

to Site No. 1, the Surface Impoundment (1972 to present). More specific industrial waste disposal practices for each industrial site are summarized in Section IV.A.1, "Summary of Industrial Waste Disposal Practices."

3. Interviews with installation employees resulted in the identification of 12 past disposal or spill sites at AF Plant 6 and the approximate dates that these sites were active (see Figure 1 for site locations).

C. CONCLUSIONS

1. Information obtained through interviews with installation personnel, installation records, and field observations indicate that hazardous wastes have been disposed of on AF Plant 6 property in the past.

2. Direct evidence (confirmed by laboratory analyses) of contaminant migration exists for Site No. 1, the Surface Impoundment; Site No. 9, the TCE Spill; and Site No. 5, Stormwater Retention Basin No. 2.

3. Indirect evidence (confirmed by visual observation) of contamination exists at Site No. 7, Position 65--the C-5 Washrack.

4. No evidence of environmental stress due to past disposal of hazardous wastes was observed at AF Plant 6.

5. The potential for surface-water migration of hazardous contaminants is high primarily because of (1) the relatively high precipitation rate, (2) the relatively low evapotranspiration rate,

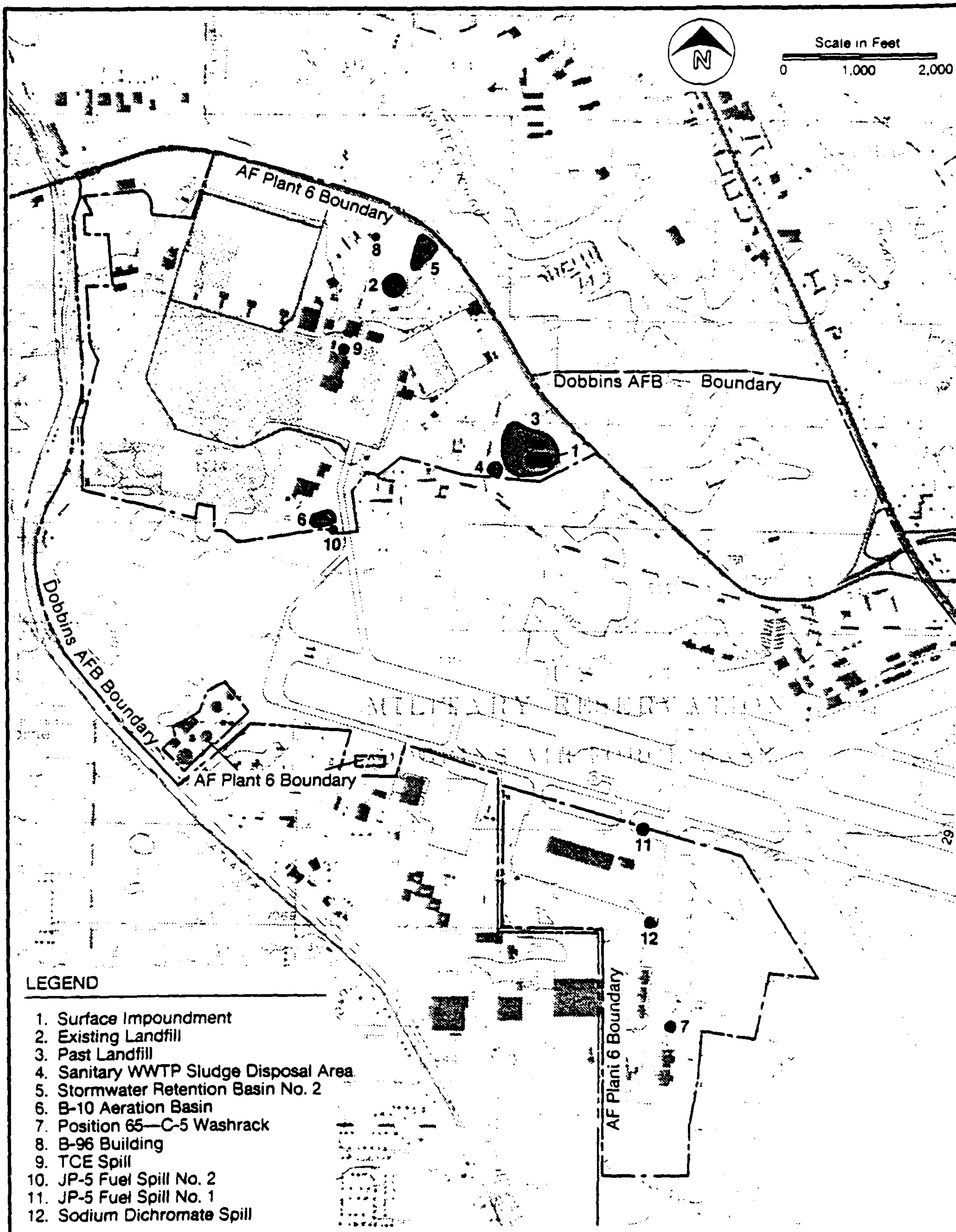

FIGURE 1.
Location Map of Identified Disposal and Spill Sites at AF Plant 6.

CH2M HILL

(3) the presence of stormwater drainage ditches and creeks on AF Plant 6 property which are flowing most of the year, (4) the proximity of several disposal sites to these water courses, and (5) moderately low to very low soil permeabilities (1×10^{-3} to 1×10^{-7} cm/sec).

6. The potential for ground-water migration of hazardous contaminants is moderate primarily due to: (1) the relatively high precipitation rate, (2) the relatively low evapotranspiration rate, (3) shallow depth to ground water (20 to 30 feet), and (4) low to very low permeabilities (1×10^{-3} to 1×10^{-7} cm/s).

7. Table 1 presents a priority listing of the rated sites and their overall scores. The following sites were designated as areas showing the most significant potential (relative to other AF Plant 6 sites) for environmental impact.

   a. Site No. 1--the Surface Impoundment

   b. Site No. 2--The Existing Landfill

   c. Site No. 3--The Past Landfill

   d. Site No. 4--The Sanitary WWTP Sludge Disposal Area

   e. Site No. 5--Stormwater Retention Basin No. 2

   f. Site No. 6--the B-10 Aeration Basin

   g. Site No. 7--Position 65--the C-5 Washrack

   h. Site No. 9--the TCE Spill

Table 1
LISTING OF DISPOSAL AND SPILL SITES

Ranking No.	Site No.	Description	Overall Score
1	1	Surface Impoundment	74
2	6	B-10 Aeration Basin	74
3	7	Position 65--C-5 Washrack	72
4	9	TCE Spill	74
5	5	Stormwater Retention Basin No. 2	69
6	12	Sodium Dichromate Spill	66
7	10	JP-5 Fuel Spill No. 2	64
8	4	Sanitary WWTP Sludge Disposal Area	62
9	2	Existing Landfill	61
10	3	Past Landfill	61
11	8	B-96 Building	49
12	11	JP-5 Fuel Spill No. 1	7

i. Site No. 10--JP-5 Fuel Spill No. 2

j. Site No. 12--Sodium Dichromate Spill

8. Sites No. 8 and 11 are not considered to present significant environmental concerns. In general, these sites received low receptor and waste characteristics subscores.

D. RECOMMENDATIONS

1. A Phase II monitoring program is recommended to confirm or rule out the presence and/or migration of hazardous contaminants. Specifically, sampling is recommended for Site No. 2, the Existing Landfill; Site No. 4, the Sanitary WWTP Sludge Disposal Area; Site No. 5, Stormwater Retention Basin No. 2; Site No. 6, the B-10 Aeration Basin; Site No. 7, Position 65--the C-5 Washrack; Site No. 9, the TCE Spill; Site No. 10, JP-5 Fuel Spill No. 2; and Site No. 12, Sodium Dichromate Spill. A groundwater quality assessment plan was prepared for Site No. 1, the Surface Impoundment, by the Chester Engineers under contact with the Lockheed-Georgia Company in November 1983. In this report, an extensive monitoring program was recommended to determine the extent and magnitude of the ground-water contamination at the site. This program was approved by the Lockheed-Georgia Company, AFPRO, and ASD and is now being reviewed by the Georgia Environmental Protection Division (EPD). Because of this, no Phase II recommendations were made for this site. Because of its proximity to Site No. 1, recommendations for Site No. 3, the Past Landfill will also be

covered by these recommendations. Figure 2 shows the locations of the sites being recommended for Phase II monitoring.

2. In addition to the Phase II recommendations made for each disposal site, all existing and proposed monitoring wells should be surveyed to determine their ground-water surface elevations. A potentiometric map should be constructed from this information.

3. Ground-water samples should be collected from all of the existing monitoring wells to confirm or rule out the presence of contamination due to leaking tanks. The parameters to be analyzed for should be established based on the constituents of each tank.

4. The final details of the monitoring program, including the exact locations of sampling points, should be determined as part of the Phase II program. In the event that contaminants at levels of serious concern are detected, a more extensive field survey program should be implemented to determine the extent of contaminant migration.

5. Other environmental recommendations in addition to the Phase II sampling include:

   a. Discontinuing the use of the two ponds at Site No. 7, Position 65--the C-5 Washrack. The contaminated water should be pumped to the IWTP for treatment and the ponds should be properly closed. The piping system should be reworked to pump washwater from the washrack directly to the IWTP.

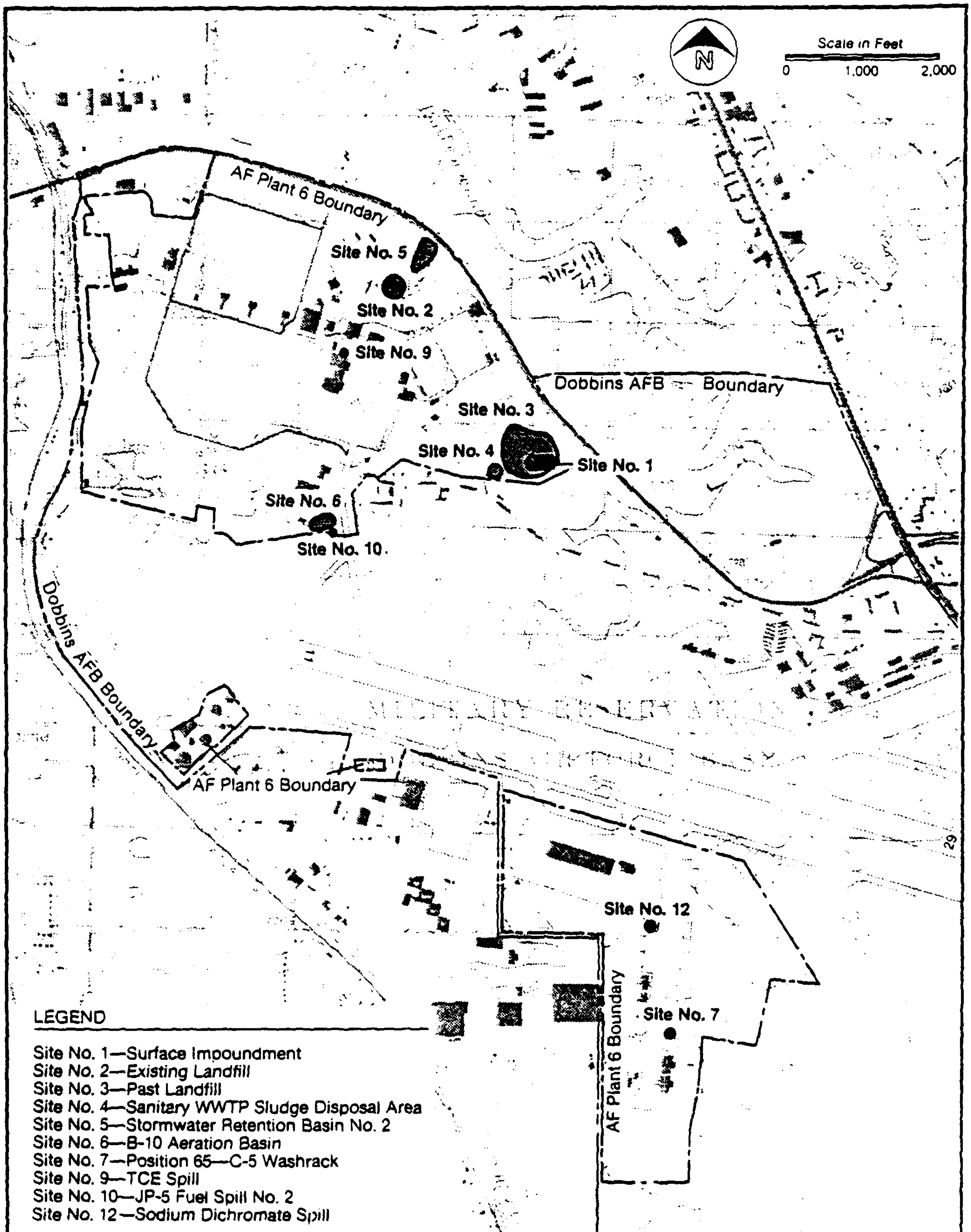

FIGURE 2.
Location Map of Sites Recommended for Phase II Monitoring.

CH2M HILL

b. Pressure testing all major belowground (BG) tanks.

c. Testing the discharge lines from the production areas to the IWTP to determine if exfiltration is occurring which could potentially pollute the ground water.

d. Investigating the future use of existing production wells located on AF Plant 6 and Dobbins property. If the wells are going to be used in the future, they should be logged to determine their existing condition. If they are going to be abandoned, they should be properly capped.

e. Inspecting the production wells to ensure that they are not connected to the existing water system.

1.3 ESE

DRAFT

INSTALLATION RESTORATION PROGRAM

PHASE II: CONFIRMATION/QUANTIFICATION
STAGE I

DOBBINS AIR FORCE BASE
MARIETTA, GA.

Prepared for:

U.S. AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY
Brooks Air Force Base, Texas

MAJOR GEORGE R. NEW
OEHL TECHNICAL MONITOR
TECHNICAL SERVICES (TS) DIVISION

Contract No. F33615-84-D-4401

Prepared by:

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Gainesville, Florida

VOLUME I

July 1985

EXECUTIVE SUMMARY

The Phase IIa Installation Restoration Program (IRP) Confirmation/ Quantification Survey for Dobbins Air Force Base (DAFB), Ga., included investigation of seven disposal, storage, and surface water drainage sites. These sites included a past base landfill, past and present firefighting training areas, two aviation gasoline (AVGAS) sludge burial sites, and two surface water drainage bodies: Little Lake and Big Lake.

A geophysical survey was conducted at four sites to locate buried metallic objects and to delineate contamination and potential plume boundaries. Organic vapor analyses surveys were performed to determine surface soil mapping of petroleum hydrocarbons. A bathymetric study was conducted to map the sediments of Big Lake. Sixteen shallow monitoring wells were installed and developed at the seven study site locations on DAFB. Wells, surface waters, soil borings, and sediments were sampled and then analyzed as indicated in Table 1. Seven inactive water supply wells were also analyzed for ground water quality indicators.

Results from the screening tests [total organic halogens (TOX), total organic carbon (TOC), pH, specific conductance, and the specific tests (metals, pesticides, phenols, cyanides, oil and grease, and PCBs)] were used to determine if contamination existed in the shallow aquifer. Contaminants exceeding National Interim Primary Drinking Water Regulations (NIPDWR), National Secondary Drinking Water Regulations (NSDWR), or the U.S. Environmental Protection Agency (EPA) criteria for the protection of freshwater aquatic life and human health were not found at any of the ground water sampling sites at the referenced locations. However, potential deterioration of ground water from lead and organic compounds may occur, due to relatively high levels found in soil samples analyzed for some of the sites.

Table 1. Summary of Sampling, Surveys, and Analyses for DAFB Phase IIa Survey

Site No.	Site Description	Survey/Sample Location	Result/Sample Analyses
D1	Past Base Landfill	o 4 monitoring wells (D1-12, D1-13, D1-14, D1-15)	o pH, specific conductivity, total organic carbon (TOC), total organic halides (TOX), oil and grease, total lead
		o EM-31 profile	o Resistivity map
		o 3 soil cores	o Lead, oil and grease, moisture, TOX, PCBs
D2	Past Firefighting Training Area	o 3 monitoring wells (D2-1, (D2-2, D2-3)	o pH, TOC, TOX, oil and grease, conductivity, EPA Methods 601 and 602 Analytes (Purgeable Halocarbons and Aromatic Aliphatics)
		o Magnetometer/EM-31 profile	o Resistivity map
		o 3 soil cores	o Oil and grease, moisture, TOX, PCBs
D3	Present Firefighting Training Area	o 3 monitoring wells (D3-3, D3-4, D3-5)	o Oil and grease, TOX, TOC, conductivity, pH
		o 3 gully AVGAS soil samples	o Oil and grease, moisture, TOX, PCBs
D4	Big Lake	o 2 monitoring wells	o pH, specific conductivity, TOC, TOX, primary heavy metals, Cu, Zn, Cn, phenols, and PCBs
		o 12 lake sediment cores	o TOX, EP toxicity, Cu, Zn, Cn, phenols, and PCBs

Table 1. Summary of Sampling, Surveys, and Analyses for DAFB Phase IIa Survey (Continued, Page 2 of 3)

Site No.	Site Description	Survey/Sample Location	Result/Sample Analyses
D4	Big Lake (continued)	o 2 soil cores	o TOX, EP toxicity, Cu, Zn, Cn, phenols, and PCBs
		o Bathymetric and lake sediment survey	o Grid map
D5	AVGAS Sludge Burial Site A	o EM-31 profile	O Resistivity map
		o OVA survey	o Map
		o 3 monitoring wells (D5-4, D5-10, D5-11)	o TOC, TOX, oil and grease, and lead
		o 1 soil core	o Oil and grease, lead, TOX, and PCBs
D6	AVGAS Sludge Burial Site B	o 1 monitoring well (D6-16)	o TOC, TOX, oil and grease, lead, conductivity, and pH
		o EM-31 profile	o Resistivity map
		o OVA survey	o Map
		o 1 soil core	o Lead, moisture, and TOX
D7	Little Lake	o Bathymetric and sediment survey	o Grip map
		o 1 lake sediment core	o EPA Pesticides Method 8080, Herbicides Method 8150, and PCBs
		o 1 lake water surface sample	o pH, conductivity, pesticides, herbicides, and PCBs

Table 1. Summary of Sampling, Surveys, and Analyses for DAFB Phase IIa Survey (Continued, Page 3 of 3)

Site No.	Site Description	Survey/Sample Location	Result/Sample Analyses
Inactive Water Supply Wells	7 inactive water supply wells (U-124, U-125, U-126, U-128, U-129, U-130, U-131)	o 7 well samples	o TOX, TOC, oil and grease, pH, conductivity, and water temperature

Source: ESE, 1985.

Based on the results, which indicated potential presence of contaminants in the shallow ground water and soil samples collected, recommendations were made to perform additional analyses at all seven sites to confirm/ quantify any contaminants. A summary of recommendations, including sampling locations and parameters to be analyzed, is presented in Table 2.

Table 2. Summary of Recommendations

Site No.	Site Name (Sample No.)	Base/ Neutral Extrac- tables	pH	Specific Conduc- tivity	EPA Method 601 Purge- able Halo- carbons	EPA 602 Aliphatics/ Aromatics	PCBs	Total Lead	Total Phenol	TOX	Rationale for Recommendation
D1	Past Base Landfill (D1-12, D1-13, D1-14, D1-15)	X	X	X	X	X		X	X	X	TOX levels at 170 ug/l at some wells; TOC at low levels; recommend base/neutral extractables, EPA 601 and 602 analytes to confirm/identify organics/chlorinated organics if present at site. Lead found in high concentrations in soil. Need to confirm lead and TOX values. A comparison between TOX and EPA 601 and base/neutral extractables can be conducted. Check for phenol. Primarily a priority pollutants scan will be performed.
D2	Past Firefighting Training Area (D2-1, D2-2, D2-3, 1 soil sample for lead)	X	X	X				X	X	X	TOX levels at 53 ug/l at one well, no oil and grease; need to confirm halogenated organics and compare correlation with TOC, check for lead and phenol in soil and ground water due to presence at other sites and potential concentrations here.
D3	Present Firefighting Training Area (D3-3, D3-4, D3-5)		X	X	X	X	X	X	X	X	Oil and grease—204 ug/l; TOX—280 g/l; need to identify/confirm identities and concentrations of organic and halogenated organics. Well D3-3 is the only well with significant concentrations. Need to check for lead and phenols in soil and ground water.
[illegible]	Big Lake (Additional sediment core samples in proximity of partially buried drums plus drum samples)		X	X	X	X	X		X	X	Partially buried drums were identified; TOX at 29 ug/l; low PCB sediment concentration. Need to confirm PCB and phenol levels. Compare TOX with EPA Method 601 analytes. Partially buried drums and local sediments require analysis. This is needed to determine suitability as a recreational area.
[illegible]	AVGAS Sludge Burial Site A		X	X	X	X		X	X	X	High concentrations of oil and grease and lead in soil; low TOX value; need to confirm if organics/chlorinated organics are found in ground water. Confirm lead and TOX values. Check for phenol as leachate source to Big Lake.

Table 2. Summary of Recommendations (Continued, Page 2 of 2)

Site No.	Site Name (Sample No.)	Base/ Neutral Extrac- tables	pH	Specific Conduc- tivity	EPA Method 601 Purge- able Halo- carbons	EPA 602 Aliphatics/ Aromatics	PCBs	Total Lead	Total Phenol	TOX	Rationale for Recommendation
1B	AVGAS Sludge Burial Site B	X	X	X	X	X	X	X	X	X	Because this site is both AVGAS burial site for tetra ethyl lead and potentially a large past landfill, a complete set of basic priority pollutants scan is required. High lead and oil and grease were found in soil with TOX of 12 ug/l. Confirmation of these values plus identification/confirmation of organics/chlorinated organics is required. Also a correlation between TOX and EPA Method 601 analytes can be evaluated.
20/ 1 0	Little Lake		X	X	X	X	X	X	X	X	Confirmation of PCBs in sediment samples. Check and identify if any organics/ chlorinated organics are found in surface water. Potential contaminants from surface drainage may accumulate in Little Lake. Check for lead and phenol due to appearance at other sites.
	Inactive Water Supply Wells		X	X	X	X	X	X	X	X	Confirmation/identification of organic/chlorinated organics that may be in wells due to detection of TOX (230 ug/l) in one well and low oil and grease present in all wells. Check for lead, phenol, and PCBs due to detection at other sites. Also compare relationship of TOX values with EPA Method 601 analytes.

Source: ESE, 1985.

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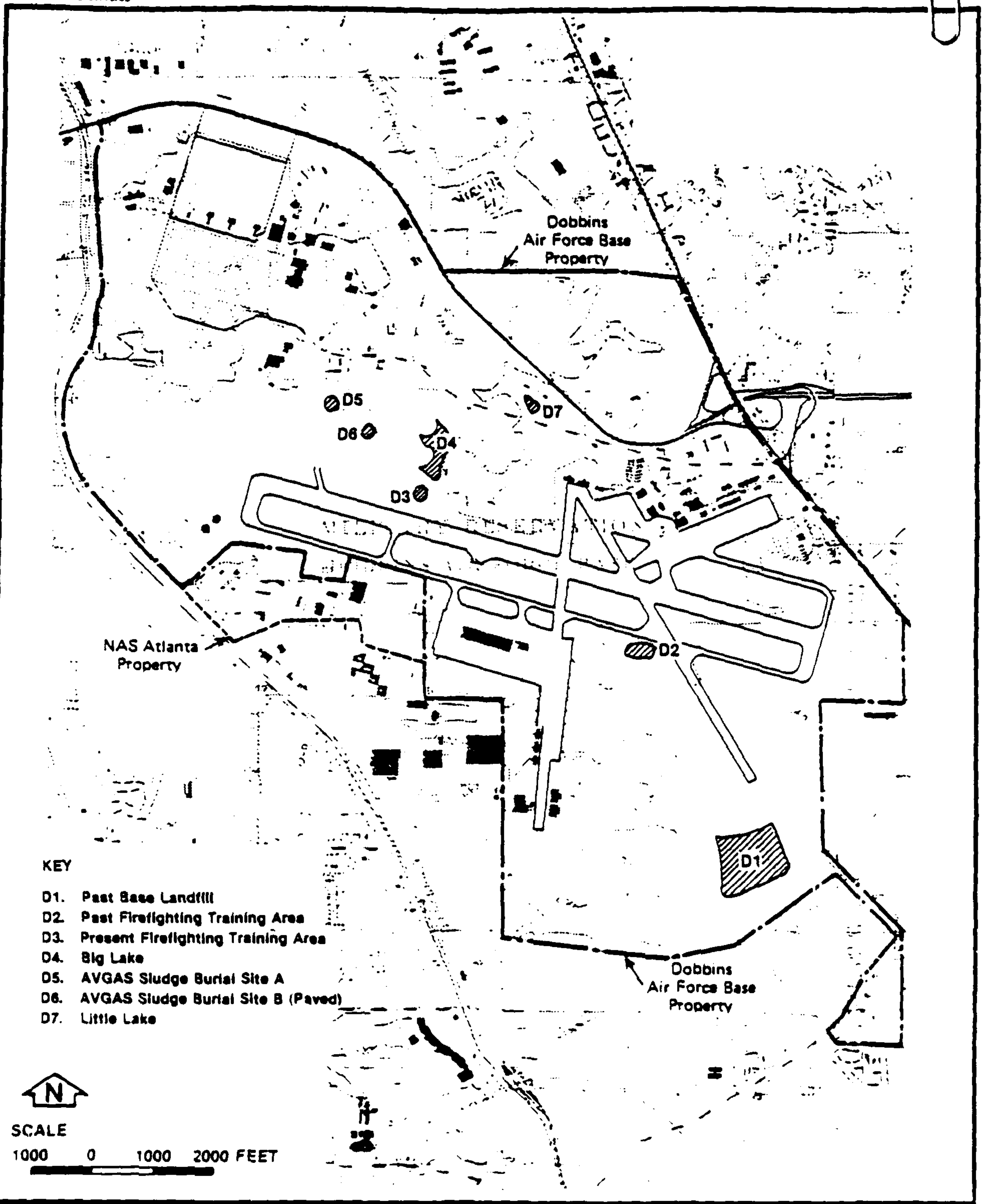

Figure 1.3-1
LOCATION MAP OF IDENTIFIED DISPOSAL SITES

SOURCES: CH2M HILL 1982; ESE 1985

INSTALLATION RESTORATION PROGRAM
Dobbins Air Force Base

1.0 INTRODUCTION

REVIEW DRAFT

Law Engineering Testing Company (LAW) has performed technical services to produce hydrogeologic data for use in Phase II A of the Installation Restoration Program for Dobbins Air Force Base in Marietta, Georgia. Our services included the following:

1. Review of available project data
2. Perform geophysics and OVA surveys
3. Obtain boring location approvals
4. Drill test borings and install monitoring wells
5. Develop monitoring wells
6. Arrange surveying of wells
7. Conduct soils laboratory analyses
8. Perform field permeability tests
9. Measure water levels
10. Reduce and summarize test data
11. Analyses test results
12. Prepare this report of findings

Our services were performed as requested by Environmental Science and Engineering, Inc. (ESE), Mr. C. Richard Neff, Project Manager. Law's key project personnel were as follows:

Project Direction/Manager - Thomas L. Cross, P.E.
Site Geologist/Manager - Charles A. Spiers, P.G.

Site Engineer - Kenneth J. Seefried Jr., P.E.

Staff Geologist - William W. Gierke

Staff Geologist - Steve Shugart

We understand that the information we provide will be used by ESE to prepare a Review Draft Report for submittal to the United States Air Force Occupational and Environmental Health Laboratory (USAF OEHL).

Included in Law's report are descriptions of the services performed, results and findings.

The first section of our report describes the regional hydrologic setting. Subsequent sections describe the hydrogeologic conditions at each of six potential contamination sites. Appendices include field and laboratory test procedures, individual test results, test boring records, and other data.

1.4 FEDERER-SAILOR AND ASSOCIATES, INC.

GROUND WATER MONITORING WELLS
CONTRACT NO. F33657-81-E-2185
AIR FORCE PLANT NO. 6
MARIETTA, GEORGIA

FEDERER SAILORS AND ASSOCIATES INC

FEDERER-SAILORS AND ASSOCIATES, INC. SOIL AND FOUNDATION ENGINEERS
1732 PLEASANT HILL ROAD, N.W. • DULUTH, GEORGIA 30136 • PHONE: 404-923-4044

February 25, 1983

Lockheed-Georgia Company
Construction Department
Marietta, Georgia

Attention: Mr. Larry Glover

Subject: Ground Water Monitoring Wells
P.O. No. CY98009
Contract No. F33657-81-E-2185
Air Force Plant No. 6
Marietta, Georgia

Gentlemen:

Federer-Sailors and Associates, Inc. has completed the installation of the ground water monitoring wells at your subject facility. The installation of each well has been verified by Mr. Larry Glover. At the time of writing this letter, each well is in operation.

Attached are two sets of copies of the Boring Logs for the installation of the wells. The auger depth listed on the Boring Logs indicates the total depth drilled. In each case, the well casing was installed so as to have the water table coincident with a portion of the slotted casing.

The basic installation of the wells was performed at a a unit price of $7950.00. Enclosed is our invoice for that amount. Additional work was required in the form of coring through asphalt and concrete at the ground surface and rock coring necessary to extend the hole below the ground water table.

An additional letter and invoice are enclosed concerning this extra work.

If there are any questions concerning this project, please give us a call at your convenience.

Respectfully submitted,

Federer-Sailors And Associates, Inc.

GEORGIA
REGISTERED
No. 10473
PROFESSIONAL
ENGINEER
JIM D. SAILORS

Jim D. Sailors, P. E.

JDS:st

LOG OF BORING

SHEET 1 OF 2

CONTRACTED WITH Lockheed-Georgia Co. BORING No. CW1

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-5-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	No topsoil			AU			
	Reddish brown micaceous silty sand						Drilling soft
		5					
		10					
		15					
	Brown sandy micaceous sandy silt						
		20					
		25					Drilling thru rock Drilling very hard Drilling firm
		30					
		35					
		40					Water table 30 days Water table 20 hours
		45					

LOG OF BORING

SHEET 2 OF 2

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW1

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-5-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Brown micaceous silt with a trace of sand	50					Drilling firm
	Auger terminated @ 55.0'	55					

AD-A190 453 INSTALLATION RESTORATION PROGRAM PHASE 2 CONFIRMATION/QUANTIFICATION STAG..(U) ENVIRONMENTAL SCIENCE AND ENGINEERING INC GAINESVILLE FL 2/5

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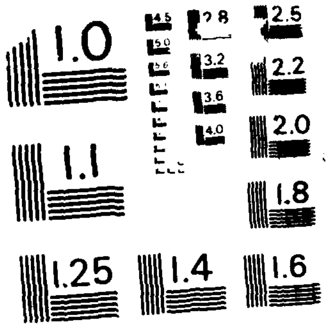

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

LOG OF BORING

SHEET __ OF __

CONTRACTED WITH Lockheed-Georgia Co. BORING No. OW2-A

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-4-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	No topsoil						Drilling soft
	Brown micaceous sandy silt			AU			
	Reddish brown micaceous silt						Drilling medium
		5					
	Reddish brown micaceous sand						Drilling firm
		10					
	Brown micaceous silty sand						Drilling thru rock Drilling very hard
		15					No water table @ 0 hours
	Auger refusal @ 15.0'						No water table @ 48 hours
							Note: Two borings drilled at this location in attempt to penetrate shallow rock

LOG OF BORING

SHEET___OF___

CONTRACTED WITH Lockheed-Georgia Co. BORING No. OW2-B

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-31-82

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	No topsoil						Drilling soft
	Brown sandy silt			AU			
	Reddish brown micaceous silt with a trace of fine sand						Drilling medium
	Brown sandy silt	5 10					
	Brown sandy silt with some gravel Auger refusal @ 18.0'	15					Drilling thru rock Drilling very hard
	Highly weathered and fractured biotite gneiss	20	A	NX WL		78%	Run A 18.0' to 29.5'
	Slightly weathered and fractured biotite gneiss	25					Water table @ 24 hours
	Slightly weathered and fractured biotite gneiss	30 35	B	NX WL		100%	Run B 29.5' to 37.0' Water table @ 0 hours
	Slightly weathered and fractured biotite gneiss	40 45	C	NX WL		96%	Run C 37.0' to 46.6'
	Slightly weathered and fractured biotite gneiss		D	NX WL		95%	Run D 46.6' to 49.9'
	Coring terminated @ 49.9'						

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW3

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-31-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	3" Concrete pavement			AU			
	Reddish brown micaceous silt with a trace of fine sand						Drilling soft
		5					
		10					
		15					
							Water table @ 96 hours Drilling thru rock Water table @ 0 hours
		20					
	Auger refusal @ 20.5'						

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW4

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-6-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	4" Gravel			AU			
	Reddish brown micaceous silty sand						Drilling soft
		5					Drilling medium
		10					
	Brown micaceous silty sand						
		15					Drilling firm
		20					
							Water table 29 days
							Drilling thru rock
		25					Drilling very hard
	Brown micaceous sandy silt						Drilling medium
		30					Drilling firm
							Drilling hard
		35					
	Auger terminated @ 35.0'						

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. OW5A

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-5-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	1" Gravel			AU			
	Brown micaceous sandy silt						Drilling soft
							Drilling medium
		5					
							Drilling firm
		10					
	Brown micaceous sandy silt						Drilling hard
		15					
		20					
		25					
							Drilling thru rock Drilling very hard
		30					No water table encountered @ 0 hours and @ 48 hours
	Auger refusal @ 30.0'						

LOG OF BORING

SHEET 1 OF 2

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW5-B

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 2-2-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	1" Gravel						
	Brown micaceous sandy silt			AU			Drilling medium
		5					
		10					Drilling firm
		15					Drilling thru rock
		20					Drilling hard
		25					Drilling very hard Drilling thru rock
	Auger refusal @ 29.5'	30					
	Highly weathered and fractured biotite gneiss		A	NX WL		57%	Run A 29.5' to 36.5'
		35					
			B	NX WL		28%	Run B 36.5' to 46.5'
		40					Water table @ 48 hours
		45					
			C	NX WL		35%	Run C 46.5' to 66.5'
		50					

LOG OF BORING

SHEET 2 OF 2

CONTRACTED WITH Lockheed-Georgia Company BORING No. OW5-B

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 2-2-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
		50	C	NX WL		35%	Run C 46.5' tp 66.5'
	Highly weathered and fractured biotite gneiss						
		55					
		60					
	Moderately weathered and fractured biotite gneiss	65					
	Coring terminated @ 66.5'						

LOG OF BORING

SHEET 1 OF 2

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW6

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-19-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	4". Asphaltic concrete gravel			AU			
	Gravel						Drilling medium
	Brown micaceous silt with a trace of fine sand						
	Reddish brown micaceous sandy silt	5					Drilling firm
	Brown micaceous silt with a trace of sand and gravel	10					
		15					
		20					
		25					
		30					
		35					Drilling hard
		40					
		45					

LOG OF BORING

SHEET 2 OF 2

CONTRACTED WITH Lockheed-Georgia Co. BORING No. OW6

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-19-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
		50					
	Brown micaceous silt with a trace of sand and rock fragments						Water table @ 16 days Drilling firm Water table @ 0 hours
	Auger terminated @ 55.0'	55					

L O G   O F   B O R I N G

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. CW7

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-28-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	4" Asphaltic concrete			AU			Drilling medium
	Reddish brown silty sand						
	Brown micaceous fine sand						Drilling firm
		5					
							Drilling hard
		10					
		15					
		20					
							Water table 0 hours
		25					Drilling thru rock Water table 7 days
		30					Drilling medium
		35					
	Auger terminated @ 40.0'	40					Note: A previous attempt to drill CW 7 refused @ 2.0'

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. OW8

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-3-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 1" Brown silty sand with organics			AU			Drilling soft
	Reddish brown micaceous silty sand	5					
	Brown micaceous silty sand	10					Drilling medium Drilling firm
	Reddish brown micaceous silt with a trace of fine sand	15 20 25					Drilling medium
	Light brown micaceous silt with a little fine sand	30 35 40					Drilling soft Water table 33 days Water table 8 hours
	Auger terminated @ 45.0'	45					

Q-99

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW9A

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-4-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	Topsoil = 1" Dark brown silty sand with some organics						
	Brown micaceous silty sand						Drilling soft
		5					
		10					
							No water table encountered
	Auger terminated @ 13.5'						

Q-100

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW9B

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-14-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	Topsoil = 2" Dark brown silty sand with some organics						
	Reddish brown micaceous sandy silt						Drilling soft
		5					
		10					Drilling very hard
	Auger terminated @ 12.5'						No water table @48 hours
							Note: Moved location 5' north

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. CW9C

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-4-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	Topsoil = 1" Dark brown silty sand with organics						Drilling soft
	Brown micaceous silty sand	5					
		10					
	Auger terminated @ 13.0'						Obstruction @ 13.0' No water table encountered Note: moved location 14' northeast

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. CW9D

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-8-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 2" Dark brown silty sand with some organics			AU			
	Reddish brown micaceous sandy silt						Drilling medium
		5					Drilling soft
		10					Drilling thru rock
	Brown micaceous silt with a trace of fine sand						Drilling firm Drilling thru rock Drilling hard
∇		15					Water table 16 days
		20					Drilling thru rock Drilling medium
		25					Drilling firm
		30					
	Auger terminated 34.0'						Note: 4 borings were drilled at this location in an attempt to penetrate boulders

L O G   O F   B O R I N G

SHEET ___ OF ___

CONTRACTED WITH Lockheed-Georgia Co. BORING No. OW10

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-14-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	No topsoil			AU			Drilling soft
	Reddish brown micaceous silty sand						
	Yellowish brown fine sand	5					Drilling firm
		10					
	Brown micaceous sand						Drilling hard
		15					
	Auger refusal @ 17.0'						
	Moderately weathered and fractured garnet - biotite gneiss		A	NX WL		57%	Run A 17.0' to 27.0'
		20					
							Water table @ 48 hours
		25					
	Highly weathered and fractured biotite gneiss		B	NX WL		42%	Run B 27.0' to 42.0'
		30					
		35					
		40					
	Coring terminated @ 42.0'						

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LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW11

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-4-83

ELEV.	DESCRIPTION	DEPTH FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	No topsoil			AU			
	Brown micaceous silty sand						Drilling medium
	Reddish brown micaceous silt with a trace of fine sand	5					Drilling firm
	Reddish brown micaceous silty sand						
	Brown micaceous silty sand	10					Water table @ 31 days Water table 0 hours Drilling hard Drilling very hard
		15					Drilling thru rock
		20					Drilling medium
	Auger terminated @ 24.0'						

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW12

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-4-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 2" Dark brown silty sand with organics						Drilling soft
	Reddish brown micaceous silty sand	5		AU			Drilling medium
	Light gray silty sand	10					Drilling firm
	Brown micaceous silty sand	15					
	Grayish brown micaceous silty sand	20					Water table 0 hours Water table 31 days
	Brown micaceous silty sand	25					
	Auger terminated @ 26.5'						Note: Moved location 2 times after hitting concrete at 2.5'

L O G   O F   B O R I N G

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW13

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 12-29-82

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"	SAMPLES	NOTES
	3" Gravel			AU			
	Yellowish brown micaceous sandy silt	5					Drilling soft medium
	Brown micaceous silty sand	10					
	Gray micaceous sandy silt	15					Water table 36 days Water table 0 hours
	Grayish brown micaceous silty sand	20					Drilling soft
	Auger terminated @ 23.5'						

L O G O F B O R I N G

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. CW14

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 12-29-82

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	No topsoil						
	Brown micaceous sandy silt			AU			Drilling medium
		5					
		10					
		15					
							Drilling soft
		20					
	Yellowish brown micaceous sandy silt						Water table 36 days
		25					Water table 0 hours
	Auger terminated @ 28.0'						

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LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW15

PROJECT NAME Ground Water Monitoring System JOB No. 82-1_0 DATE 12-30-82

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 2" Dark brown sandy silt with some organics			AU			Drilling medium
	Reddish brown micaceous silty sand	5					
	Light brown micaceous sandy silt	10					Drilling soft
		15					
	Brownish gray micaceous silty sand	20					Water table 35 days Water table 0 hours
		25					
	Auger terminated @ 28.5'						

L O G O F B O R I N G

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW16

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-13-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 2" Dark brown sand with some organics			AU			Drilling soft
	Grayish brown micaceous silt with a trace of sand	5					
∇ 3							Water table 23 days
	Grayish brown silty sand						
∇ 3		10					Water table 0 hours
	Auger terminated @ 12.0'						

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L O G   O F   B O R I N G

SHEET 1 OF 1

CONTRACTED WITH Lockheed Georgia Co. BORING No. CW17

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-3-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 1" Dark brown silty sand with some organics						Drilling soft
	Brown micaceous sandy silt			AU			
	Reddish brown micaceous sandy silt	5					
	Brown micaceous silty sand	10					Drilling medium
		15					Drilling firm
		20					
		25					Drilling hard
		30					Water table @ 50 days
		35					Water table 0 hours
							Drilling hard
		40					
		45					Drilling very hard
	Auger refusal @ 48.0'						

Q-111

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW18

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-13-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	Topsoil = 2" Dark brown sand with some organics			AU			Drilling soft
	Brown silty sand with a trace of gravel						
	Brown micaceous silty sand	5					Cuttings had strong chemical odor
		10					Drilling medium
17	Reddish brown micaceous silt with a trace of fine sand						Water table 23 days Water table 0 hours
		15					
	Auger terminated @ 16.5'						

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW19

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 1-14-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 2" Dark brown silt with some organics			AU			Drilling medium
	Reddish brown micaceous silty sand	5					Drilling hard
	Brown micaceous ssndy silt	10					Water table 22 days Water table 0 hours
	Reddish brown micaceous silt with a trace of fine sand	15					
	Auger terminated @ 16.0'						

LOG OF BORING

SHEET___OF___

CONTRACTED WITH Lockheed-Georgia Co. BORING No. GW20

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 12-30-83

ELEV	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	SAMPLES TYPE	SAMPLES BLOWS/6"		NOTES
	Topsoil = 1" Dark brown silty sand with some organics			AU			Drilling medium
	Reddish brown micaceous sandy silt						
	Brown micaceous silt with some fine sand	5					
		10					Water table @ 35 days
	Yellowish brown sandy silt						
		15					Water table @ 0 hours
	Brown micaceous sandy silt	20					
	Auger terminated @ 22.0'						

LOG OF BORING

SHEET 1 OF 1

CONTRACTED WITH Lockheed-Georgia Co. BORING No. OW21

PROJECT NAME Ground Water Monitoring System JOB No. 82-150 DATE 12-30-83

ELEV.	DESCRIPTION	DEPTH IN FEET	SAMPLES NO	TYPE	BLOWS/6"		NOTES
	Topsoil = 3" Protland cement concrete			AU			Drilling medium
	Reddish brown micaceous sandy silt						
		5					Water table @ 35 days
	Yellowish brown silt						
							Water table @ 0 hours
		10					
	Auger terminated @ 14.0'						

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1.5 INTERNATIONAL TECHNOLOGY CORPORATION

REPORT
GROUND WATER QUALITY ASSESSMENT
B-10 AERATION BASIN
AIR FORCE PLANT 6
MARIETTA, GEORGIA

D R A F T

Prepared for:

Lockheed-Georgia Company
A Division of Lockheed Corporation
Marietta, Georgia

Prepared by:

IT Corporation
Pittsburgh, Pennsylvania

October 18, 1985
Project No. 611059PR

2.1.1 Aeration Basin

As reported, the aeration basin was formed by the construction of a east-west dike perpendicular to the taxiway embankment and the taxiway embankment. The other side slopes are believed to be natural soil at and below the water line. The basin is approximately 250 feet long, 180 feet wide, with an approximate depth of 10 feet. The sediment in the basin has been removed at a previous date which resulted in deepening the basin to approximately 15 feet. The basin has never had a liner system.

For the purpose of obtaining representative samples of water and sediment, the basin was divided into five zones (Figure 2-1). At the time of sampling, the aeration basin had approximately nine feet of water and one foot of sediment. Each zone had two sampling points to prepare the appropriate composite samples for analysis. Because volatile organics in the water would have been released during compositing of water samples, single samples for volatile organic analysis (VOA) were collected. Water samples were collected prior to sediment samples to minimize the disturbance of the respective media and chemical reactions.

The sediment sampling technique involved positioning a row boat at the desired sampling location and manually inserting a 2.5-inch diameter polyvinyl chloride (PVC) pipe through the sediment and into the bottom of the basin. The collected sediments were extruded into a plastic bucket. Five composite samples (L0011 through L0015) were made by hand-mixing equal volumes of sediments. The samples were transferred to appropriate bottles with teflon lids and preserved. To avoid cross contamination, the PVC pipe was thoroughly cleaned and rinsed with distilled water prior to reuse.

Water samples from the aeration basin were collected similar to the sediment sampling and at approximately the same location. A clean stainless-steel Kemmerer sampler was lowered to approximately mid-depth of the water in the basin to collect the water samples. The water was drained from the bottom of the Kemmerer to minimize the release of volatiles. The samples destined for dissolved metal analysis were drained into a teflon bottle, filtered in the field using 0.45-micron membrane filter, and acidified according to Georgia EPD procedures. Time sensitive parameters were measured in field and the

3.0 DESCRIPTION OF GROUND WATER CONTAMINATION

The conclusions presented herein are based on the analytical results of the existing wells (MW-22 through 25, A-1, A-2, B-1, B-2, and MW-9). Presently, the analytical data from the new wells (ITS-1 through 10 and ITD-1 through 3) is not available. Nevertheless, the data available establishes the presence of contaminant migration away from a source.

The sediments in the aeration basin are contaminated with cadmium and chromium though leaching potential is low due to the near neutral (7.0) ph of the water in the basin. This is evidenced by the low concentration of these metals in the water. The chromium may be a residual effect of previous treatment activities for chromium in open-bottom tanks in the general area.

Major chlorinated volatiles detected in the areation basin sediment are tetrachloroethylene and low concentrations of trichloroethylene. The low aqueous solubility of tetrachloroethylene along with a specific gravity greater than water results in this compound settling and accumulating in the sediments. Tetrachloroethylene is not present in any of the surface or ground water samples; however, it has been documented that it anaerobically degrades into trichloroethylene, trans-1,2-dichloroethane, and vinyl chloride which are present in several surface and/or ground water samples. Cline et al. (1984), during studies of migration and degradation of volatile halogenated organic compounds, have shown that through anaerobic degradation tetrachloroethylene reduces to trichloroethylene, trans-1,2-dichloroethylene, and vinyl chloride. The high concentration of trichloroethylene (6,300 ug/l) in MW-25, may be the result of such anaerobic degradation. Based on the degradation principle and the presence of the degradation products in MW-25 and MW-24, the potential for seepage from the aeration basin exists, although tetrahloroethylene has not been identified in any of the well samples.

The sedimentation pond receives surface runoff from the treatment plant area. This pond was found to contain trace quantities of 1,1,1-trichloroethane and tetrachloroethylene in the water (could be due to the seepage from the aeration basin). Based on the analysis to date, the sediment samples analysis has not detected any contamination which indicates the sedimentation pond is not a source of ground water contamination.(3)

The underdrain is located along the northern edge of the aeration basin and discharges into the drop inlet of the sedimentation basin. The underdrain flow is then conveyed through the culvert to the stream. Construction drawings show that the underdrains are constructed of perforated pipes embedded in crushed rock and are located approximately 10 feet below the aeration basin bottom elevation. This poses a high potential for the underdrain to collect leachates migrating from the aeration basin (assuming the basin is leaking). Water level data (ITS-4) indicates a slightly higher reading than ITD-1, which can be interpreted as mounding. However, it can be concluded that due to the southeast flow of ground water and low trichloroethylene and no tetrachloroethylene concentration in the underdrain samples and excludes the aeration basin as a potential source of underdrain contamination. The underdrain system contains significant concentrations of trichloroethylene and trans-1,2-dichloroethylene which can be associated with the treatment plant facilities.

The stream samples receive their discharge from the underdrain system and surface drainage system. Analysis of the stream samples collected at the culvert discharge detected the presence of trichloroethylene, although at significantly lower concentrations than the underdrain sample. This is probably due to the loss of volatiles by aeration and volatilization. The tetrachloroethylene concentrations further decrease in the stream flow away from the culvert outlet. The source of trichloroethylene in the underdrain system and subsequently in the stream could be resulting from a leaking clarifier tank(s).

Because MW-9 is located north of the aeration basin and within the ground water flow pattern, it should be unaffected by the contents of the aeration basin. However, trace quantities of several organics indicate a different source of contamination is present. As MW-9 is located downgradient of the paint stripping operation and acid/caustic spillage is evident, the paint stripping operation is considered the source.

1.6 JRB ASSOCIATES

Environmental, Energy, and Resource Conservation Review of Air Force Plant 6

Prepared for

U.S. Air Force Occupational and Environmental Health Laboratory
U.S. Air Force Aeronautical Systems Division

Prepared by:

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October 1983

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LEN WAFFEN

EXECUTIVE SUMMARY

In response to Air Force Regulation 78-22, the Air Force Aeronautical Systems Division (ASD) at Wright Patterson Air Force Base (WPAFB) is conducting environmental reviews of 15 Government- Owned Contractor-Operated (GOCO) industrial facilities. This report presents the results of the review of Air Force Plant 6 (AFP 6) in Marietta, Georgia. It analyzes significant activities at this plant as they relate to:

- o Environmental management practices and regulatory compliance
- o Hazards associated with past, present, and planned environmental management practices
- o Opportunities for conserving, reusing, or recycling materials and energy resources in plant operations.

Report results are based on information obtained from AFP 6 personnel, ASD personnel, and a walk-through review of operations on August 11-13, 1983.

Summary of AFP 6

Air Force Plant 6 (AFP 6) is located on the Dobbins Air Force Base Military Reservation in Marietta, Georgia. Lockheed Georgia Company (LGC) is the only contractor on AFP 6. AFP 6 consists of four land parcels on 714 acres. Buildings have a total area of 6,444,606 million square feet. Activities involve specialized airframe development, production, and testing. Current production involves the C-130 Hercules prop-jet transport, aircraft modification, and spare parts manufacturing. Future production activities will also involve production of the C-5B Galaxy transport aircraft and modification of C-141's, C-5A Cargo transports, and C-130 aircraft.

Adjacent to AFP 6 property on the Dobbins Air Force Base Military Reservation are several other entities. Lockheed-Georgia Company owns and occupies 168 acres of land and improvements. The U.S. Naval Air Station, U.S. Marine Corps, and U.S. Corps of Engineers are also located on the base. These entities typically have little interface with LGC AFP 6 operations and activities.

Table E-1 presents a synopsis of the results of the environmental reviews performed for LGC operations at AFP 6. The table summarizes environmental activities, areas of non-compliance, additional hazard areas, and recommendations. Also presented are assessments of energy use activities, energy conservation opportunities, and resource conservation opportunities.

It should be noted that there is a distinction between above cited "areas of non-compliance" and "additional hazard areas." As indicated by the term, areas of non-compliance are operations and/or practices that were judged to be in violation of applicable environmental and energy laws and regulations. Additional hazard areas refer to non-regulated operations and/or practices that pose potential risks to human and environmental receptors.

R Regulatory Problem
H Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
WASTE		
Waste Generation Operations:	R7. (Major) Potential deficiencies in Part B Permit application:	-- Review Part B for noted deficiencies
o Vapor degreasing	-- Part A waste codes are inconsistent with Waste Characteristics Section	
o Painting	-- Surface impoundment variably identified as storage and disposal	
o Cleaning paint equipment and thinning paints	-- Topographic map requires further details	
o Cleaning aircraft fuel tanks	-- Aisle space is required	
o Electroplating and surface metal finishing and treatment	-- B-10 containment capacity may not be sufficient	
o Heat treating of fabricated metal parts	-- B-10 rainwater sampling procedures not included	
o Paint stripping	-- Surface impoundment data is inconsistent and inadequate	
o Thickening of industrial-wastewater treatment sludges	-- Notice of Deed for surface impoundment is necessary	
o Flushing firefighting foam	-- Additional closure and post-closure information is necessary	
o Aircraft sealing	H3. (Major) Use of trichloroethylene as a degreasing solvent.	-- Review use of trichloroethylene and investigate use of 1,1,1-trochloroethene or other agent.
o General clean-up operations		
o Photo-processing		
o Fueling and testing		

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R - Regulatory Problem
H Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (Continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
Waste Storage		
o Building B-10 storage area drums		
-- 8,140 gallon capacity		
Full waste drums and empty drums outside fenced area	R1. (Major) Storage of wastes in inadequately equipped and designed on un-permitted area.	-- Transport wastes to approved disposal facility or expand B-10 storage area. Review containment capacity of B-10 area.
Building T 569 storage area drums	R3. (Significant) Cyanide waste stored in raw material drums.	-- *Maintain LGC procedure* to use only clean reconditioned drums for collection and storage of generated wastes.
-- 5,500 gallon capacity		
-- To be replaced by Building T-559 storage area		

R - Regulatory Problem
H - Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities; Problems; Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
o Building B-32 storage area drums -- Recoverable materials	R2. (Major) Storage of wastes in inadequately equipped and designed area	-- Upgrade storage area
Waste Treatment: o Rotary vacuum filters -- Treat industrial wastewater treatment sludge	None	None
Waste Transportation o On-site -- Forklifts Mercury carts o Off-site -- Contracted haulers		

R - Regulatory Problem
H - Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
Waste Disposal and Recovery.		
o On-site		
- Surface impoundment	R5. (Critical) Noted groundwater contamination. State requested compliance schedule.	-- Accelerate investigation of groundwater contamination and remedial action.
- Installed 1969		
- 6.7 million gallons of waste		
- Seepage is probably occurring		
-- Disposal of oils and rags in incinerator and boiler		
o Off-site		
-- Contracted haulers, disposers, recyclers		
AIR		
At least 9 permitted sources	None	None

R - Regulatory Problem
H - Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
WATER Industrial Wastewater Treatment Plant: o Separate collection and treatment systems for: -- General Industrial Wastes (IWO) -- Concentrated Industrial Wastes (IWC) o Treated effluent discharged to Tertiary Treatment Plant o Sludges dewatered and dropped to surface impoundment	None	None
Tertiary Wastewater Plant: o Treat industrial wastewater treatment plant effluent and sanitary wastewaters o Discharges treated effluent via NPDES permitted outfall	None	None

R - Regulatory Problem
H - Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
OTHER SIGNIFICANT ACTIVITIES		
Petroleum Product Storage:	R8. (Majpr) SPCC Plan and oil material storage/handling activities do not meet all 40 CFR 112.1 - 112.7 requirements.	-- Review SPCC Plan and activities and make appropriate changes to to ensure compliance with 40 CFR 112.1 - 112.7 requirements
o Stationary tanks		
-- Ground level	H2. (Major) No routine inspection; potential for undetected release of fuels	-- Incorporate annual inspection of all tanks
-- Elevated		
-- Below ground		
o Mobile tanks		
o Tank trucks		
o Rail tank cars		
o Drums		
Use and Storage of PCB Items	R6. (Significant) Unlabelled PCB transformer vaults	-- Label PCB vaults
o PCB transformers	H1. (Major) Unspecific accounting of PCB transformers	-- Incorporate testing program for all transformers removed from service
o Storage of PCB items	H1. (Major) Potential for long term storage of PCB items	-- Arrange for removal of all PCB items by 1/1/84

R Regulatory Problem
H - Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
Raw Materials Storage. o Storage areas throughout facility	None	None
Steam Plant and Oil Incinerator. o Steam plant -- Burns general refuse, wood, paper, lightly soiled rags (13.2 tons/yr) o Oil Incinerator -- Burns fuel spillage, oils, and magna flux materials	R4. (Major) Incineration of oils containing contaminants is subject to 40 CFR Subpart O regulations. Oil residues around incinerator. No containment.	-- Review practice of burning waste oils - Sample oils for hazardous RCRA constituents - Investigate off-site recycling opportunities. -- Clean spilled oils and install containment
Waste Spill: o 1,000 gallons trichloroethylene spilled on 3/22/82 -- Currently cleaning up material from catch basin through aeration -- Performed sampling and monitoring	None	None

R Regulatory Problem
H Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
ENERGY		
Primary Sources: o Electricity o No. 2 fuel oil o Natural gas o Waste oil and solid waste	None	None
Energy Uses: o Lighting o Ventilation and air conditioning o Process o Heating	None	None
Energy Program: o In plant program per corporate policy Maintain energy use records Develop energy projects for funding approval Develop employee awareness program for energy conservation Maintain active Energy Conservation Committee	None	None

R - Regulatory Problem
H - Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
Goals: o AFR 28-22 goal not formally adopted	None	None
Progress Towards Achieving Goals: o Energy use up 23% over 1975 o Will not meet AF Goals o Good maintenance program for energy using systems	None	None
Projects Planned. o Several projects planned, Most significant are: -- Install heat recovery system in Paint Hangar -- Install control systems in individual Bldgs. -- Initiated program to convert production area lighting systems to high pressure sodium -- Evaluating heat recovery devices, variable speed motor controls, free cooling systems	Other conservation options available	-- Increase AF funding -- Retrofit project for B-98 boiler -- Evaluate installation of EMCS system -- Consider increasing solid waste incineration output -- Install chill water reset on chillers in B-25 -- Evaluate destratification of manufacturing areas -- Consider wall and ceiling insulation in Blgs. B-22 and B-28 -- Perform annual plant wide natural gas & compressed leak survey

R Regulatory Problem
H Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
		-- Install night setback in B-27 & B-28 -- Perform annual O_2 combustion tests on individual boilers -- Evaluate potential for additional steam condensate recovery -- Consider blow down heat recovery on flight line boiler (B-98) -- Recommend Plant Energy Conservation Committee establish annual goals.
Projects Completed: -- Solid waste incineration heat recovery plant installed -- Oxygen trim controls water conditioning and heat recovery in B-7 -- Replacement of Mercury Vapor and fluorescent lighting systems with HPS -- General energy conservation measures in routine maintenance -- Doing study of effects of changing air filters and cleaning of cooling coils -- Installed computerized load shedding capability	None	None

R - Regulatory Problem
H - Additional Hazard Area

Lockheed Georgia Company
Plant 6
Activities, Problems, Recommendations

Table E-1 (continued)

PLANT ACTIVITIES	EXISTING/POTENTIAL PROBLEMS: ENVIRONMENTAL/ENERGY/RESOURCE CONSERVATION	RECOMMENDATIONS
RESOURCE CONSERVATION		
On-site:	Possibility for further resource recovery of generated wastes	-- Segregate solvents by type at point of accumulation
o Collection and segregation of wastes		-- Investigate oil waste segregation
o Wastes recovered through:		-- Investigate off-site recovery of oils
-- Burning in oil incinerator		-- Investigate recovery of silver from photo-rinsewaters
-- Burning in waste steam boiler		
-- Silver removal from photo-processing fixer solution		
Off-site:		
o Program directed by Conservation Department involving:		
-- Degreasing solvents		
-- Equipment cleaning and paint thinning solvents		
-- Aircraft fuel tank cleaning solvents		
-- Raw material drums		

1.7 LAW ENGINEERING TESTING COMPANY

1.7.1 HYDROGEOLOGIC DATA

ESE Phase IIa IRP Air Force Plant No. 6

1.0 INTRODUCTION

Law Engineering Testing Company (LAW) has performed technical services to produce hydrogeologic data for use in Phase II A of the Installation Restoration Program for Air Force Plant 6 in Marietta, Georgia. Our services included the following:

1. Review of available project data, including several reports by Wilson and Company, and the Chester Engineers, 1984.
2. [illegible] s
3. Obtain boring location approvals
4. Drill test borings and install monitoring wells
5. Develop monitoring wells
6. Arrange surveying of wells
7. Conduct soils laboratory analyses
8. Perform field permeability tests
9. Measure water levels
10. Reduce and summarize test data
11. Analyses test results
12. Prepare this report of findings

Our services were performed as requested by Environmental Science and Engineering, Inc. (ESE), Mr. C. Richard Neff, Project Manager. Law's key project personnel were as follows:

Project Direction/Manager - Thomas L. Cross, P.E.

Site Engineer/Manager - Kenneth J. Seefried Jr., P.E.

Site Geologist - Charles A. Spiers, P.G.

Staff Geologist - William W. Gierke

Staff Geologist - Steve Shugart

We understand that the information we provide will be used by ESE to prepare a Review Draft Report for submittal to the United States Air Force Occupational and Environmental Health Laboratory (USAF OEHL).

Included in Law's report are descriptions of the services performed, results and findings.

The first section of our report describes the regional hydrologic setting. Subsequent sections describe the hydrogeologic conditions at each of twelve potential contamination sites. Many of the sites have previously been described by Wilson and Company, 1984 and the Chester Engineers, 1984. After a lengthy review of these reports, we have attempted to condense and summarize the hydrogeology of each of the sites described, and sites that Law Engineering have collected additional information. Appendices in this report include field and laboratory test procedures, individual test results, test boring records, and other data.

1.7.2 REPORT OF SUBSURFACE EXPLORATION AND PRELIMINARY GROUND WATER MONITORING PROGRAM

LAW ENGINEERING TESTING COMPANY

REPORT OF SUBSURFACE EXPLORATION
AND PRELIMINARY GROUNDWATER MONITORING PROGRAM
AIR FORCE PLANT NO. 6 DISPOSAL BASIN
LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
JOB NUMBER 9101

LAW ENGINEERING TESTING COMPANY
geotechnical, environmental & construction materials consultants
396 PLASTERS AVENUE, N.E.
P.O. BOX 13260 • ATLANTA, GEORGIA 30324
(404) 873-4761

March 17, 1981

Lockheed-Georgia Company
Department 49-11, Zone 255
Marietta, Georgia 30063

Attention: Mr. R. L. Kilgore

Subject: Report of Subsurface Exploration
and Preliminary Groundwater Monitoring Program
Air Force Plant No. 6 Disposal Basin
Lockheed-Georgia Company
Marietta, Georgia
Job Number 9101

Gentlemen:

Law Engineering Testing Company is pleased to submit this report of our subsurface exploration and preliminary groundwater monitoring program for the above project. This report has been prepared in accordance with our proposal number 1939-S and your purchase order number CX09793.

This report describes the exploration, presents the results, and discusses the subsurface conditions and the quality of the groundwater encountered at the site.

If you have any questions concerning this report, please do not hesitate to contact us.

Very truly yours,

LAW ENGINEERING TESTING COMPANY

James A. Hancock

James A. Hancock
Geotechnical Engineer

Donald G. Miller, Jr.

Donald G. Miller, Jr., P.E.
Technical Director
Waste Management Program

JAH:DGM/ljh

1.0 INTRODUCTION

1.1 PURPOSE OF EXPLORATION

The purpose of this exploration was to:

1) Determine subsurface conditions in the immediate vicinity of the subject disposal basin.

2) Determine if the disposal basin is leaking and thereby degrading the quality of local groundwaters (sample from the upper aquifer, as specified by 40 CFR Part 265.91, Federal Register, May 19, 1980, P. 33240 and 33257).

3) Provide data as a part of a compliance program for state and federal regulations governing the monitoring of hazardous material disposal areas.

1.2 SCOPE OF EXPLORATION

Our exploration consisted of five soil test borings, installation of monitoring wells, field permeability testing, laboratory testing, and an analysis.

Boring locations were established in the field by taping distances and estimating right angles from existing site features. These approximate locations are shown on the Boring Location Plan included in Appendix A. Standard penetration tests were performed in all of the borings in general accordance with applicable ASTM procedures. Undisturbed soil samples were also collected for laboratory testing. Sealed 2" PVC monitoring wells were installed at all of the boring locations. Drilling, well installation and field data collection procedures are included in Appendix B along with the Soil Test Boring Records. Elevations shown on these boring records were established by using a bench mark at building B-90 as shown on drawing PE:Z9-C.10-R3413-1, which was provided during our field work.

Laboratory tests were performed on undisturbed and selected split-tube soil samples taken from the site. Testing included grain size analysis, moisture content, Atterberg limits, and permeability testing. A short description of these test procedures and the test results are presented in Appendix C.

Analytical laboratory tests were also performed on groundwater samples taken on January 26, 1981 from four of the observation wells. These sample locations included one well situated hydraulically up gradient from the basin (B-5) for the acquisition of background data. Sample locations also included three wells (B-2, 3, 4) which were situated down gradient in a pattern that is reasonably expected to intercept possible contaminants reaching the groundwater system.

The tests performed on these samples were selected in accordance with applicable sections of RCRA (40 CFR 265.92 "Sampling and Analysis", Federal Register, May 19, 1980, P. 33240) and were performed in accordance with current USEPA standards and guidelines. The results of these laboratory tests are included in Appendix C.

We understand that no radioactive materials have been disposed in the study area. John Taylor, of the Georgia Environmental Protection Division, has informed us that tests for radioactive materials are generally not required when these materials have not been disposed in the study area; therefore, these tests were not performed.

2.0 PROJECT INFORMATION

2.1 SITE LOCATION AND TOPOGRAPHY

The subject disposal basin is shown on the attached Site Location Plan. The basin is located approximately 300 feet south of Radome Building B-90 adjacent to the antenna test area of the Lockheed-Georgia Company in Marietta, Georgia. As shown on the attached Boring Location Plan, the plan dimensions of the basin are approximately 300 feet by 150 feet. A patrol road, which establishes the northern extent of Dobbins Air Force Base, is located approximately 100 to 200 feet south of the basin. A stream, which flows generally from northwest to southeast, crosses this patrol road and is located approximately 150 to 200 feet southwest of the basin.

Topographic information for the site containing the subject disposal basin has been taken from the provided Lockheed-Georgia Company drawing number PE-Z9-C.10-R3413-1 entitled, "Industrial Waste Lake Sludge Disposal Basin Plot Plan" revised November 6, 1969. Site topography generally slopes downward from north to south and varies in elevation from approximately 1070 to 1035 with the ground surface immediately surrounding the basin embankments ranging from approximately 1060 to 1050. The topography drops sharply in the southern portion of the site toward the stream and the patrol road to a minimum elevation of approximately 1035.

The ground surface cover at the site consists of grass between building B-90 and the subject basin. The area to the south of the basin is moderately wooded. During the initial portion of our field work, these woods included numerous moderately-sized pine trees located primarily on the exterior southern embankment of the basin. Since that time the trees on the embankment have been cut down.

Four existing water wells are located to the south and southeast of the subject basin. The approximate location of these wells is shown on the Site Location Plan included in Appendix A. We understand that these wells have not been in use for several years, and that no future use is planned.

2.2 PREVIOUS SITE USE

We understand that the subject basin was constructed in an area previously utilized for the disposal of construction debris and soils. Materials deposited here may also have included scrap metals and paper. These waste materials are evident in previous subsurface investigations performed in 1969 and 1977.

2.3 BASIN CONSTRUCTION AND USE

Construction of the subject waste basin took place in 1969. We understand from Mr. W. L. Humphress of the Lockheed-Georgia Company that the area within the basin limits was excavated to an elevation of approximately 1041 during basin construction. The fill material which was encountered during that excavation was moved to the area immediately south of the basin. Mr. Humphress recalls that the excavation was not extended down to virgin soil in all areas within the basin prior to placement of a 4-foot thick compacted layer composed of on-site soils. This compacted soil layer was constructed up to an elevation of 1045 for the basin floor and extended up the basin embankments to elevations which would be exposed to waste. The embankments which form the basin limits were constructed to a maximum elevation of 1062.5 with interior slopes of 1.5H:1V and exterior slopes of 2H:1V.

We understand that the subject disposal basin has been in relatively continuous use since 1972. The waste material which was initially deposited in the basin had previously been retained in a basin located near building B-10 of the Lockheed-Georgia Company. We understand that the following wastes have been placed in the basin: heavy metal sludge, paint residues and sludge, and miscellaneous waste materials which include sulfates, fluorides, chlorides, lime, iron, oils and possibly cyanides. We further understand that no halogenated or chlorinated compounds such as solvents or thinners have been placed in the basin and that no record has been kept on the volume of waste placed in the basin.

3.0 GEOHYDROLOGIC CONDITIONS

3.1 GEOLOGY

The site is located in the Piedmont Physiographic Province which occurs as a wide band across this portion of the southeast. Piedmont soils consist generally of micaceous clayey silts, sandy silts and silty sands. Soils are formed by the chemical and/or mechanical weathering of the underlying parent rock. Normally, the most advanced weathering occurs near the surface. Weathering decreases with increased depth until the unaltered parent rock is encountered. Due to the weathering process, the soils tend to increase in sand content with depth and intact bedrock elevations are often quite erratic.

3.2 SUBSURFACE CONDITIONS

A subsurface cross section is included in Appendix B which presents the conditions encountered at the soil test boring locations. The following paragraphs present a generalized description of the soils encountered at the site. The attached cross-section and the Soil Test Boring Records provide more detailed descriptions at individual boring locations.

Beneath a thin surface veneer of topsoil, borings B-1 through B-4 encountered fill material. At boring location B-1 this fill material consisted of a surface cover of soils generally described as silty sands to an approximate depth of 7 feet. These soils were underlain by organic landfill material composed primarily of wood chips and soil to an approximate depth of 23 feet. The fill material encountered by borings B-2 through B-4 was composed of soils generally described as clayey silty sands. One exception to this condition was found at boring location B-3 where considerably more organic material was mixed with the soil between an approximate depth of 6 to 12 feet.

Residual soils were encountered beneath the fill materials at locations B-1 through B-4 and from the ground surface at location B-5. Residual soils are the product of the in-place weathering of the underlying parent bedrock. As shown by the attached grain size distribution curves, the residual soils encountered at the site can generally be described as silty sands with varying amounts of clay size particles. Borings B-2 through B-4 were terminated in these residual soils.

Material classified as partially weathered rock was encountered at boring locations B-1 and B-5. Partially weathered rock is a designation applied to residual material with a penetration resistance near 100 blows per foot. This material was encountered at approximate depths of 28 and 33 feet in B-1 and B-5, respectively and extended to a depth of approximately 43 feet at both of these boring locations. The partially weathered rock encountered at these locations generally varies from silty sands to primarily sandy material.

Refusal material, defined as material which cannot be penetrated by soil drilling equipment, was encountered at a depth of approximately 43 feet at boring locations B-1 and B-5. Refusal may result from boulders, rock seams or the upper surface of hard continuous rock.

3.3 GROUNDWATER

Water table surfaces in the Piedmont generally conform to the local topography and intersect the ground surfaces at ponds and streams. Groundwater level measurements taken at the site on January 26, 1981 indicate a decrease in the water table from north to south. These elevations include a high of 1043.8 at B-5 to a low of 1026.3 at B-4. Measurements also indicate a drop in the groundwater elevations moving from east to west in the borings located south of the basin. These readings range from a high elevation of 1034.3 at B-2 to 1026.3 at B-4. Based on these readings, groundwater appears to flow in the southeastern direction. These readings also indicate that groundwater at the time of our field work was located within the residual soils mass at all boring locations except B-2 where it is approximately at the cut-fill line.

We note that groundwater elevations tend to fluctuate due to such factors as seasonal and climatic variations and surface runoff and could therefore be different at other times.

3.4 PERMEABILITY

One laboratory permeability test was performed on a sample of unsaturated fill soils with results of 6×10^{-7} cm per second. This value may not represent totally saturated conditions and would be expected to increase with saturation. We note that the zones of organic material within the fill soil mass may possibly have higher permeabilities which would be likely to allow water to move through the organic zones at a higher rate than through the soils themselves.

The permeability of residual soils at the site was tested in both the laboratory and by field in-situ tests. These results range from 4×10^{-6} to 1×10^{-4} cm/sec. Our experience indicates that 10^{-4} to 10^{-5} cm/sec values are typical of this portion of the Piedmont.

4.0 GROUNDWATER QUALITY

The laboratory test results indicate a significant increase in concentrations for several parameters from the background well (B-5) to the wells located down gradient from the subject basin (wells B-2, 3, 4). Several selected parameters are summarized in the following table:

AVERAGE OF FOUR REPLICATE TESTS[1]

MONITORING WELL	SULFATE ION SO_4 (mg/l)	TOTAL MANGANESE (mg/l)	pH	SPECIFIC CONDUCTANCE (umho/cm at 25°C)	TOC (mg/l)	TOH (mg/l as Cl)
B-2	600	9	6.3	1818	41	1.4
B-3	570	12	5.3	1380	25	1.7
B-4	120	6.8	5.4	815	10	0.5
B-5	3	0.93	7.0	38	6	0.5

Complete results presented in Appendix C.

[1] Parameters used a indicators of groundwater contamination (40 CFR 265.92 "Sampling and Analysis, Federal Register, May 19, 1980, p. 33240).

In addition, further inspection of the GC scan indicated the following:

Well B-5 Sample - trace of DDT,
- 0.18 ppb 2,4,5 - T (2 columns)

Well B-2 Sample - 0.93 ppb methyl parathion (2 columns),
- numerous organophosphates

5.0 CONCLUSIONS

The groundwater quality testing indicates that some degradation of the groundwater has occurred in the area downgradient from the subject basin.

This conclusion is based on comparison of downgradient sample results with the upgradient (B-5) control sample results. With the exception of one suspect nitrate result (B-4) no samples contained concentrations in excess of the EPA Interim Primary Drinking Water Standards; however, this does not imply that there could not be any health and/or safety hazards. The one suspect nitrate result (74 mg/l) should be verified in subsequent sampling.

Additional significant information regarding samples from the upgradient well (B-5) is the indication of the presence of DDT and 2,4,5-T. One possible source of the latter is the solvents which are used on the concrete apron area located north of building B-90.

The most significant downgradient contamination was found in wells B-2 and B-3 which indicate sulfates in excess of 500 mg/l, organic carbon at about 30 mg/l and total organic halogens at about 1.5 mg/l. The GC scan indicated 0.93 ppb methyl parathion and numerous organophosphates. The B-2 and B-3 locations also exhibit magnesium levels of about 10 mg/l; however, none of the other heavy metals tested (refer to Appendix C) were greater than detection limits. Sodium, which is a fairly mobile groundwater flow tracer, was elevated to more than 400 mg/l downgradient as compared to an upgradient sodium of about 4 mg/l.

Based on these observations and the information provided regarding the contents of the basin, it is reasonable to conclude that seepage is occurring from the basin. To date, there is no indication of significant heavy metal contamination although manganese is somewhat elevated. However, as noted, some organics (methyl parathion and organophosphates) may be migrating from the basin. We understand that NPDES monitoring downstream from the basin has not revealed any contamination.

6.0 RECOMMENDATIONS FOR FURTHER STUDY

The future use of the basin will likely be a function of several factors including groundwater use in the area, long term documentation of contaminant migration, future regulations and regulatory agency interpretation of those regulations as well as plant operational requirements. Approaches to addressing the geohydrologic and water quality aspects are presented in the following sections.

6.1 Evaluation of Water Use

We recommend further investigation (in the form of a study) of potential use of both surface water and groundwater in areas on Dobbins A.F.B. or Lockheed property which are located downgradient from the basin. If sources of potential drinking water are found, these sources should be sampled for contamination.

6.2 Assessing Extent of Groundwater Degradation and Documentation of Performance

Various interim status and proposed regulations address the need to determine the rate and extent of migration of contaminants. In order to assess the vertical and lateral migration of contaminants, additional data in the form of groundwater levels and groundwater quality from downgradient locations is required. For this geohydrologic setting we anticipate that wells at a minimum of three (3) additional downgradient locations will be necessary. At least 2 vertical levels should be sampled at two of these locations.

Sampling from these wells as described in Section 6.3 should be conducted. The resulting data can then be used with geohydrologic data obtained at the monitoring well locations in order to make predictions on the anticipated extent of groundwater degradation in the area.

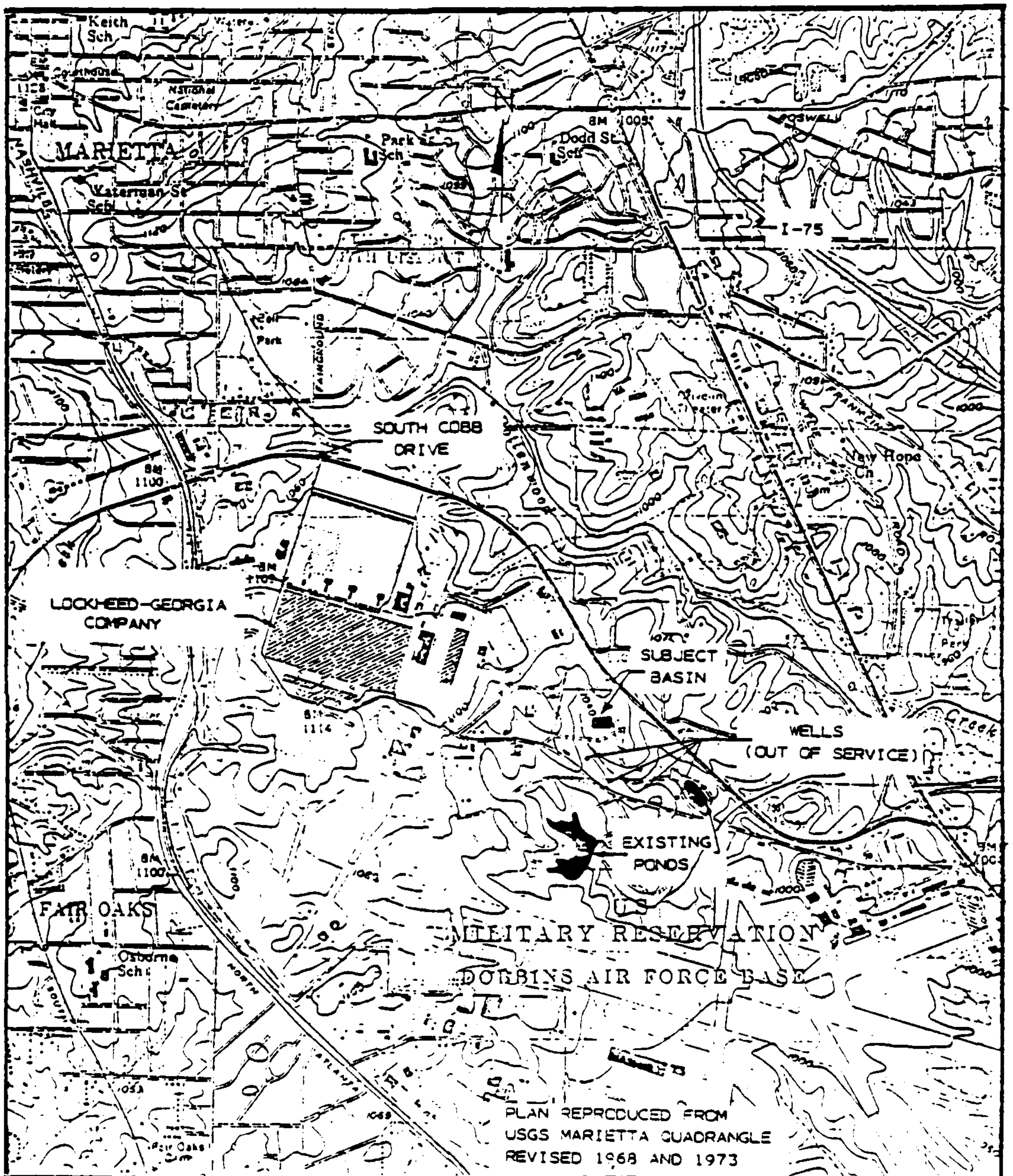
6.3 Sampling Program

In addition to the well installation and sampling discussed in Section 6.2, we recommend taking additional samples from the existing wells. Sampling of sediments from the adjacent stream bed is also recommended. Sampling should be conducted on a monthly basis for at least a 3 to 6 month period during spring and summer in order to determine if seasonal fluctuations are occurring in the contaminant concentrations. These samples should also be analyzed for parameters which presently indicate groundwater degradation in the area immediately south of the basin. It may also be advisable to analyze a few key parameters which are specifically indicative of the contents of the basin.

6.4 Basin Maintenance

We recommend that the basin embankments be kept clear of trees which have the potential for extending deep roots into the basin embankments. After extended periods of time, this growth can lead to the development of channels for contaminants to leak out of the basin.

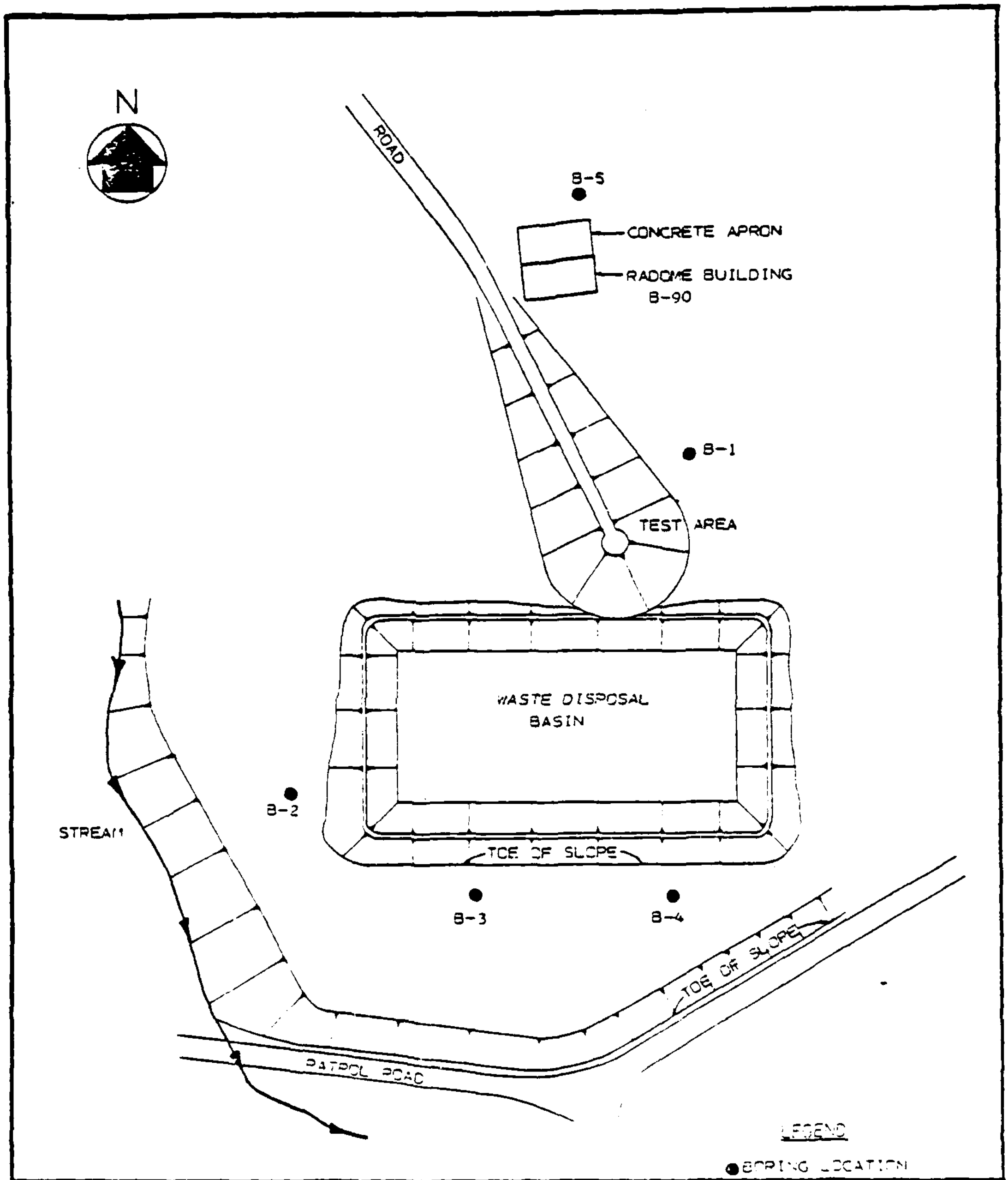
Appendix A
Drawings



Law Engineering Testing Company
Geotechnical and Materials Engineers

SITE LOCATION PLAN
AFP NO. 7 WASTE DISPOSAL BASIN
LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA

Job Number	Scale
9101	1:24000



Law Engineering Testing Company
Geotechnical and Materials Engineers

BORING LOCATION PLAN
AFP NO. 6 WASTE DISPOSAL BASIN
LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA

Job Number	Scale
9101	1" = APPROXIMATELY 100'

Appendix B
Field Operations

FIELD OPERATIONS

The general field procedures employed by Law Engineering Testing Comany are summarized in ASTM Specification D-420 which is entitled, "Investigating and Sampling Soils and Rocks for Engineering Purposes." This recommended practice lists recognized methods for determining soil and rock distribution and groundwater conditions. These methods include in situ test methods as well as borings.

Borings are drilled to obtain subsurface samples using one of several alternate techniques depending upon the subsurface conditions. These techniques are:

a) Continuous 2-1/2 or 3-1/4 inch I.D. hollow stem augers;

b) Wash borings using roller cone or drag bits (mud or water);

c) Continuous flight augers (ASTM Spec. D-1425).

These drilling methods are not capable of penetrating through material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core drilling procedures are required to determine the character and continuity of refusal materials.

The subsurface conditions encountered during drilling are reported on a field test boring record by the Chief Driller. The record contains information concerning the boring method, samples attempted and recovered, indications of the presence of various materials such as coarse gravel, cobbles, etc., and observations of groundwater. It also contains the driller's interpretation of the soil conditions between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are on file in our office.

The soil and rock samples plus the field boring records are reviewed by a geotechnical engineer. The engineer classifies the soils in general accordance with the procedures outlined in ASTM Specification D-2488 and prepares the final boring records which are the basis for all evaluations and recommendations.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examination and tests of the field samples. These records depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in a change in the subsurface soil and groundwater conditions at these boring locations. The lines designating the interface between soil or refusal materials on the records and on profiles represent approximate boundaries. The transition between materials may be gradual. The final records are included in this Appendix.

The detailed data collection methods used du ng this study are discussed on the following pages in this Appendix.

SOIL SAMPLING PROCEDURES

PENETRATION TEST AND SPLIT-TUBE SAMPLING

Penetration tests and split-tube sampling are normally conducted in the drilling operations. The standard penetration test provides samples for visual examination and classification tests.

The standard penetration test and split-tube sampling are conducted simultaneously according to ASTM Specification D-1586-67. At regular intervals, the drilling tools are removed and soil samples obtained with a standard split-tube sampler connected to an AW-rod. The sampler is first seated six inches, to penetrate any loose cuttings, then driven an additional foot with blows of a 140 pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final foot is recorded and is designated the "penetration resistance" Representative portions of the soil samples obtained from each split-tube sample are placed in glass jars, sealed and transported to our laboratory.

Descriptions of the split tube sample and the penetration resistances are shown on the attached "Soil Test Boring Records".

UNDISTURBED SAMPLING

Split-tube samples are suitable for visual examination and classification tests but are not sufficiently intact for quantitative laboratory testing. Relatively undistrubed samples are obtained by pushing sections of three inch O.D., 16 gauge, steel or brass tubing (Shelby tube) into the soil at the desired sampling levels. This procedure is described by ASTM Specification D-1578-67. Each tube, together with the encased soil, is carefully removed from the ground, made airtight, and transported to the laboratory. Locations and depths of undisturbed samples are shown on the "Soil Test Boring Records".

MONITORING WELL INSTALLATION

The wells installed for groundwater monitoring were constructed in general accordance with the USEPA Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities (EPA/530/SW-611, August, 1977). Typically, the monitoring wells consist of a section of 2-inch I.D. schedule 40 PVC solid wall pipe fitted mechanically to a slotted section of PVC pipe placed at the lower 10 feet of the installation. The slotted section is protected by a backfill of clean fine gravel completely filling the annular space between the borehole and the pipe. The annular space above the gravel is sealed utilizing bentonite pellets. Above this, cohesive soil backfill is employed to within 3 feet of the existing ground surface. A surface seal of portland cement is then placed to effectively seal the installation and preclude the entry of surface waters. The PVC assembly projects above the ground surface approximately 2 to 3 feet and is furnished with a PVC cap. Following installation, all wells were adequately developed in order to provide representative groundwater samples.

FIELD VARIABLE HEAD PERMEABILITY TESTS

Field variable head tests are used to determine the in situ permeability of soils. In performing field variable head tests, water is removed from the bore hole and the resulting groundwater level is measured. The water level is then allowed to rise while readings of the groundwater level are taken at predetermined time intervals. The data provides a means of calculating the permeability coefficient. The results of these tests are included on the subsurface cross section in Appendix B.

The variable head permeability test is best suited for relatively impermeable soils. If the permeability is very high, the rate of water rise is too rapid to obtain accurate readings or to have enough time intervals to compute an average permeability.

MONITORING WELL DATA
LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
JOB NUMBER 9101

MONITORING WELL	DEPTH[1]	GROUND ELEVATION[2]	GROUNDWATER DEPTH[3]	GROUNDWATER ELEVATION
B-1	43	1064.6	28.6	1036.0
B-2	30	1052.4	18.1	1034.3
B-3	30	1051.3	22.9	1028.4
B-4	30	1050.0	23.7	1026.3
B-5	29	1070.8	27.0	1043.8

[1] BELOW LAND SURFACE, IN FEET.

[2] ELEVATIONS BASED ON BENCH MARK AT BUILDING B-90 AS SHOWN ON DRAWING PE:Z9-C.10-R3413-1 PROVIDED BY LOCKHEED.

[3] IN FEET BELOW LAND SURFACE, MEASURED ON JANUARY 26, 1981.

KEY TO CLASSIFICATIONS AND SYMBOLS

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

	NO. OF BLOWS, N	RELATIVE DENSITY
SANDS	0–4	VERY LOOSE
	4–10	LOOSE
	10–30	FIRM
	30–50	DENSE
	OVER 50	VERY DENSE
		CONSISTENCY
SILTS AND CLAYS	0–2	VERY SOFT
	2–4	SOFT
	4–8	FIRM
	8–15	STIFF
	15–30	VERY STIFF
	30–50	HARD
	OVER 50	VERY HARD

SYMBOLS

	-Undisturbed sample (UD) recovered
	-Undisturbed sample (UD) not recovered
100/2"	-Number of blows (100) to drive the spoon a number of inches (2)
AX BX, NX	-Core barrel sizes which obtain cores 1-1/8, 1-5/8 and 2-1/8 inches in diameter respectively
65%	-Percentage (65) of rock core recovered
RQD	-Rock quality designation-%of core segments 4 or more inches long
	-Water table at least 24 hours after drilling
	-Water table one hour or less after drilling
◄	-Loss of drilling water
A	-Atterberg limits test performed
C	-Consolidation test performed
GS	-Grain size test performed
T	-Triaxial shear test performed
P	-Proctor compaction test performed
V	-Field vane shear test performed
18	-Percent of natural moisture content (18)

DRILLING PROCEDURES

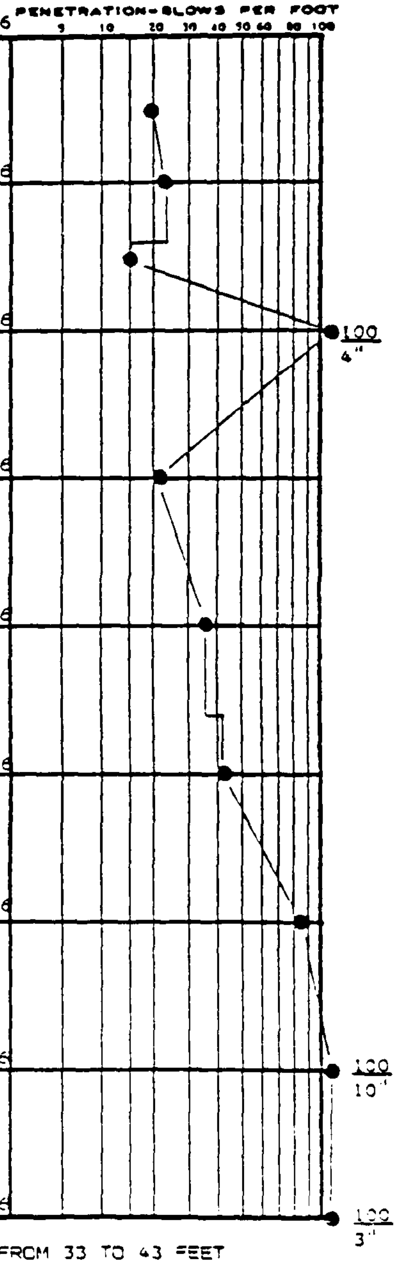
Soil sampling and penetration testing performed in accordance with ASTM D 1586-67.
The standard penetration resistance is the number of blows of a 140 pound hammer falling 30 inches to drive a 2 inch O.D., 1.4 inch I.D. split spoon sampler one foot.
Core drilling in accordance with ASTM designation D 2113-62T.
The undisturbed sampling procedure is described by ASTM specification D 1587-67.

Law Engineering Testing Company

Soil Test Boring Record

BORING NUMBER: B-1
DATE DRILLED: 11/12/80
JOB NUMBER: 9101
PAGE 1 OF 2

DEPTH (FT.)	DESCRIPTION	ELEV.
0		1064.6
0.5	TOPSOIL	
	FIRM BROWN MICACEOUS SILTY FINE SAND - FILL	1059.6
7	SILTS AND SANDS WITH ORGANIC LANDFILL MATERIAL	1054.6
		1049.6
		1044.6
23	DENSE BROWN MICACEOUS SILTY FINE SAND - RESIDUAL	1039.6
28	VERY DENSE BROWN MICACEOUS SILTY FINE SAND - PARTIALLY WEATHERED ROCK	1034.6
		1029.6
40		1024.6



REMARKS: 2 INCH SLOTTED PVC MONITORING WELL INSTALLED FROM 33 TO 43 FEET

Law Engineering Testing Company

Soil Test Boring Record

BORING NUMBER B-1
DATE DRILLED 11/12/80
JOB NUMBER 9101
PAGE 2 OF 2

DEPTH (FT.)	DESCRIPTION	ELEV.	PENETRATION-BLOWS PER FOOT
40		1024.6	100/3"
	VERY DENSE BROWN MICACEOUS SILTY FINE SAND- PARTIALLY WEATHERED ROCK		
43	BORING REFUSAL AT 43 FEET	1019.6	

REMARKS: 2 INCH SLOTTED PVC MONITORING WELL INSTALLED FROM 33 TO 43 FEET

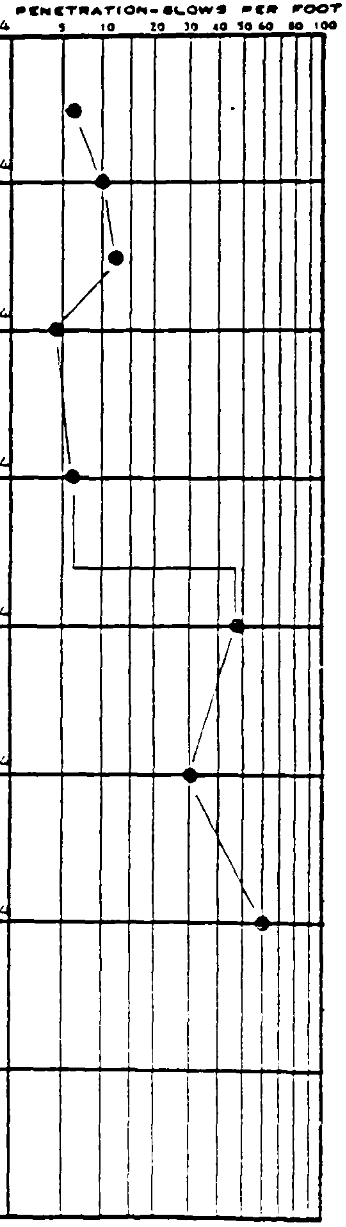
Law Engineering Testing Company

Soil Test Boring Record

BORING NUMBER B-2
DATE DRILLED 11/13/80
JOB NUMBER 9101
PAGE 1 OF 1

DEPTH (FT.)	DESCRIPTION		ELEV.
0			1052.4
0.5	TOPSOIL		
	LOOSE TO FIRM BROWN CLAYEY MICACEOUS SILTY FINE TO COARSE SAND WITH OCCASIONAL ORGANICS, GRAVEL AND DEBRIS - FILL	A GS 21% K_L	1047.4 1042.4 1037.4
18	DENSE TAN AND BROWN MICACEOUS SILTY FINE TO COARSE SAND - RESIDUAL		1032.4
23	FIRM TO DENSE BROWN MICACEOUS SILTY FINE SAND		1027.4
30	BORING TERMINATED AT 30 FEET		1022.4

PENETRATION-BLOWS PER FOOT



REMARKS: 2 INCH SLOTTED PVC MONITORING WELL INSTALLED FROM 20 TO 30 FEET

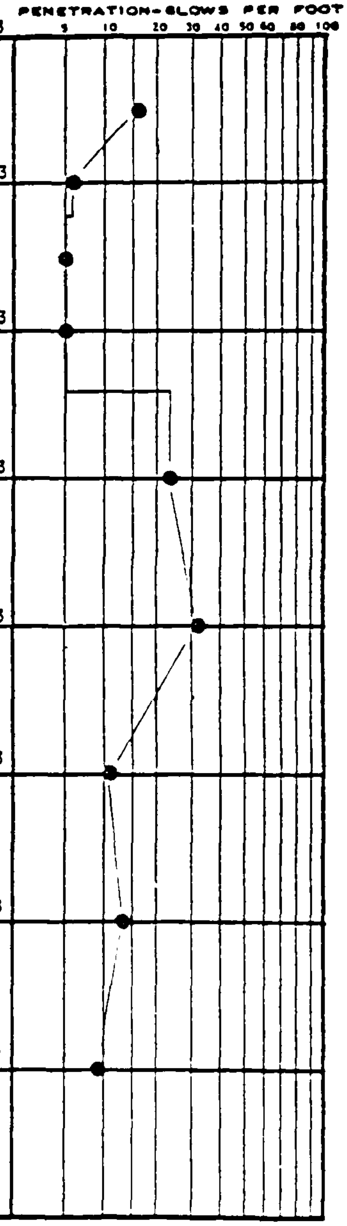
Law Engineering Testing Company

Soil Test Boring Record

BORING NUMBER B-3
DATE DRILLED 11/13/80
JOB NUMBER 9101
PAGE 1 OF 1

DEPTH (FT.)	DESCRIPTION		ELEV.
0			1051.3
0.5	TOPSOIL		
	FIRM TO LOOSE BROWN CLAYEY MICACEOUS SILTY FINE TO MEDIUM SAND - FILL	A GS	1046.3
6	LOOSE ORGANIC BROWN CLAYEY MICACEOUS SILTY FINE SAND - FILL		1041.3
12	FIRM TO DENSE TAN AND BROWN SLIGHTLY CLAYEY MICACEOUS SILTY FINE TO MEDIUM SAND - RESIDUAL	A GS 26% K L	1036.3
			1031.3
23	FIRM TO LOOSE TAN AND BROWN SLIGHTLY CLAYEY MICACEOUS SILTY FINE SAND WITH OCCASIONAL THIN ZONES OF COARSE SAND		1026.3
			1021.3
35	BORING TERMINATED AT 35 FEET		1016.3

PENETRATION—BLOWS PER FOOT



REMARKS: 2 INCH SLOTTED PVC MONITORING WELL INSTALLED FROM 20 TO 30 FEET

Law Engineering Testing Company

Soil Test Boring Record

BORING NUMBER B-4

DATE DRILLED 11/13/90

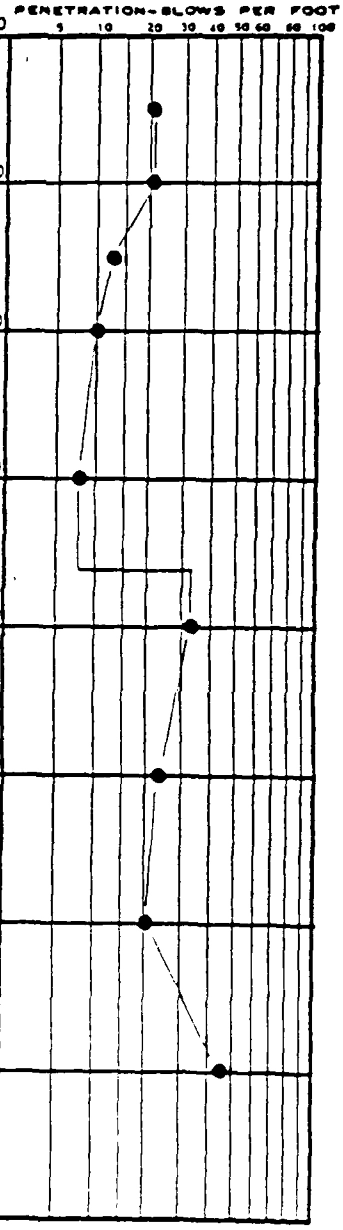
JOB NUMBER 9101

PAGE 1 OF 1

DEPTH (FT.)	DESCRIPTION	ELEV.
0		1050.0
0.5	TOPSOIL	
	FIRM TO LOOSE BROWN CLAYEY MICACEOUS SILTY FINE SAND WITH OCCASIONAL ORGANICS AND GRAVEL - FILL	1045.0
		1040.0
		1035.0
18	DENSE TAN AND BROWN SLIGHTLY CLAYEY MICACEOUS SILTY FINE TO MEDIUM SAND - RESIDUAL	1030.0
23	FIRM TAN AND BROWN SLIGHTLY CLAYEY MICACEOUS VERY SILTY FINE TO MEDIUM SAND	1025.0
		1020.0
33	DENSE GRAY AND BROWN MICACEOUS SILTY FINE TO MEDIUM SAND	
35	BORING TERMINATED AT 35 FEET	1015.0

A GS

PENETRATION-BLOWS PER FOOT



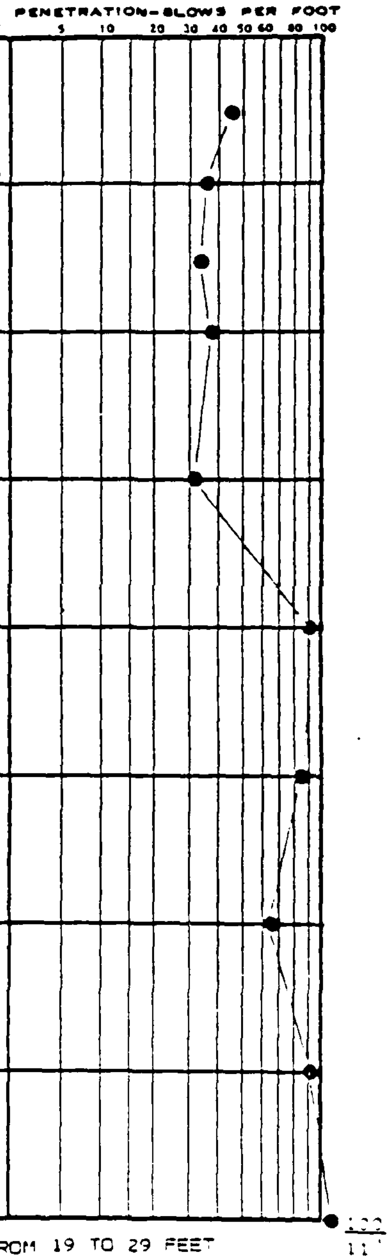
REMARKS: 2 INCH SLOTTED PVC MONITORING WELL INSTALLED FROM 20 TO 30 FEET

Law Engineering Testing Company

Soil Test Boring Record

BORING NUMBER: B-5
DATE DRILLED: 11/17/80
JOB NUMBER: 9101
PAGE 1 OF 2

DEPTH (FT.)	DESCRIPTION	ELEV.
0	DENSE TAN GRAY AND BROWN MICACEOUS SILTY FINE SAND - RESIDUAL	1070.8
		1065.8
		1060.8
		1055.8
19	VERY DENSE TAN GRAY AND BROWN MICACEOUS SILTY FINE SAND - RESIDUAL	1050.8
		1045.8
		1040.8
32	VERY DENSE TAN AND DARK GRAY MICACEOUS FINE TO COARSE SAND - PARTIALLY WEATHERED ROCK	1035.8
40		1030.8



REMARKS: 2 INCH SLOTTED PVC MONITORING WELL INSTALLED FROM 19 TO 29 FEET

Law Engineering Testing Company

Soil Test Boring Record

BORING NUMBER B-5
DATE DRILLED 11/17/80
JOB NUMBER 9101
PAGE 2 OF 2

DEPTH (FT.)	DESCRIPTION	ELEV.	PENETRATION-BLOWS PER FOOT
40		1030.8	100/11"
	VERY DENSE TAN AND DARK GRAY MICACEOUS FINE TO COARSE SAND - PARTIALLY WEATHERED ROCK		
43	BORING REFUSAL AT 43 FEET	1025.8	

REMARKS: 2 INCH SLOTTED PVC MONITORING WELL INSTALLED FROM 19 TO 29 FEET

Appendix C
Laboratory Testing

LABORATORY PROCEDURES FOR SOIL TESTING

ATTERBERG LIMITS

A representative sample of soil is tested to determine its plasticity characteristics as an indication of the shrink-swell potential. The soil's plastic index (PI) is representative of this characteristic and is bracketed by the liquid limit (LL) and the plastic limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid and is determined in accordance with ASTM D-423. The PL is the moisture content at which the soil begins to lose its plasticity and is determined in accordance with ASTM D-424. The data is shown on the corresponding Grain Size Distribution sheets in Appendix C.

GRAIN SIZE DISTRIBUTION TEST

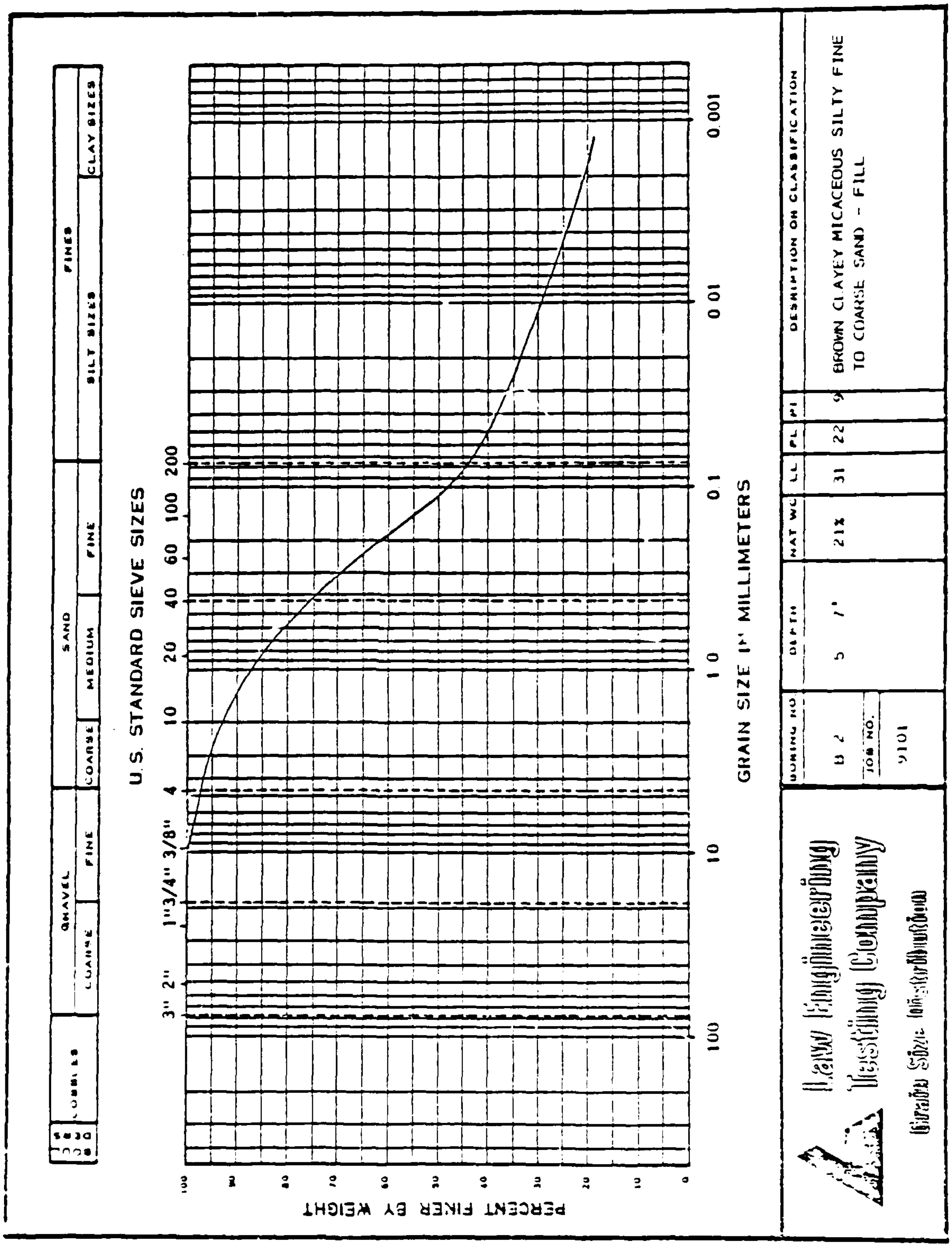
Grain size tests are performed to determine the particle size and distribution of soil samples. The grain size distribution of soils coarser than 0.075 mm in diameter is determined by passing the sample through a set of nested sieves. Material less than 0.075 mm in diameter is suspended in water and the grain size distribution measured by the rate of settlement. These tests are similar to those described by ASTM D-421 and D-422. The results are presented in Appendix C in the form of a curve showing the distribution of particle diameters.

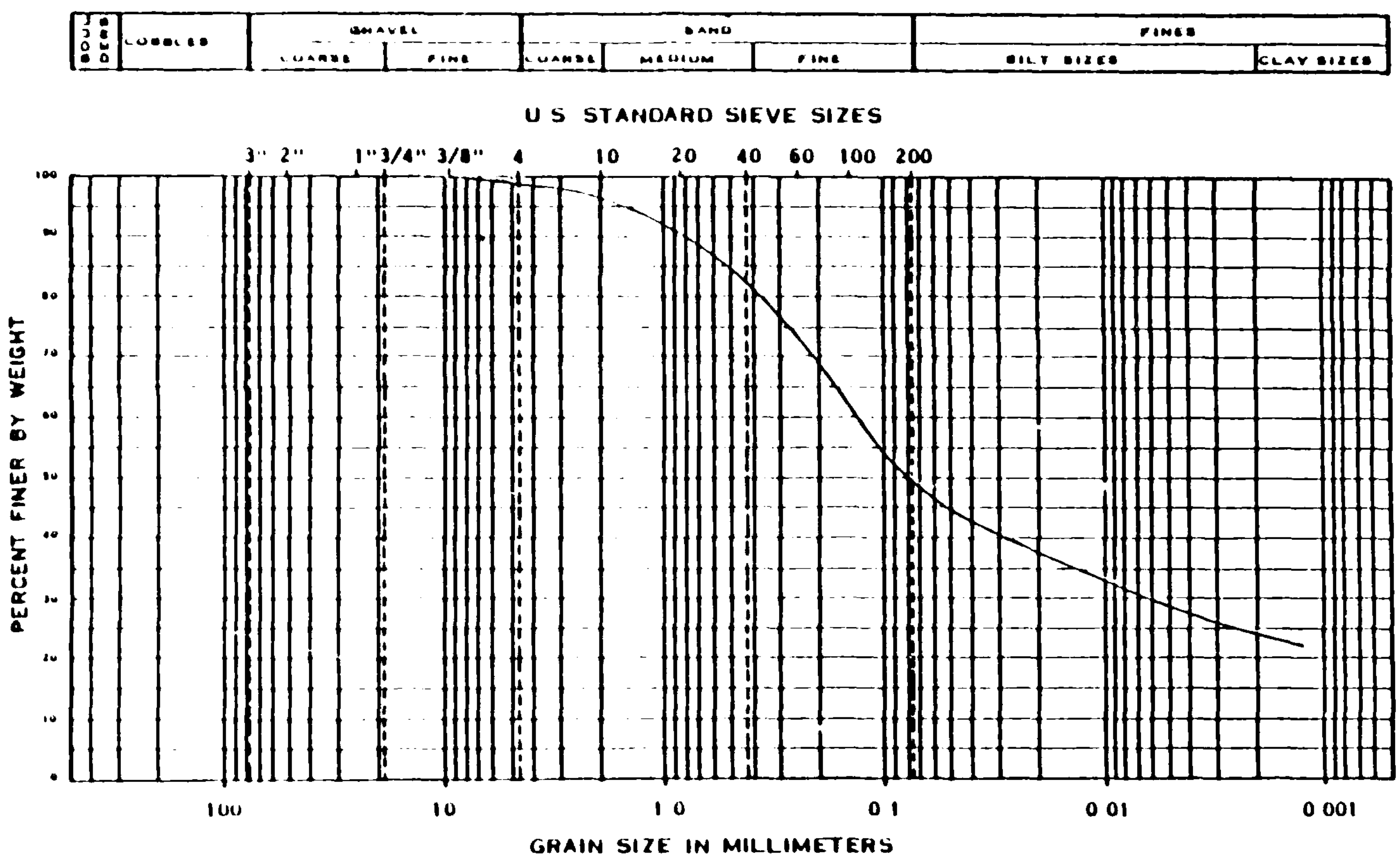
MOISTURE CONTENT

The moisture content of soil is defined as the weight of water in a given soil mass divided by the weight of dry soil solids in the same mass. Natural moisture contents are determined in accordance with ASTM designation D-2216. The data is shown on the Soil Test Boring Records in Appendix B and on the corresponding Grain Size Distribution sheets in Appendix C.

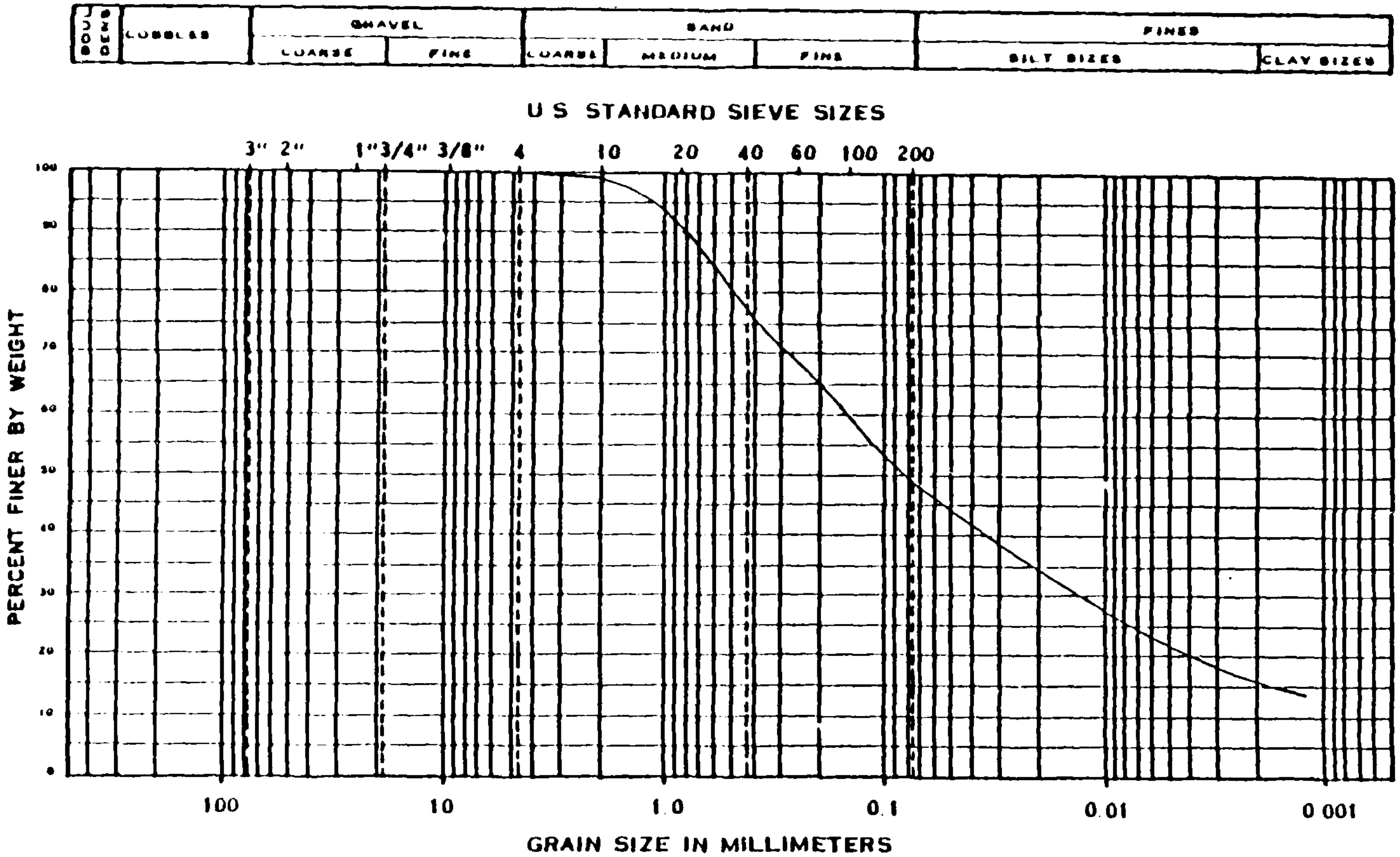
PERMEABILITY TEST

The permeability coefficient of representative soil samples are obtained by laboratory testing of undisturbed samples. A hydrostatic head is applied to the top of the sample and the quantity of water flowing through the sample is measured for a given time period. The data provides a means of calculating the permeability coefficient. The results of these tests are included in Appendix C, and on the subsurface cross section in Appendix B.


U.S. STANDARD SIEVE SIZES
3" 2" 1"3/4" 3/8" 4 10 20 40 60 100 200
COBBLES
GRAVEL
COARSE
FINE
SAND
COARSE
MEDIUM
FINE
FINES
SILT SIZES
CLAY SIZES
PERCENT FINER BY WEIGHT
100 90 80 70 60 50 40 30 20 10 0
100 10 1.0 0.1 0.01 0.001
GRAIN SIZE IN MILLIMETERS
BORING NO
B-2
JOB NO.
9101
DEPTH
5-7'
NAT WC
21%
LL
31
PL
22
PI
9
DESCRIPTION OR CLASSIFICATION
BROWN CLAYEY MICACEOUS SILTY FINE TO COARSE SAND - FILL
Law Engineering Testing Company
Grain Size Distribution



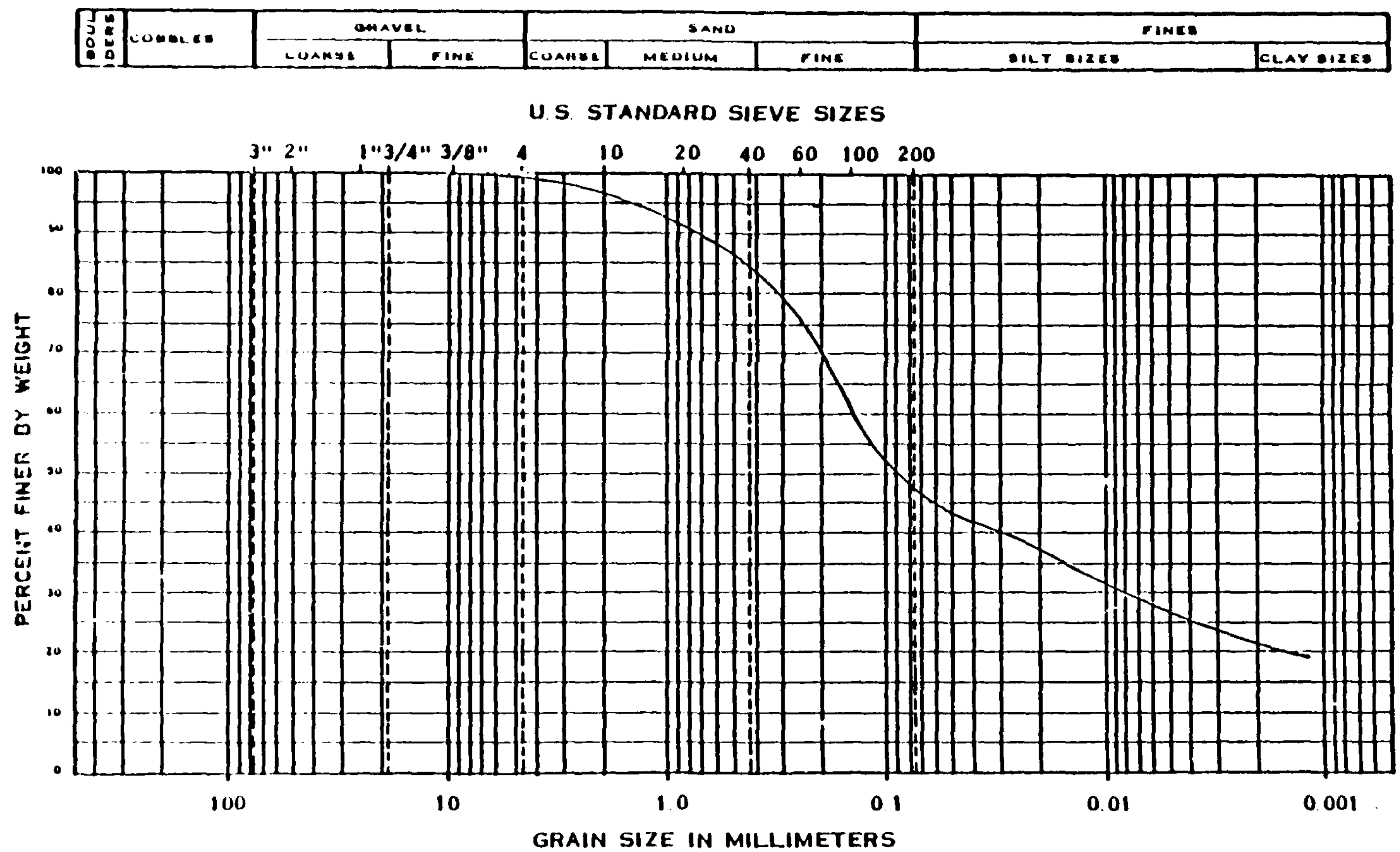
Law Engineering Testing Company	BORING NO	DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
Grain Size Distribution	B 3	5'		33	20	13	BROWN CLAYEY MICACEOUS SILTY FINE TO MEDIUM SAND - FILL
	JOB NO						
	9101						



Law Engineering Testing Company

Grain Size Distribution

BORING NO.	DEPTH	NAT WC	LL	PL	PI	DESRIPTION OR CLASSIFICATION
B-3	14-16'	26%	NL	NP		TAN AND BROWN SLIGHTLY CLAYEY MICACEOUS SILTY FINE TO MEDIUM SAND - RESIDUAL
JOB NO.						
9101						



Law Engineering Testing Company

Grain Size Distribution

BORING NO.	DEPTH	NAT WC	LL	PL	PI	DESRIPTION OR CLASSIFICATION
B-4	15'	21%	31	25	6	BROWN CLAYEY MICACEOUS SILTY FINE TO MEDIUM SAND - FILL
JOB NO.						
9101						

RESULTS OF LABORATORY PERMEABILITY TESTS
LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
JOB NUMBER 9101

BORING	SAMPLE DEPTH (FT.)	DRY WEIGHT (PCF)	MOISTURE CONTENT (%)
B-2	5-7	101	21
B-3	14-16	93	26

VOID RATIO	CONFINING STRESS (KSF)	HEAD (PSI)	PERMEABILITY (CM/SEC)
0.67	0.3	2	6×10^{-7} [1]
0.82	0.9	2	4×10^{-6} [1]

[1] THIS VALUE MAY NOT REPRESENT TOTALLY SATURATED CONDITIONS AND WOULD BE EXPECTED TO INCREASE WITH SATURATION.

RESULTS OF ANALYTICAL TESTS
LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
JOB NUMBER 9101

PARAMETER	GROUNDWATER SAMPLE LOCATION B-2	B-3	B-4	B-5[1]
PH	6.2	5.2	5.4	7.2
	6.3	5.3	5.4	7.0
	6.3	5.3	5.4	6.9
	6.3	5.3	5.4	6.9
SPECIFIC CONDUCTANCE (UMHO/CM AT 25° C)	1810	1380	810	38
	1820	1380	820	38
	1820	1380	810	38
	1820	1380	820	38
TOTAL ORGANIC CARBON (MG/L)	42	25	11	5
	38	24	9	5
	38	25	10	6
	45	26	11	6
TOTAL ORGANIC HALOGEN (MG/L AS Cl)	1.4	1.7	0.5	0.4
	1.5	1.6	0.5	0.5
	1.4	1.7	0.5	0.5
	1.4	1.6	0.5	0.5
CHLORIDE, Cl^- (MG/L)	90	59	70	5
TOTAL IRON (MG/L)	<0.1	<0.1	<0.1	<0.1
TOTAL MANGANESE (MG/L)	9	12	6.8	0.93
PHENOLICS (MG/L)	0.019	0.014	<0.005	<0.005

[1]BACKGROUND MONITORING WELL

PARAMETER	GROUNDWATER SAMPLE LOCATION B-2	B-3	B-4	B-5[1]
TOTAL SODIUM (MG/L)	440	280	140	3.3
SULFATE ION, SO_4 (MG/L)	600	570	120	3
TOTAL ARSENIC (MG/L)	<0.05	<0.05	<0.05	<0.05
TOTAL BARIUM (MG/L)	<0.3	<0.3	<0.3	0.3
TOTAL CADMIUM (MG/L)	<0.005	<0.005	<0.005	<0.005
TOTAL CHROMIUM (MG/L)	<0.05	<0.05	<0.05	<0.05
FLUORIDE, F^- (MG/L)	<0.1	0.1	0.2	<0.1
TOTAL LEAD (MG/L)	<0.02	<0.02	<0.02	<0.02
TOTAL MERCURY (MG/L)	<0.0005	<0.0005	<0.0005	<0.0005
NITRATE, NO_3-N (MG/L)	<0.1	<0.1	74*	1.1
TOTAL SELENIUM (MG/L)	<0.2	<0.2	<0.2	<0.2
TOTAL SILVER (MG/L)	<0.05	<0.05	<0.05	<0.05

[1]BACKGROUND MONITORING WELL
*SUSPECT VALUE

PARAMETER	GROUNDWATER SAMPLE LOCATION B-2	B-3	B-4	B-5[1]
ENDRIN (MG/L)	<0.00003	<0.00003	<0.00003	<0.00003
LINDANE (MG/L)	<0.000008	0.00008	<0.000008	<0.000008
METHOXYCHLOR (MG/L)	<0.0003	<0.0003	<0.0003	<0.0003
TOXAPHENE (MG/L)	<0.0012	<0.0012	<0.0012	<0.0012
2, 4-D (MG/L)	<0.0052	<0.0052	<0.0052	<0.0052
2, 4, 5-TP, SILVEX (MG/L)	<0.0001	<0.0001	<0.0001	<0.0001
TURBIDITY (NTU)	3100	1000	1700	1800
TOTAL COLIFORM (COLONIES PER 100 ML)	<100 NI	<100 NI	<100 NI	1700 NI

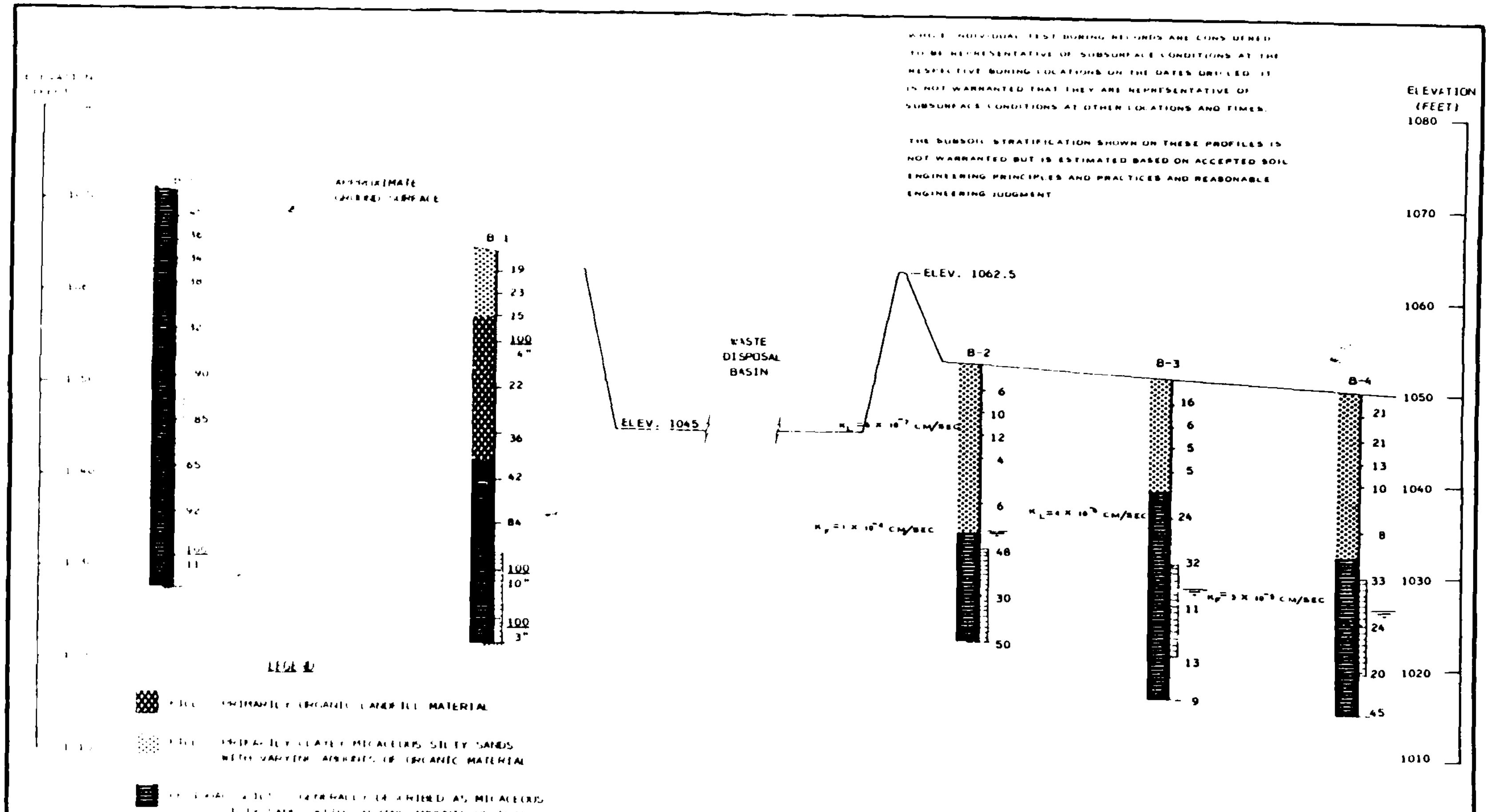
ADDITIONAL INFORMATION:

B-5 TRACE OF DDT
0.18 PPB 2, 4, 5-T (2 COLUMNS)

B-2 0.93 PPB METHYL PARATHION (2 COLUMNS)
NUMEROUS ORGANOPHOSPHATES

NO PCBS FOUND IN SAMPLES

[1]BACKGROUND MONITORING WELL



Law Engineering Testing Company
Geotechnical and Materials Engineers

SUBSURFACE CROSS SECTION
AFP NO. 6 WASTE DISPOSAL BASIN
LOCKHEED GEORGIA COMPANY
MARIETTA, GEORGIA

JOB NUMBER 9101

SCALE AS SHOWN

ELEVATIONS BASED ON BENCH MARK AT BUILDING B-90 TAKEN FROM PROVIDED DWG. PE: 29-C.10 R3413 1

ATTACHMENT "C"

1.8 WILSON AND COMPANY

1.8.1 GROUND WATER QUALITY ASSESSMENT REPORT SURFACE IMPOUNDMENT

LOCKHEED-GEORGIA COMPANY
A DIVISION OF LOCKHEED CORPORATION
MARIETTA, GEORGIA

GROUNDWATER QUALITY ASSESSMENT REPORT
SURFACE IMPOUNDMENT
(Industrial Waste Sludge Disposal Basin)

AIR FORCE PLANT NO. 6
MARIETTA, GEORGIA

By
TM Christy
BL Johnson

10 OCTOBER 1984
(84-031)
(84-9528)

WILSON
& COMPANY
ENGINEERS &
ARCHITECTS

SECTION I - EXECUTIVE SUMMARY

A groundwater quality assessment has been performed at the hazardous waste surface impoundment at Air Force Plant No. 6, Marietta, Georgia. This investigation was undertaken in response to previous analytical data gathered from an existing groundwater monitoring system installed at the subject surface impoundment. These data indicated that contaminants may be emanating from the surface impoundment, triggering regulatory requirements for a groundwater quality assessment.

The groundwater quality assessment was performed in a hierarchical manner, beginning with indicator studies yielding information about the contaminant plume, expected groundwater flow patterns and water quality from various sources within the study area, and ending with the installation [illegible] sampling of monitor wells to confirm the limits of contamination [illegible] from the impoundment.

Contamination is migrating from the surface impoundment. These migrating contaminants form a plume which flows southwest from the impoundment and discharge into an adjacent stream. The maximum extent of groundwater contamination from the surface impoundment is approximately [illegible] feet [illegible] of the impoundment.

Contaminants migrating from the impoundment include heavy metals, [illegible] priority pollutants, and common salts. The contaminant plume from the impoundment discharges into the stream where contaminants are both [illegible] and removed to environmentally safe levels. Data gathered during the course of this study indicate that the receiving stream meets all [illegible] safe drinking water limits prior to leaving the site.

The distribution of volatile compounds at the site was found to be extremely complex, owing to the apparent presence of several contaminant sources other than the subject hazardous waste surface impoundment.

This document satisfies the requirement for groundwater quality assessment, but does not include results of Appendix VIII analyses. These data will be furnished separately in the near future.

Recommendations presented in this report include the following:

a. Modifications should be made at the B-90 building in order to abate existing sources of contamination.

b. The extent of the volatile organic contaminant plume to the northeast of the impoundment should be determined. This determination is outside the scope of this project.

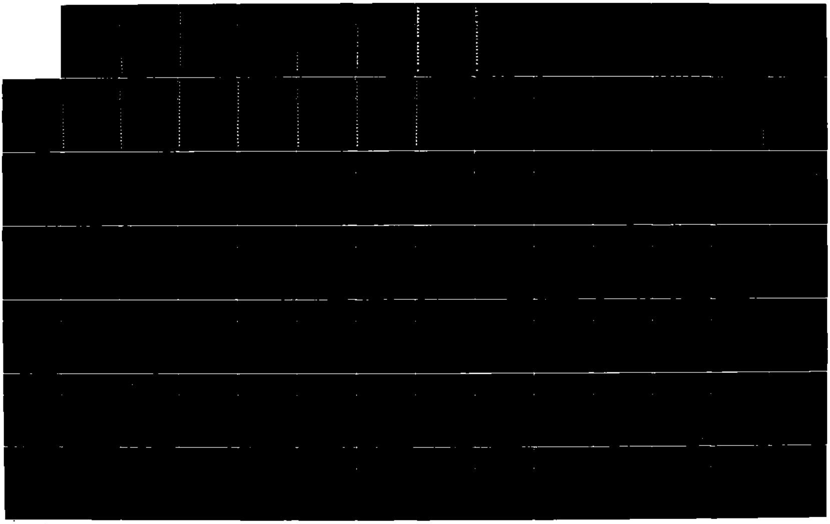
c. The source of the contaminant plume on the west bank of the impoundment should be determined and abated. This work is outside the scope of this project.

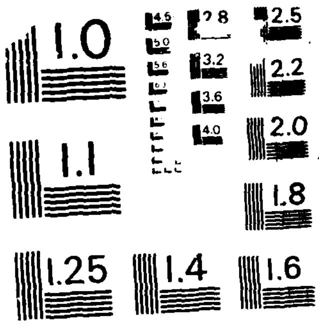
d. Regular monitoring should be performed at the stream prior to the point of exiting the study area in order to assure that the quality of this discharge does not exceed tolerable contaminant limits.

e. The treatment and delisting of the hazardous waste impoundment contents should be investigated as an alternate means of closing this facility.

AD-A190 453 INSTALLATION RESTORATION PROGRAM PHASE 2 CONFIRMATION/QUANTIFICATION STAG..(U) ENVIRONMENTAL SCIENCE AND ENGINEERING INC GAINESVILLE FL 3/5

UNCLASSIFIED C R NEFF ET AL. 09 AUG 86 F/G 24/3 NL





MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

SECTION IV - CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION.

Previous sections of this report have presented investigative methodology and analytical data. Interpretation of these data has been limited to the development of flow patterns in the residual soil and bedrock in the surface impoundment area. This section provides assessment of the distribution of contaminants across the site, their origin and eventual fate.

B. DISTRIBUTION AND CONCENTRATION OF INORGANIC CONTAMINANTS.

The apparent distribution of inorganic contaminants is well-defined across the site. Data suggest contaminants migrate from the surface impoundment and travel through the plume area indicated on Plate IV-1, discharging into the stream. The apparent boundaries for the discharge zone of this plume have been established by the stream survey. Apparent boundaries of this plume in the residual soil have been established by well analyses. The reader is referred to Section III for complete tabulations of analytical data from individual wells and stream points.

Data suggest Wells D-1, B-2, B-3 and B-4 are all contaminated with leachate from the surface impoundment. Concentrations of nearly all of the common ions are elevated within the plume area though sodium and sulfate are predominate. Sodium and chloride concentrations, useful tracers in the flow of contaminants in the impoundment area, are shown on Plate IV-2. By contrast, concentrations in monitor wells D-3, D-4, D-7 and E-4 are representative of background water quality. A band of elevated sodium and chloride concentrations does extend through B-1 and B-6. Flow patterns show that these slightly elevated concentrations are not from the surface impoundment. Their most likely source is the septic tank leach field east of the E-30 building.

Concentrations of zinc and cadmium are slightly elevated in the plume area. The maximum concentration of zinc is .22 mg/l in Well B-4. The maximum concentration of cadmium is .0009 mg/l in B-4, far below the drinking water limit for this metal.

Lead concentrations are also elevated in the plume area. The lead concentration in Well D-1 is 0.083 mg/l which exceeds the safe drinking water limit of 0.05 mg/l.

Analysis of Well BR-2 indicates that groundwater intercepted by the open bore hole interval in bedrock (29-79') is contaminated with inorganics from the surface impoundment. However, this contamination does not extend to the 180-229 foot bedrock interval monitored by Well BR-3.

C. DISTRIBUTION AND CONCENTRATION OF ORGANIC CONTAMINANTS.

Organic compounds encountered at the site include phenolic and volatile, base neutral and acid priority pollutants. The occurrence and distribution of these compounds across the site indicate that sources of organic contaminants other than the [illegible].

[illegible] Table [illegible] and base [illegible] volatile and base neutral compounds only.

TABLE IV-[illegible]

SUMMARY OF [illegible]

Compound	Detection Limit	Locations Detected
[illegible]	[illegible]	[illegible], D-7, E-2, B-3, BR-1
Volatile Compounds (ug/l)		
Chlorobenzene	5.	E-2, B-4, B-6, E-8
1,1,2-Trichloroethane	5.	E-8, E-8
1,1-Dichloroethane	5.	D-1, E-2, B-3, B-4, BR-2, E-8
1,1-Dichloroethylene	5.	Pump 6, BR-2, E-1, D-1, B-1, B-2, B-3, B-4, B-5, E-8
Methylene Chloride	5.	D-1, D-2, E-5, D-4, B-4, Pump 6, BR-2, E-8
1,2-Transdichloroethylene	5.	Pump 6, BR-2, E-5, D-1, D-2, E-7, E-8, SP-1, D-3, D-4, B-2, B-3, B-4
1,1,1-Trichloroethane	5.	E-1, D-1, B-1, B-2, B-3, B-4, B-5, BR-2, E-7, E-8
Trichloroethylene	5.	B-3, B-4, B-5, B-6, B-7, BR-1, BR-2, E-1, E-5, D-1, D-2, D-3, D-4, D-5, D-6, B-1, B-2, E-6, E-7, E-8, SP-1
Vinyl Chloride	5.	E-5, D-1, D-2, B-1, B-2, B-3, B-4, Pump 6, BR-2, E-8
Chloroform	5.	D-2, D-4
1,2-Dichloroethane	5.	D-2, D-4, B-1, E-5, E-3, E-7, E-8
1,2-Dichloropropane	5.	D-2, D-4, D-6, B-4, B-6, E-7, E-8
Base Neutrals (ug/l)		
Bis (2-Ethylhexyl) Phthalate	5.	B-7, BR-1, BR-2, E-6, E-4, E-7, E-8, E-2, E-3, D-1, D-2, D-3, D-5, B-1, B-3, B-4, B-5, B-6, Pond

TABLE IV-1 (Continued)

Compound	Detection Limit	Locations Detected
Di-N-Butyl Phthalate	5.	D-1, D-3, D-5, B-1, B-5
1,2-Dichlorobenzene	5.	D-2, D-4, BR-1, E-5, E-[illegible]
Di-N-[illegible]	5.	[illegible]
[illegible]	5.	[illegible]
[illegible]		
[illegible]	[illegible]	[illegible]

The distribution of organic compounds across the site, their origin and residence time, is a complex puzzle, the solution of which is beyond the [illegible] of this project.

[illegible] sources of [illegible] [illegible] the [illegible] impoundment, are apparently present in the study area. A third extraneous source is [illegible].

[illegible] confirm that organic compounds have entered the groundwater at the B-[illegible] building. This source is believed to have been in existence long enough to contribute organic compounds to the groundwater beneath the impoundment area prior to the construction of the impoundment. Onto this pre-existing plume is superimposed the impoundment leachate. The seepage mound of the impoundment precludes any further flow under the impoundment from the B-90 building, diverting the pre-existing plume to the east, creating a wider area of contamination.

A second source of contamination is believed to exist on the west bank of the stream. This source may be the materials landfilled in this area, or industrial leakage to the west and north.

A third [illegible] of organic contaminants may exist and be the source of contaminants in the (B-6)-(D-2)-(D-4) area. An alternate explanation is that these contaminants originated at the B-90 building. Flow patterns and inorganic analyses in the (B-6)-(D-2)-(D-4) area suggest that contaminants in this area are not from the impoundment.

The distribution of organic compounds across the site is not consistent with the distribution of inorganic compounds from the surface impoundment or the flow patterns in the impoundment area. Distributions for the various compounds are discussed individually in the following paragraphs:

1. Phenols were detected at only five locations among the "B" and "D" series wells. Although phenols do appear to be migrating from the impoundment as indicated by their detection in wells B-2 and B-3, the detection of these compounds in wells D-5, D-6 and D-7 indicate the presence of a second source. Flow from the impoundment does not appear to be capable of transporting phenols to D-5, D-6 and D-7. The concentration of phenol in B-2 and B-3 is [illegible] and 0.011 mg/L, respectively. The concentration of phenols at D-[illegible] and D-[illegible] is [illegible] and [illegible] mg/L, respectively.

The highest concentration of phenol is encountered above the seep area (point SA-1) near the head of the stream, apparently from an extraneous source. The phenol concentration at this point is 0.[illegible] mg/l. Phenols are rapidly diluted after SA-1, but remain above the detection limit through stream station S-12. Phenols are below the detection limit [illegible] at stream station S-1.

[illegible]

a. 1,1-Dichloroethane. [illegible] for this compound is shown on Plate IV-3. This [illegible] to be migrating from the [illegible] impoundment. [illegible] are not [illegible] of the impoundment [illegible]

b. 1,1-Dichloroethylene. A distribution plot for this compound is shown on Plate IV-4. This compound is found [illegible] the site in a wide [illegible] [illegible] for this [illegible] are apparently [illegible] the [illegible] building and adjacent septic tank leach field, and one originating at the surface impoundment. Prevailing flow patterns should eventually carry this compound from the [illegible] area to wells D-[illegible], D-2, D-5 and D-[illegible]. 1,1-Dichloroethylene is found in the stream in a pattern which confirms the distribution of the contaminant plume on Plate IV-4. The peak stream concentration being attained at the culvert (stream station S-[illegible]) and then diminishing from that point downstream.

c. 1,1,1-Trichloroethane. Plate IV-5 depicts the distribution of this compound in the study area. This plume is similar to the pattern obtained for 1,1-Dichloroethylene, contaminants being found in an area extending from the [illegible] area southwest to the stream. This plume appears to be the result of [illegible] separate [illegible]. The [illegible] portion of the plume originating at the [illegible] building and the southwest portion originating at the surface impoundment. Contaminants from the impoundment should move in the already established plume area south and east of the impoundment. The northeast portion of the plume can be expected to move [illegible] to the (D-2)-[illegible] area. The extreme northeast tip of the plume should move to the southeast.

d. 1,2-Dichloropropane. This compound has a distribution concentrated in a narrow area southeast of the surface impoundment as shown on Plate IV-6. Because 1,2-Dichloropropane was not found in the impoundment pore waters it is doubtful that the concentration of 1,2-Dichloropropane in well P-4 originated from the impoundment. The lack of any inorganic contamination in wells D-4, D-2, D-5 and D-6 strongly implicate a separate source. This plume probably originates in the landfill. This plume [illegible] intersect with the stream as indicated by the stream survey. 1,2-Dichloropropane in P-4 can be expected to move within the impoundment contaminant [illegible] in a southeast direction to the stream. The portion of the [illegible] can be expected to move southeast to be intercepted by the [illegible]

e. Trichloroethylene. Analyses indicate the presence of four separate sources for this plume. Present data do not facilitate the development of isocons at each of these sources. However, the contamination from the surface impoundment is apparently well defined. Isocons have been drawn for the highest concentrations of trichloroethylene in the study area. These are shown on Plate IV-7.

One source of Trichloroethylene contamination is believed to occur at the B-90 building, resulting in low level concentrations in B-7, B-6, E-1 and BR-1. A second source or sources appears responsible for trichloroethylene contamination in E-5, D-3 and E-6. Both of the areas are located so as to preclude the flow of water from the surface impoundment. Inorganic constituents at both locations indicate that contamination from the surface impoundment has not occurred. Flow from the (E-5)-(E-6) area will be east to the secondary stream. Flow from the B-90 area should be south to the (D-2)-(B-6)-(D-6) area, with the east side of the plume area at E-1 moving east.

Trichloroethylene in the (B-2)-(B-3)-(B-4)-(D-1) area is probably from the impoundment. The lack of any inorganic contaminants in the (D-5)-(D-2)-(D-4) area strongly favors a separate source for the contamination found in this area. The extent of trichloroethylene in areas downgradient and southeast of the surface impoundment has probably achieved its maximum extent, while contaminants at D-6 will apparently migrate southeast to be intercepted by the secondary stream.

f. 1,2-Transdichloroethylene. The distribution of this compound is shown on Plate IV-8. Two basic areas of contamination are shown: an area south of the surface impoundment and an area on the west bank of the stream. The area on the west bank favors a source other than the surface impoundment.

D. RATE AND EXTENT OF CONTAMINATION.

Wilson Laboratories believes that the actual extent of both inorganic and organic contamination from the surface impoundment is equivalent to the area defined on Plate IV-1. This area is surrounded on the north, east and southeast by contaminants apparently derived from other sources. It would appear that a plume or plumes from other sources also exists on the west bank of the stream.

The contaminant plume from the surface impoundment is believed to have established its maximum extent as shown on Plate IV-1 The rate of flow within this plume varies from approximately 17 to 90 feet per year. The plume is intersected by and discharges into the stream.

Data suggest constituents contributed to the stream by the impoundment are either diluted, as in the case of inorganics, or removed, as in the case of volatile priority pollutants, prior to the stream leaving the study area. Data indicate the stream water leaving the site is free from harmful concentrations of any constituent and would be considered a safe drinking water supply by any standard.

Data gathered from the three bedrock wells installed at the site indicate that contaminants from the residual soil mantle have entered the site bedrock. Contamination was detected in the upgradient position bedrock Well BR-1, which penetrated to a depth of 93 feet below ground surface. Contamination was found in downgradient Well BR-2 which penetrated to a depth of 79 feet below ground surface. Well BR-3 which penetrates to a depth of 230 feet was found to be free from contamination. This well sampled formation water at a depth of 183-223 feet.

As discussed in Section III, the flow pattern of groundwater through the bedrock is ill-defined.

In general, it can be said that the net transport of water through the bedrock will closely parallel flow in the residual soils; moving toward the center and down the valley. The impoundment plume is located adjacent to the stream which serves as a groundwater discharge zone from the bedrock. For this reason solutes from the impoundment have little impetus to enter the bedrock. The bedrock surface is irregular and can be expected to be recharged from the directly overlying residual soils. The pumping of Wells BR-1 and BR-2 for sampling purposes may have induced contaminant flow into these wells from the residual soils.

This document satisfies the requirements of the groundwater quality assessment plan with the exception of Appendix VIII analysis data. Pursuant to the 21 September letter[7] from Georgia EPD to Lockheed, these data will be provided separately in the near future.

E. RECOMMENDATIONS.

The following recommendations are forwarded based on the analytical results and conclusion of this study:

1. The B-90 building should be modified such that the disposal of all industrial wastes will be to the Lockheed Industrial Waste Plant rather than to the existing septic tank-leach field system. In addition, an enclosed industrial solvent storage area should be constructed for this building and administrative steps taken to assure that all personnel are instructed in and carry out the safe disposal of solvents.

2. The extent and fate of the plume extending east from the B-90 building should be determined, but this is considered outside the scope of this project.

3. The source or sources of contaminants to the stream west bank should be determined and, if possible, abated. This work is also outside the scope of this project.

4. The stream should be monitored at station S-0 and analysis made for common ions, heavy metals, organic priority pollutants and phenolic compounds in order to assure that the present high quality of water leaving the site is maintained. This monitoring should be performed in accordance with Georgia EPD requirements. No remedial action other than that provided by the natural environment is recommended.

5. Analysis of the impoundment contents shows that these materials would not meet the definition of a hazardous waste if the organic priority pollutants were removed. Removal of these compounds and delisting of the sludge would allow the disposal of this sludge in a permitted industrial landfill. Such disposal would, in all probability, be more economical than disposal in a hazardous waste landfill, as well as being environmentally safer. For these reasons, we recommend that Lockheed-Georgia undertake an engineering and economic investigation of this treatment and disposal option.

1.8.2 GEOTECHNICAL ENGINEERING REPORT

GEOTECHNICAL ENGINEERING REPORT

WASTE IMPOUNDMENT
LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA

Prepared By

Hanson Engineers Incorporated
1525 South Sixth Street
Springfield, Illinois 62703

Prepared For

Wilson & Company
631 E. Crawford Avenue
P.O. Box 1648
Salina, Kansas 67401

August 9, 1984

SYNOPSIS

A geotechnical investigation was conducted by Hanson Engineers, Inc. to investigate the stability and seepage conditions for the embankments of the existing Waste Impoundment at the Lockheed-Georgia Company in Marietta, Georgia. The investigation and subsequent stability analyses indicated that adequate stability factors-of-safety exist for the idealized cross sections that were studied. Considerations of the seepage conditions (as they relate to the structural integrity of the embankments) indicate no apparent areas that may adversely influence the embankments' structural integrity.

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22 October 1984

Lockheed-Georgia Company
86 S. Cobb Drive
Marietta, GA 30063

Attn: J.H. Lucas
Dept. 49-11

Re: Dike Structural Integrity
Groundwater Assessment Plan Implementation
Purchase Order No. CA 95072
Register No. B5454
Subcontract Agreement No. 03 84 528
WCEA File: 84-031

Dear Mr. Lucas:

It is our opinion that the Geotechnical Engineering Report on Lockheed's Surface Impoundment prepared for us by Hanson Engineers, Incorporated, satisfies the intent of 40 CFR Part 264.226(c). This report is included in our Groundwater Quality Assessment Report as Appendix B.

Our opinion is based on the fact that the Hanson Report is a certified document by a qualified engineer (George F. Jameson, Georgia P.E., Registration No. 14604) who states the following:

1. "The investigation and subsequent stability analyses indicated that adequate stability factors of safety exist for the idealized cross sections that were studied. Considerations of the seepage conditions (as they relate to the structural integrity of the embankments) indicate no apparent areas that may adversely influence the embankments' structural integrity." (Second and third sentences of the synopsis appearing immediately after the Table of Contents.)

2. ". . ., it is Hanson Engineers' opinion that the embankment is in a structurally stable condition." (Portion of last sentence on page 17 of paragraph titled Results.)

3. "This seepage, though important in considering possible contamination of the groundwater, does not appear to adversely influence the embankment stability." (Fifth sentence on page 17 of paragraph titled Seepage Considerations.)

4. "It is not considered necessary to modify the existing embankment to improve its structural integrity or seepage conditions (as they relate to stability)." (First sentence on page 18 of only paragraph in section entitled RECOMMENDATIONS.)

The Hanson Report addresses the horizontal stability of the dike and the affect of seepage and provides backup data and calculations to support the opinions therein as required by 40 CFR Part 264.226(c). We therefore submit that the entire Hanson Report included as Appendix B of our Groundwater Quality Assessment Plan is the required certification of dike stability by a qualified engineer.

In the eight copies of the report furnished you for permit application purposes, Mr. Jameson's seal did not reproduce. Therefore, we are enclosing ten copies of the page on which his seal did reproduce.

If you have any questions or require additional information, please contact us.

WILSON & COMPANY

Herbert H. Bassett, P.E.

-slw

WILSON
& COMPANY
ENGINEERS &
ARCHITECTS

1.8.3 CHEMICAL WASTE TREATMENT FOR INDUSTRIAL WASTE TREATMENT PLANT B-10

Chemical Waste Treatment for Industrial Waste Treatment Plant B-10
Wilson & Company Architects + Engineers

June 1985

SECTION I - EXECUTIVE SUMMARY

This Engineering Report has been completed to present alternatives for the treatment of phenolic compounds and waste stream reduction measures for chemical milling operations at Air Force Plant No. 6 operated by the Lockheed Georgia Company, Marietta, Georgia.

Several methods of chemical reduction of phenols as well as biological reduction were considered. Of these, the biological method has been recommended to be applied on the basis of both initial cost and operating costs. This method requires only the addition and maintenance of mutant bacteria in the existing activated sludge basin. Although a relatively new procedure, effectiveness has been proven at other similar operations.

This method can be applied and the effectiveness confirmed for an initial cost of approximately $6,000. The length of trial is expected to be three months.

None of the physical/chemical methods considered would be cost-effective. And, there are no other known methods to be considered further.

Therefore, should the mutant bacteria be not effective, Lockheed should consider negotiating with the Georgia EPD for an increase in their NPDES Permit Limit for phenolic compounds.

With respect to waste stream reduction, two methods of removing aluminum from chem mill solution were considered. One was the precipitation of tri-calcium aluminate by lime addition and the other was the crystallization of alumina tri-hydrate. Of these methods, precipitation using lime is not economically feasible, because of the extended payback period of 3.7 years.

The crystallization process can be an effective method to remove aluminum from chem mill solutions. However, crystallization is not effective at the operating concentrations of free aluminum at Lockheed. The crystallization process developers require a feed to the crystallizers of 5.4 to 6.0 oz/gal of aluminum as determined by atomic absorption. This corresponds to approximately 7.3 to 8.2 oz/gal as determined by titration. The desirable operating range at Lockheed is 4.5 to 5.0 oz/gal as determined by titration, although a range of 5.3 to 6.0 oz/gal can be tolerated.

Addition of a thermal evaporation/vapor recompression step to increase the aluminum concentration ahead of the crystallizers and improve the effectiveness of crystallization was considered. However, evaporation of the CM solution concentrates the caustic as well as aluminum. This increased caustic concentration raises the aluminum solubility which precludes crystallization until the temperature is depressed below practical limits.

If the operating concentration of free aluminum were to be increased, crystallization might be viable. Since this is not practicable, it is recommended that Lockheed continue to transport the spent chem mill solution for treatment and disposal by others.

SECTION II - GENERAL

A. INTRODUCTION.

This Engineering Report discusses additional industrial waste treatment capabilities and waste stream reduction at Air Force Plant No. 6, Marietta, Georgia, operated by the Lockheed-Georgia Company. The additional capabilities are for the treatment of wastes generated by paint stripping operations and penetrant inspection processes. The waste stream reduction is for the chemical milling operations at the B-91 Building (Chem Mill Facility).

Current operations have been such that the effluent from the Third Level Treatment Facility has been out of compliance with respect to phenolic compounds concentration. The Lockheed NPDES Permit Limit for these have been established at 5 micrograms per liter (5 μg/l). The effluent has contained concentrations in the range of 25-30 μg/l on numerous occasions. These occurrences have necessitated the additional treatment considerations for phenolic compounds removal discussed later in this report.

Current operations at the B-91 Building are such, that at current production rates, the buildup in the caustic etch (milling) solution has required the replenishment of the solution. In 68 weeks of operation, approximately 200,000 gallons have been replaced on two occasions. Since no facilities exist to treat these significant slugs of high pH, heavy metal-bearing wastes, waste stream reduction by regeneration to recover the caustic has been considered later in this report.

This section of the report discusses current operations at Lockheed with respect to paint stripping, penetrant inspection, chemical milling and industrial waste treatment; and presents recommendations for additional chemical waste treatment and caustic etch solution regeneration.

The analysis of design, estimates of construction cost, and proposed construction schedule appear in sections that follow.

This report satisfies the requirements for the Process Studies and Concept Report Portion of Title IA, Architect-Engineer services in accordance with Lockheed's Statement of Work dated 28 August 1984, as revised 26 January 1985 and as amended by the U.S. Air Force, ASD/PMDA letter of 21 March 1985.

B. CURRENT OPERATIONS.

1. Paint Stripping. The only phenol-bearing paint stripper currently in use at Lockheed is a Turco product #5212 containing methylene chloride, lactic acid, formic acid and phenol. This stripper is used primarily at the B-3 Hangar to strip polyurethane coatings. The material is brushed on with brooms, allowed to soften the coating and rinsed off with a water spray. Several applications with some rubbing are required. The annual

usage, although quite low (1,320 gallons per year), contributes significantly to the industrial waste load. However, these phenols are readily amenable to treatment afforded by the existing waste treatment facilities.

Although there has been no phenolic stripper used in the B-78 Building (Paint Hangar) in the last 18 months, there has been past occasional use. On these occasions, small quantities (one to two gallons) from the B-3 Building stock of Turco #5212 have been used.

Waste effluent from the B-78 Building is discharged to the IWO system via a surface flow equalization pond.

Analysis for phenolic compounds of a pond sample taken 9 May 1985, showed that none were present.

Turco #5212 contains 18 percent by weight of phenol so the contribution of this operation is approximately 13,600 pounds per year of phenol. It is Lockheed's desire to eliminate the use of phenolic strippers as soon as practicable. Lockheed is proposing to remove polyurethane coatings by shell or plastic blast techniques instead of phenolic strippers. Blast facilities will not be available, however, for one year or less.

The Paint Stripper Treatability Study completed by Wilson Laboratories in August 1980 was performed on paint strippers being used by Lockheed at that time. These strippers were Turco Products #5351, #5873 and #6017. Of these, Lockheed is currently using only #5873 on a limited basis. This stripper is a basic solution containing methylene chloride and ammonia but no phenols.

The treatability study concluded that these strippers were amenable for reduction using ozone in the presence of ultraviolet light (ozone-UV), followed by biological treatment for further reduction.

2. Penetrant Inspection (Zyglo). The Zyglo inspection process at Lockheed generally consists of a part being coated by a viscous penetrant through spray or immersion. Next, the part is sprayed with water and then sprayed or dipped in an aqueous solution of penetrant emulsifier to remove excess penetrant. The part is then sprayed or dipped to rinse residual penetrant and emulsifier. A developer step can be added to enhance the penetrant that may be remaining in any cracks or flaws.

Of primary concern in this report is the penetrant emulsifier in use at Lockheed. The emulsifier is a product of the Magnaflux corporation called ZR-10A and consists of the following:

a. C10 to C12 Alkyl Benzenes - 5 percent
b. Ethoxylated Alkylphenols - 43 percent
c. Glycols and Glycol Ethers - 52 percent
d. Fluorescent Dye - 0.02 percent (trace)

The alkylphenols could be a contributor to the problem of phenolic compounds in the Third Level effluent because test methods are non-specific for phenol versus alkyl phenol.

The emulsifier appears in several process tanks in Cost Center 42 or process areas in the B-1 Building. The tanks are:

a. Q-701, an Emulsifier Dip Tank in the Apple Line of 138-gallon capacity.

b. Q-702, a Manual Rinse Tank for ZR-10A in the Apple Line of 138-gallon capacity.

c. Q-707, a Spray Rinse Tank for ZR-10A in the AB process area in the B-1 Building of 8,980-gallon capacity.

d. Q-708, an Emulsifier Dip Tank in the AB process area of 8,980-gallon capacity.

e. Q-714, a Spray Rinse Tank for ZR-10A in the Apple Line of 15,000-gallon capacity.

f. Q-715, an Emulsion Spray Application Tank in the Apple Line of 15,000-gallon capacity.

The emulsifier tanks Q-701, Q-708 and Q-715 contain a 33-1/3 percent by volume concentration of ZR-10A. The concentration of ZR-10A in the rinse varies, but the maximum is estimated to be 1 percent by volume.

The Magnaflux Emulsifier Treatability Study completed by Wilson Laboratories in August 1980, concluded that ozone-ultraviolet, hydrogen peroxide-ultraviolet and hydrogen peroxide-iron-ultraviolet treatment processes were all technically feasible methods for treatment of penetrant emulsifier wastes. Each of these oxidation processes break the refractory organic compounds into biodegradable species. Without this intermediate oxidation, the emulsifier is not amenable to further reduction at the sewage treatment plant and the Third Level Facility.

The treatability study was performed on two solution concentrations--a one percent by weight solution and a one-hundredth percent by weight solution. Various concentrations may be discharged from the process area.

Prior to the startup of the Third Level Facility in 1975, a spill occurred from a line break at Q-708. The spill reached Nickajack Creek without abatement other than dilution. This has been the only loss of material from Q-708; there has been no requirement to dispose of its contents. This tank is currently isolated from the collection systems. The rinse tanks for ZR-10A emulsifier drain to the IWO sewer.

Incineration of emulsifier rinse waters was considered briefly in the study, but was discounted because of the substantial capital cost and the large energy requirements for the evaporation of water.

3. Chemical Milling. Chemical milling operations at the B-91 Building consist primarily of aluminum removal from C-5B parts using a caustic solution at elevated temperatures. In order for the caustic solution to mill parts satisfactorily, the solution must meet an operating strength window. The window currently in use at Lockheed is as follows:

TABLE II-1. OPERATING WINDOW FOR CHEMICAL MILLING SOLUTION

Parameter	Amounts Minimum	Maximum	Operating
Sodium Hydroxide, oz/gal as 100% NaOH	12.9	17.6	13.0-17.5
Aluminum, Free, oz/gal	2.5	10.2	2.5-7.0*
Sodium Bisulfide (NASH), oz/gal as Na_2S	1.0	4.0	2.0-2.5
Temperature, °F (°C)	190(87.8)	210(98.9)	195(90.6)
Etch Rate, mils per minute per surface	0.8	1.5	1.0

*Ideal is 4.5-5.0 oz/gal of free Aluminum determined by titration. This would correspond to 2.9 - 3.2 oz/gal by AA.

At the current production rate, which is below both earlier and future projected rates, a buildup of free aluminum occurs at a rate of 0.05 oz/gal/wk. Earlier production rates caused a buildup of 0.2 oz/gal/wk. Future peak buildup amounts are projected to be 0.3 oz/gal/wk.

Scheduling of production at the B-91 Building is determined by lot amounts of shipsets. The schedule for milling is currently as follows:

Lot #	Shipsets	Begin	Duration	Operation
1	6	11/83	4 mos.	2 shifts/5-days
2	9	11/84	6 mos.	2 shifts/5-days
3	16	11/85	8 mos.	(1)
4	19	11/86	10 mos.	(2)

(1) Will probably require 3 shifts or 7-days per week operation
(2) May require 3 shifts/7-days operation

At present, thirteen shipsets have been completed and work is in progress on the fourteenth. There are an estimated 5,500 parts per shipset with approximately 8,000 pounds of aluminum being removed from each shipset.

The caustic etch system at the B-91 Building consists of several milling tanks; a piping network and recycle pumps; surge and storage tanks; heat exchangers and a clarifier. The nominal volume of the caustic system is 350,000 gallons.

The sodium hydroxide and NASH window ranges can be maintained by the addition of new chemicals. Once the free aluminum content exceeds the desired window concentration, the system must be decanted to remove spent etchant.

The system was initially charged with 350,000 gallons of new etch solution in late 1984. Since that time, 200,000 gallons of spent etchant has required replacement on each of two occasions.

This study compares two methods of solution regeneration so that the etchant can be returned to the system instead of requiring waste treatment and disposal. The two methods considered are:

a. Precipitation Process - Removal of the free aluminum by lime addition to precipitate tricalcium aluminate.

b. Crystallization Process - Removal of the free aluminum by the physical crystallization of aluminum trihydrate at controlled temperature.

4. Industrial Waste Treatment (IWT). Both the paint stripper and emulsifier containing wastewaters are discharged to the industrial waste-oily (IWO) collection system. The current IWO treatment consists, in general, of the following:

a. The IWO Pumped Storage Tank for flow equalization.

b. The IWO Flocculation Basin for free oil removal, pH adjustment, chemical coagulation and hexavalent chromium reduction.

c. The Dissolved Air Flotation Clarifier for additional free oil removal and emulsified oil removal.

d. The Neutralization Basin for pH readjustment and precipitation of chromium and other metal hydroxides.

e. Biological treatment at the sewage treatment plant (activated sludge) and additional physical/chemical treatment at the Third Level Treatment Facility.

During the design of the IWT Plant Rehabilitation (B-10 Building) in 1970, specific treatment steps for phenol removal were not provided because at that time, the amount of phenol contamination was slight. Further, budget constraints would not allow provisions to be made.

Also, the appearance of phenols in the Third Level effluent was not evident until after the C-5B program began.

There are other possible sources of phenolic contamination in addition to that from paint stripping and penetrant inspection operations. They are:

a. From unknown sources at the Atlanta Naval Air Station (NAS)

b. From unknown sources at Dobbins AFB

c. From other sources at Air Force Plant No. 6, such as in housekeeping or other cleaning compounds in various usage throughout the Facility.

C. RECOMMENDATIONS.

1. No additional equipment should be purchased to pretreat the paint stripping wastewater due to the possible discontinued use of phenolic strippers and the fact that the present system plus the additional treatment added for the dilute penetrant inspection wastewater treatment should adequately treat the phenols and methylene chloride in the paint stripping wastewater.

2. The concentrated penetrant inspection wastewaters should be incinerated in the existing waste heat furnace should future disposal be required.

3. The refractory phenolic compounds, ethoxy alkyl phenols, in the dilute penetrant inspection wastewaters should be treated by the addition of a special bacteria to the existing second level activated sludge basin. These bacteria are supplied by Chem Crobe among others, and have demonstrated biological destruction of ethoxy alkyl phenols.

4. The chem mill waste generation process using aluminum crystallization cannot be implemented to regenerate the chem mill solution. The process is not effective for the design conditions of 14 oz/gal of caustic and 3 to 4 oz/gal of dissolved aluminum as determined by Atomic Absorption Analysis.

5. The chem mill waste regeneration process using lime precipitation should not be implemented unless the projected operating time is more than four years at an average aluminum mill rate of 3,960 lbs Al/wk.

6. If the lime precipitation process is used, then a new horizontal belt vacuum filter should be purchased for the system.

2.0 ANALYTICAL DATA

GROUND WATER MONITORING FIELD IMPLEMENTATION PROGRAM

Site G1 Previous Scope of Work

Wilson and Companies Architects and Engineers

1. Preliminary inorganic constituents survey

2. Impoundment material characterization survey--Dixie Well Boring Company

3. The electrical earth resistivity survey

4. The stream survey

5. The dike structural integrity study--Geotechnical Engineering Report--Hanson Engineering, Inc.

6. Subsurface exploration program for residual soils and bedrock

2.1 SURFACE IMPOUNDMENT--SITE G1, ZONE 1

Table 7
SHALLOW GROUND-WATER ANALYSIS

Well	Sulfate Ion SO_4 (mg/l)	Total Manganese (mg/l)	Average of Four Replicate Tests[a] pH	Specific Conductance (µmhos/cm @ 25°C)	TOC (mg/l)	TOX (mg/l as Cl)
B-2	600	9	6.3	1,818	41	1.4
B-3	570	12	5.3	1,380	25	1.7
B-4	120	6.8	5.4	815	10	0.5
B-5	3	0.93	7.0	38	6	0.5

[a] Parameters used a indicators of ground-water contamination (40 CFR 265.92 "Sampling and Analysis, Federal Register, May 19, 1980, p. 33240).

Note: Samples collected in March 1981. Further inspection of the GC scan indicated the following: Well B-5 Sample--trace of DDT and 0.18 ppb 2, 4, 5 - T (2 columns); Well B-2 Sample--0.93 ppb methyl parathion (2 columns), numerous organophosphates.

Well B-1 was abandoned and replaced by B-4 due to interference with landfill.

Source: Law Engineering Testing Company

Table 20
SUMMARY OF RESULTS FOR GROUND-WATER MONITORING PROGRAM

Parameter	January 28, 1982 Well No. 2	Well No. 3	Well No. 4	Well No. 5-B	April 8, 1982 Well No. 2	Well No. 3	Well No. 4	Well No. 5-B	July 7, 1982 Well No. 2	Well No. 3	Well No. 4	Well No. 5-B
pH	6.7	5.5	5.2	5.9	7.2	5.6	5.5	6.1	7.0	5.5	5.4	6.2
Specific Conductance, µmhos/cm	1,310	1,410	940	47	1,210	1,450	850	50	1,250	1,400	800	39
Total Organic Halogens, µg/l Cl	1,167	2,385	743	2,215	1,000	1,700	540	780	230	1,490	312	92
Total Organic Carbon, mg/l C	47	49	13	1.2	90	32	15	9.6	10	82	30	11
Cadmium, mg/l Cd	0.02	0.05	0.08	0.01	0.01	0.02	0.04	0.03	0.013	0.027	0.067	0.023
Total Fluoride, mg/l F	0.17	0.17	0.20	0.28	0.28	0.20	0.89	0.14	0.20	0.11	0.56	0.16
Nitrates, mg/l N	0.012	0.14	45	0.068	0.005	0.007	0.002	0.050	0.030	0.013	39	0.34
Chlorides, mg/l Cl	55	51	48	3	49	55	60	3	49	54	53	2
Sodium, mg/l Na	340	300	162	2.8	320	300	148	4	330	330	134	3
Phenols, mg/l as Phenol	0.013	0.008	0.009	0.005	0.011	0.007	0.005	0.007	0.021	0.007	0.005	≤0.004
Manganese, mg/l Mn	3.3	12	5.2	0.26	2.8	13	6.0	0.35	2.6	12	4.7	0.21
Sulfates, mg/l SO_4	292	495	113	19	326	616	165	10	266	656	192	4

Parameter	October 5, 1982 Well No. 2	Well No. 3	Well No. 4	Well No. 5-B	April 1, 1983 Well No. 2	Well No. 3	Well No. 4	Well No. 5-B	October 6, 1983 Well No. 2	Well No. 3	Well No. 4	Well No. 5-B
pH	6.9	5.6	5.5	6.2	6.6	5.3	5.0	5.9	6.8	5.6	5.3	6.3
Specific Conductance, µmhos/cm	1,675	1,950	1,075	53	1,192	1,400	871	60	1,390	1,216	776	44
Total Organic Halogens, µg/l Cl	1,490	2,980	510	123	478	2,132	870	42	616	1,125	296	26
Total Organic Carbon, mg/l C	55	63	14	9	40	40	13	10	34	24	5	≤1
Cadmium, mg/l Cd	0.008	0.024	0.070	0.018	0.008	0.012	0.015	0.008	0.018	0.018	0.038	0.015
Total Fluoride, mg/l F	1.34	0.20	0.53	0.34								
Nitrates, mg/l N	0.008	0.008	21.3	0.48								
Chlorides, mg/l Cl	46	54	54	3								
Sodium, mg/l Na	350	320	133	3								
Phenols, mg/l as Phenol	0.019	0.010	0.009	0.006								
Manganese, mg/l Mn	2.7	13	5.8	0.20								
Sulfates, mg/l SO_4	314	624	180	17								

Q-209

Part B Application
Hazardous Waste Facility Permit

Lockheed-Georgia Company
A Division of Lockheed Corporation
Marietta, Georgia 30063

Lockheed

A Division of Lockheed Corporation
Marietta, Georgia 30063

26 March 1982

TO: Georgia Department of Natural Resources
Land Protection Branch
Environmental Protection Division
270 Washington Street, S.W.
Atlanta, Georgia 30334

ATTN: Mr. Howard Barefoot

THRU: AFPR/PD
Lockheed-Georgia Company
Marietta, Georgia 30063

ENCL: (A) Chester Laboratories, Laboratory Analysis Report for Lockheed-Georgia Company, dated 2-24-82

1. Enclosed is a copy of the analyses of samples collected on 28 January 1982 from the groundwater monitoring wells at Air Force Plant No. 6, Marietta, Georgia. The data are tendered at this time because ". . . parameters are observed whose concentration or value is found to exceed the maximum contaminant levels listed in the EPA Interim Primary Drinking Water Standards" as required by the Federal Register.

2. Lockheed-Georgia Company proposes to collect new samples during the first week of April 1982, and will split these to accomplish confirming analyses in separate laboratories. You will be apprised of the second quarter tests as soon as results are available.

3. Please direct any questions to the undersigned at (404) 424-3295.

Yours truly,

LOCKHEED-GEORGIA COMPANY

C. F. Griffin

CFG/bw

APPROVED FOR TRANSMITTAL ________ DATE 30 March

Received 30 March 82

Engineers
Architects
Planners

296 Interstate North
Suite 110
Atlanta
Georgia 30339
404 955-6005

The**Chester**Engineers

Ref. No. 3276-02

March 1, 1982

Mr. Cliff Griffin
Zone 255, Department 49-10
LOCKHEED GEORGIA COMPANY
South Cobb Drive
Marietta, Georgia 30063

Dear Mr. Griffin:

Enclosed are the results of analysis performed on your Groundwater Monitoring Wells. This analysis represents the first quarter requirements under the Federal Resource Conservation Recovery Act. Samples were collected by The Chester Engineers personnel on January 28, 1982, as per the attached chain of custody form.

I am confident that everything is in order. If you should have any questions in reference to any of the analytical data, please feel free to contact us as we are at your service.

Sincerely,

David M. Henderson
Southeast Regional Director

DMH:pa

Enclosures

CHAIN-OF-CUSTODY FOR GROUNDWATER MONITORING

CLIENT

Facility: Lockheed-Georgia
Location: Marietta, Georgia
Contact:
Phone: (404)424-3577
Mr. Cliff Griffin

LABORATORY

Lab Name: The Chester Engineers
Location: Coraopolis, PA
Project No.: 3276-02
Date Received

WELL NO.	DEPTH OF WATER	DEPTH TO BOTTOM	WELL DIAMETER	VOLUME PURGED	DATE OF SAMPLING	TIME	SAMPLING PERSONNEL
B-5	26'4"	28'6"	2"	2 gal.	1-28-82	9:00AM	R. Morris
2	18'5"	26'8"	2"	7 gal.	1-28-82	9:30AM	R. Morris
3	22'9"	30'	2"	6 gal.	1-28-82	10:00AM	R. Morris
4	23'6"	28'10"	2"	5 gal.	1-28-82	10:35AM	R. Morris

ANALYSES REQUESTED

Suitable Drinking Water Parameters X

Groundwater Quality Parameters X

Indicators of Groundwater Contamination Parameters X

CHAIN-OF-CUSTODY SIGNATURES

Sampler	Laboratory Recipient	Date Received	Time	Method of Transfer	Samples Properly Preserved	Seals Intact
[illegible]	[illegible]	1-29-82	PM	Air Freight	Yes	Yes

ChesterLaboratories

A Division Of

The**Chester**Engineers

[illegible] Fourth Avenue

[illegible]

[illegible] 15108

Phone (412) [illegible]

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 1/29/82
Report Date: 2/24/82

Monitoring Well Analyses

Source	Well #2	Well #3	Well #4	Well #5-B
Log No. 82-	611	612	613	614
Date Collected	1/28/82	1/28/82	1/28/82	1/28/82
pH	6.7	5.5	5.2	5.9
Specific Conductance, umhos/cm	1,310	1,410	940	47
Total Organic Halogens, ug/L Cl	1,167	2,385	743	2,215
Total Carbon, mg/L C	115	83	27	6.8
Inorganic Carbon, mg/L C	68	34	14	5.6
Total Organic Carbon, mg/L C	47	49	13	1.2
Arsenic, mg/L As	<0.001	<0.001	<0.001	<0.001
Barium, mg/L Ba	0.1	0.1	0.1	0.1
Cadmium, mg/L Cd	0.02	0.05	0.08	0.01
Chromium, mg/L Cr	0.01	0.01	<0.01	<0.01
Lead, mg/L Pb	0.02	0.01	<0.01	<0.01
Mercury, mg/L Hg	<0.001	<0.001	<0.001	0.011
Selenium, mg/L Se	<0.001	<0.001	<0.001	<0.001
Silver, mg/L Ag	<0.01	<0.01	<0.01	<0.01
Total Fluoride, mg/L F	0.17	0.17	0.20	0.28
Nitrates and Nitrites, mg/L N	0.030	0.15	45	0.080
Nitrites, mg/L N	0.018	0.01	0.01	0.012
Nitrates, mg/L N	0.012	0.14	45	0.068
Radium 226, pCi/L	<3	<3	<3	<3
Gross Alpha, pCi/L	0	0.3	0	0.1
Gross Beta, pCi/L	0.7	5.8	0	0.9
Turbidity, NTU	30	20	5.8	29
Total Coliform, No./100 mL	30	8	<10	32
Endrin, ug/L	<0.01	<0.01	<0.01	<0.01
Lindane, ug/L	<0.01	<0.01	<0.01	<0.01
Methoxychlor, ug/L	<0.1	<0.1	<0.1	<0.1
Toxaphene, ug/L	<0.5	<0.5	<0.5	<0.5
2,4-D, ug/L	<1	<1	<1	<1
2,4,5-TP Silvex, ug/L	<1	<1	<1	<1

* Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
* Less-than (<) values are indicative of the detection limit.

Ann Arbor • Atlanta • Chadds Ford • Dallas • Kingston • Nashville

ChesterLaboratories

A Division Of
TheChesterEngineers
845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone (412) 262-1035

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 1/29/82
Report Date: 2/24/82

Replicate Analyses
Monitoring Well #5-B

Source	Replicate #2	Replicate #3	Replicate #4
Log No. 82-	614	614	614
Date Collected	1/28/82	1/28/82	1/28/82
pH	5.9	5.9	5.9
Specific Conductance, umhos/cm	47	47	47
Total Organic Halogens, ug/L Cl	2,550	2,915	2,545
Total Carbon, mg/L C	6.8	6.8	6.8
Inorganic Carbon, mg/L C	5.5	5.5	5.5
Total Organic Carbon, mg/L C	1.3	1.3	1.3

• Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
• "Less than" (<) values are indicative of the detection limit.

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LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses
(Continued)

Source	Well #2	Well #3	Well #4	Well #5-B
Log No. 82-	611	612	613	614
Chlorides, mg/L Cl	55	51	48	3
Sodium, mg/L Na	340	300	162	2.8
Phenols, mg/L PhOH	0.013	0.008	0.009	0.005
Manganese, mg/L Mn	3.3	12	5.2	0.26
Iron, mg/L Fe	0.45	0.20	0.18	0.25
Sulfates, mg/L SO_4	292	495	113	19

bcc: Marty Blankenship
E. J. Docekal
J. H. Lucas
R. C. Sawyer

14 June 1982

TO: Georgia Department of Natural Resources
Land Protection Branch
Environmental Protection Division
270 Washington Street, S. W.
Atlanta, Georgia 30334

ATTN: Ms. Cheryl Stevens

THRU: AFPR/PD
Lockheed-Georgia Company
Marietta, Georgia 30063

ENCL: (A) Chester Laboratories, Laboratory Analysis Report for Lockheed-Georgia Company, dated 4-29-82

1. Enclosed is a copy of the analyses of samples collected on 4-6-82, from the groundwater monitoring wells at Air Force Plant No. 6, Marietta, Georgia. The second quarter report shows improvement in all three problem parameters over the first quarter report.

2. Lockheed-Georgia Company will keep you advised as further information is received.

3. Please direct any questions to the undersigned at (404)424-3299.

Yours truly,

LOCKHEED-GEORGIA COMPANY

C. F. Griffin
Plant Construction Representative

CFG:mk

Enclosure

APPROVED FOR TRANSMITTAL ______________ DATE ______________

Engineers
Architects
Planners

296 Interstate North
Suite 110
Atlanta
Georgia 30339
404 955-6005

TheChesterEngineers

Ref. No. 3276-02

May 17, 1982

Mr. Cliff Griffin
Zone 255
Department 49-10
LOCKHEED GEORGIA, COMPANY
South Cobb Drive
Marietta, Georgia 30063

Dear Mr. Griffin:

Please find enclosed your second quarter analytical results and Chain-of-Custody document as required under the Resource Conservation and Recovery Act (RCRA) pertaining to Groundwater Monitoring (40 CFR 265, Sub-Part F).

Data indicates that the maximum allowable concentration for cadmium of 0.01 Mg/L was exceeded in values recorded for Wells 3, 4, and 5-B. All other analytical results are within the established maximum concentration values.

If you have any questions concerning the reported results, please do not hesitate to contact us.

Very truly yours,

Richard R. Morris
Analytical Sales Representative

RRM:pa

Enclosure

CHAIN-OF-CUSTODY FOR GROUNDWATER MONITORING

CLIENT		LABORATORY	
Facility	Lockheed-Georgia	Lab Name	The Chester Engineers
Location	Marietta, Georgia	Location	Coraopolis, PA
Contact	Mr. Cliff Griffin	Project No.	3276-02
Phone	404-424-3577	Date Received	

WELL NO.	DEPTH TO WATER	DEPTH TO BOTTOM	WELL DIAMETER	VOLUME PURGED	DATE OF SAMPLING	TIME	SAMPLING PERSONNEL
B-5	23'8"	29'0	2"	3 Gal.	4-6-82	9^{32} Am	R. Morris
2	16'8"	27'4"	2"	6 Ga.	4-6-82	10^{45} Am	R. Morris
3	20'	30'	2"	6 Gal.	4-6-82	11^{15} AM	R. Morris
4	20'1"	29'10"	2"	5 Ga.	4-6-82	Noon	R. Morris

ANALYSES REQUESTED

Suitable Drinking Water Parameters	X
Groundwater Quality Parameters	X
Indicators of Ground-water Contamination Parameters	X

CHAIN-OF-CUSTODY SIGNATURES

Relinquished By	Relinquished To	Date Received	Time	Method of Transfer	Samples Properly Preserved	Seals Intact
	[illegible]	4-8-82	6 PM	Air Freight	Yes	Yes

ChesterLaboratories

A Division Of
The Chester Engineers

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 4/8/82
Report Date: 4/29/82

Monitoring Well Analyses

Source	Well #2	Well #3	Well #4	Well #5-B
Log No. 82-	2080	2081	2082	2083
Date Collected	4/7/82 @ 10:45 AM	4/7/82 @ 11:15 AM	4/7/82 @ Noon	4/7/82 @ 9:30 AM
pH	7.2	5.6	5.5	6.1
Specific Conductance, umhos/cm	1,210	1,450	850	50
Total Organic Halogens, ug/L Cl	1,000	1,700	540	780
Total Organic Carbon, mg/L C	90	32	15	9.6
Arsenic, mg/L As	0.0015	<0.001	0.0060	<0.001
Barium, mg/L Ba	<0.1	<0.1	0.1	0.1
Cadmium, mg/L Cd	0.01	0.02	0.04	0.03
Chromium, mg/L Cr	<0.01	<0.01	<0.01	<0.01
Lead, mg/L Pb	<0.01	<0.01	<0.01	<0.01
Mercury, mg/L Hg	<0.001	<0.001	<0.001	<0.001
Selenium, mg/L Se	<0.001	<0.001	<0.001	<0.001
Silver, mg/L Ag	<0.01	<0.01	<0.01	<0.01
Total Fluoride, mg/L F	0.28	0.20	0.89	0.14
Nitrates and Nitrites, mg/L N	0.018	0.015	0.070	0.056
Nitrites, mg/L N	0.013	0.008	0.008	0.006
Nitrates, mg/L N	0.005	0.007	0.062	0.050
Radium, 226, pCi/L	0.2	0.2	0.2	0.06
Gross Alpha, pCi/L	0.2	1.8	0.3	0.0
Gross Beta, pCi/L	11	2	1	5
Turbidity, NTU	80	20	30	46
Total Coliform, No./100 mL	<1	<1	<1	<1
Endrin, ug/L	<0.01	<0.01	<0.01	<0.01
Lindane, ug/L	<0.01	<0.01	<0.01	<0.01
Methoxychlor, ug/L	<0.1	<0.1	<0.1	<0.1
Toxaphene, ug/L	<0.5	<0.5	<0.5	<0.5
2,4-D, ug/L	<1	<1	<1	<1
2,4,5-TP Silvex, ug/L	<1	<1	<1	<1

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- Less-than (<) values are indicative of the detection limit

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ChesterLaboratories

A Division Of
The Chester Engineers
845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone (412) 262-1035

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 4/8/82
Report Date: 4/29/82

Replicate Analyses
Monitoring Well #5-B

Source	Replicate #2	Replicate #3	Replicate #4
Log No. 82-	2083	2083	2083
pH	6.1	6.1	6.1
Specific Conductance, μmhos/cm	50	50	50
Total Organic Halogens, μg/L Cl	790	790	770
Total Organic Carbon, mg/L C	9.9	9.5	9.7

• Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
• "Less-than" (<) values are indicative of the detection limit.

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LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses
(Continued)

Source	Well #2	Well #3	Well #4	Well #5-B
Log No. 82-	2080	2081	2082	2083
Chlorides, mg/L Cl	49	55	60	3
Sodium, mg/L Na	320	300	148	4
Phenols, mg/L PhOH	0.011	0.007	0.005	0.007
Manganese, mg/L Mn	2.8	13	6.0	0.35
Iron, mg/L Fe	0.53	0.14	0.18	0.67
Sulfates, mg/L SO_4	326	616	165	10

LOCKHEED-GEORGIA COMPANY

A DIVISION OF LOCKHEED AIRCRAFT CORPORATION

MARIETTA, GEORGIA 30063

16 September 1982

TO: Georgia Department of Natural Resources
Land Protection Branch
Environmental Protection Division
270 Washington Street, S.W.
Atlanta, GA 30334

ATTN: J. R. Kaduck

THRU: AFPR/PD
Lockheed-Georgia Company
Marietta, GA 30063

ENCL: (A) Chester Laboratories, Laboratory Analysis Report for Lockheed-Georgia Company, dated 8-11-82

1. Enclosed is the consultant's report of third quarter analytical results which indicate a continuation of the favorable trends in concentrations of cadmium and nitrate, although levels remain outside of drinking water standards. We are further encouraged by the diminishing concentrations of mercury in the sample, this item already at a level acceptable for drinking water. Please also note that gross beta has appeared for the first time. We have no known source at this facility.

2. Lockheed-Georgia (Air Force Plant 6) will keep you advised as further information is received.

3. Please direct any questions to the undersigned at (404) 424-3295.

Very truly yours,

LOCKHEED-GEORGIA COMPANY

C. F. Griffin

C. F. Griffin
Plant Construction Representative

CFG:ek

Enclosure

APPROVED FOR TRANSMITTAL ________, P.E DATE 24 SEP 82
APPR / PDP

Engineers
Architects
Planners

The**Chester**Engineers

Ref. No. 3276-02

AUG 12 1982

August 11, 1982

AUG 17 1982

Mr. Cliff Griffin
Zone 255
Department 49-10
LOCKHEED-GEORGIA COMPANY
South Cobb Drive
Marietta, Georgia 30063

Dear Mr. Griffin:

Please find enclosed Third Quarter analytical results and Chain-of-Custody document as required under the Resource Conservation and Recovery Act (RCRA) pertaining to Groundwater Monitoring (40 CFR 265, Sub-Part F).

Results indicate that the maximum allowable concentration for cadmium of 0.01 mg/l was exceeded in values recorded for all four (4) wells. The maximum allowable concentration for nitrates of 10 mg/l was exceeded in well four (4). In addition the gross beta concentration for well three (3) showed a high level of 64 pCi/L. All other analytical results are within the established maximum concentration limits.

If you have any questions concerning the reported results, please do not hesitate to contact us.

Very truly yours,

Richard R. Morris

Richard R. Morris
Engineering Technician

RRM:sd

Enclosure

The**Chester**Engineers

LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 7/7/82
Report Date: 8/5/82

Monitoring Well Analyses

Source	Well #2	Well #3	Well #4	Well #5-B
Log No. 82-	3718	3719	3720	3721
Date Collected	7/7/82 @ 2:15 PM	7/7/82 @ 2:45 PM	7/7/82 @ 1:30 PM	7/7/82 @ 11:00 AM
pH	7.0	5.5	5.4	6.2
Specific Conductance, umhos/cm	1,250	1,400	800	39
Total Organic Halogens, ug/L Cl	230	1,490	312	92
Total Organic Carbon, mg/L C	10	82	30	11
Arsenic, mg/L As	0.0010	<0.001	<0.001	<0.001
Barium, mg/L Ba	<0.1	<0.1	<0.1	<0.1
Cadmium, mg/L Ca	0.013	0.027	0.067	0.023
Chromium, mg/L Cr	0.01	0.01	<0.01	<0.01
Lead, mg/L Pb	<0.01	<0.01	<0.01	<0.01
Mercury, mg/L Mg	<0.001	<0.001	0.001	<0.001
Selenium, mg/L Se	<0.001	<0.001	<0.001	<0.001
Silver, mg/L Ag	0.01	<0.01	<0.01	0.01
Total Fluorides, mg/L F	0.20	0.11	0.56	0.16
Nitrates and Nitrites, mg/L N	0.040	0.017	39	0.34
Nitrites, mg/L N	0.010	0.004	<0.01	<0.01
Nitrates, mg/L N	0.030	0.013	39	0.34
Radium 226, pCi/L	0.2	0.3	0.3	0.08
Gross Alpha, pCi/L	0.9	2.4	2.0	0.5
Gross Beta, pCi/L	0	64	3	3
Turbidity, NTU	100	75	60	26
Total Coliform, No./100 mL	<1	<1	<1	<1
Endrin, ug/L	<0.01	<0.01	<0.01	<0.01
Lindane, ug/L	<0.01	<0.01	<0.01	<0.01
Methoxychlor, ug/L	<0.1	<0.1	<0.1	<0.1
Toxaphene, ug/L	<0.5	<0.5	<0.5	<0.5
2,4-D, ug/L	<1	<1	<1	<1
2,4,5-TP Silvex, ug/L	<1	<1	<1	<1

*Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
*"Less than" (<) values are indicative of the detection limit.

LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses
(Continued)

Source	Well #2	Well #3	Well #4	Well #5-B
Log No. 82-	3718	3719	3720	3721
Chlorides, mg/L Cl	49	54	53	2
Sodium, mg/L Na	330	330	134	3
Phenols, mg/L PhOH	0.021	0.007	0.005	<0.004
Manganese, mg/L Mn	2.6	12	4.7	0.21
Iron, mg/L Fe	0.64	0.47	0.57	0.45
Sulfates, mg/L SO_4	266	656	192	4

Engineers
Architects
Planners

296 Interstate North
Suite 110
Atlanta
Georgia 30339
404 955-6005

TheChesterEngineers

LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 7/8/82
Report Date: 8/5/82

Replicate Analyses
Monitoring Well #5-B

Source	Replicate #2	Replicate #3	Replicate #4
Log No. 82-	3721	3721	3721
pH	6.2	6.2	6.2
Specific Conductance, µmhos/cm	39	39	39
Total Organic Halogens, µg/L Cl	89	85	96
Total Organic Carbon, mg/L C	11	11	11

CHAIN-OF-CUSTODY FOR GROUNDWATER MONITORING

CLIENT		LABORATORY	
Facility	Lockheed-Georgia	Lab Name	The Chester Engineers
Location	Marietta, Georgia	Location	Coraopolis, PA
Contact	Mr. Cliff Griffin	Project No.	3276-02
Phone	404/424-3577	Date Received	7-8-82

WELL NO.	DEPTH TO WATER	DEPTH TO BOTTOM	WELL DIAMETER	VOLUME PURGED	DATE OF SAMPLING	TIME	SAMPLING PERSONNEL
B-5	24.5'	29.4'	2"	3 Gal.	7-7-82	11 AM	R. Morris
2	16.9'	27.4'	2"	6 Gal.	7-7-82	2:15 PM	R. Morris
3	21.1'	30.6'	2"	5 Gal.	7-7-82	2.45 PM	R. Morris
4	21.4'	29.9'	2"	5 Gal.	7-7-82	1:30 PM	R. Morris

ANALYSES REQUESTED

Suitable Drinking Water Parameters	x
Groundwater Quality Parameters	x
Indicators of Groundwater Contamination Parameters	x

CHAIN-OF-CUSTODY SIGNATURES

Relinquished By	Relinquished To	Date Received	Time	Method of Transfer	Samples Properly Preserved	Seals Intact
[illegible signature]	[illegible]	7-8-82	AM	Custody/Air Freight	Yes	Yes

DISTRIBUTION, D/81-35:
E. J. Docekal
C. F. Griffin
R. C. Sawyer
E. C. Hudson
J. P. Lovell
LM File
Dept. File 221.00
Corres. Files
Reading File

Lockheed-Georgia Company

A Division of Lockheed Corporation
Marietta, Georgia 30063

19 November 1982

LM/31966

SUBJECT: Chester Laboratories, Laboratory Analysis Report for Lockheed-Georgia Company

TO: Georgia Department of Natural Resources
Land Protection Branch
Environmental Protection Division
270 Washington St., S.W.
Atlanta, Georgia 30334
Attention: J. R. Kaduck

THRU: AFPR/PD
Lockheed-Georgia Company
Marietta, Georgia 30063

ENCL.: Chester Laboratories, Laboratory Analysis Report for Lockheed-Georgia Co., dated Nov. 4, 1982

1. Enclosed is the consultant's report of fourth quarter analytical results which show a continuation of cadmium at about the same level of concentration and a reduction in the level of concentration for nitrate. The mercury appears to no longer be a problem, and the Gross Beta that appeared in the third quarter report is back down within drinking water limits.

2. Lockheed-Georgia Company (Air Force Plant 6) will keep you advised as further information is received.

3. Please direct any question to the undersigned at (404) 424-2531.

Very truly yours,

LOCKHEED-GEORGIA COMPANY

E. J. Docekal
Chief Facilities Engineer

EJD:sc

APPROVED FOR TRANSMITTAL ____________ DATE 1 Dec 1982
AFPR/PD

Engineers
Architects
Planners

296 Interstate North
Suite 110
Atlanta
Georgia 30339
404 955-6005

TheChesterEngineers

Ref. No. 3276-02

November 4, 1982

Mr. Cliff Griffin
Zone 255
Department 49-10
LOCKHEED-GEORGIA COMPANY
South Cobb Drive
Marietta, Georgia 30063

Dear Mr. Griffin:

Please find enclosed Fourth Quarter First Year analytical results and Chain-of-Custody document as required under the Resource Conservation and Recovery Act (RCRA) pertaining to Groundwater Monitoring (40 CFR 265, Sub-Part F).

Results indicated that the maximum allowable concentration for cadmium of 0.01 mg/l was exceeded in values recorded for wells 3, 4 and 5B. The maximum allowable concentration for nitrates of 10 mg/l was exceeded in well 4. All other EPA primary drinking water results are within the established maximum concentration limits. The primary drinking water results should be reported to the Regional Administrator of EPA within 15 days of receipt.

If you have any questions concerning the reported results, please do not hesitate to contact us.

Very truly yours,

Richard R. Morris

Richard R. Morris
Engineering Technician

RRM:sd

Enclosures

NOV 5 1982

Chester Laboratories

A Division Of

The Chester Engineers

[illegible]

Laboratory Analysis Report For

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 10/6/82

Report Date: 11/2/82

Source	Well #2	Well #3	Well #4	Well #5B
Log No. 82-	5130	5131	5132	5133
Date Collected	10/5/82 @ 9:30 AM	10/5/82 @ 10:15 AM	10/5/82 @ 11:15 AM	10/5/82 @ 12:15 PM
pH	6.9	5.6	5.5	6.2
Specific Conductance, umhos/cm	1,675	1,950	1,075	53
Total Organic Halogens, ug/L Cl	1,490	2,980	510	123
Total Organic Carbon, mg/L C	55	63	14	9
Arsenic, mg/L As	<0.001	<0.001	<0.001	<0.001
Barium, mg/L Ba	<0.05	<0.05	<0.05	<0.05
Cadmium, mg/L Cd	0.008	0.024	0.070	0.018
Chromium, mg/L Cr	0.014	0.014	0.012	0.012
Lead, mg/L Pb	<0.005	<0.005	<0.005	<0.005
Mercury, mg/L Hg	<0.0005	<0.0005	<0.0005	<0.0005
Selenium, mg/L Se	<0.001	<0.001	<0.001	<0.001
Silver, mg/L Ag	<0.01	<0.01	<0.01	<0.01
Total Fluoride, mg/L F	1.34	0.20	0.53	0.34
Nitrates and Nitrites, mg/L N	0.011	0.012	21.3	0.48
Nitrites, mg/L N	0.003	0.004	0.005	0.005
Nitrates, mg/L N	0.008	0.008	21.3	0.48
Radium 226, pCi/L	0.1	0	0.1	0.02
Gross Alpha, pCi/L	0.2	0.6	1.6	0.5
Gross Beta, pCi/L	0.4	19.3	6.9	5.4
Turbidity, NTU	40	19	16	32
Total Coliform, No./100 mL	<1	<1	<1	<1
Endrin, ug/L	<0.01	<0.01	<0.01	<0.01
Lindane, ug/L	<0.01	<0.01	<0.01	<0.01
Methoxychlor, ug/L	<0.5	<0.5	<0.5	<0.5
2,4-D, ug/L	<1	<1	<1	<1
2,4,5-TP Silvex, ug/L	<1	<1	<1	<1
Chlorides, mg/L Cl	46	54	54	3
Sodium, mg/L Na	350	320	133	3
Phenols, mg/L PhOH	0.019	0.010	0.009	0.006
Manganese, mg/L Mn	2.7	13	5.8	0.20
Iron, mg/L Fe	0.77	0.15	0.14	0.19
Sulfates, mg/L SO_4	314	624	180	17

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

ChesterLaboratories

A Division Of
The Chester Engineers
845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone: (412) 262-1035

Laboratory Analysis Report For

Lockheed-Georgia Company
Marietta, Georgia

Replicate Analyses
Well #5B

Samples Received: 10/6/82
Report Date: 11/2/82

Source	Replicate #2	Replicate #3	Replicate #4
Log No. 82-	5133	5133	5133
pH	6.2	6.2	6.2
Specific Conductance, umhos/cm	53	50	54
Total Organic Halogens, ug/L Cl	113	130	135
Total Organic Carbon, mg/L C	9	9	8

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

Ann Arbor • Atlanta • Chadds Ford • Dallas • Kingston • Nashville

CHAIN-OF-CUSTODY FOR GROUNDWATER MONITORING

CLIENT		LABORATORY	
Facility	Lockheed-Georgia	Lab Name	The Chester Engineers
Location	Marietta, Georgia	Location	Coraopolis, PA
Contact	Mr. Cliff Griffin	Project No.	3276-02
Phone	404/424-3577	Date Received	10-6-82

WELL NO.	DEPTH TO WATER	DEPTH TO BOTTOM	WELL DIAMETER	VOLUME PURGED	DATE OF SAMPLING	TIME	SAMPLING PERSONNEL
B-5	26.6'	29.4'	2"	1.5 Gal.	10/5/82	12:15 PM	R. Morris
2	18.4'	27.4'	2"	5 Gal.	10/5/82	9:30 AM	R. Morris
3	23.9'	30.6'	2"	3.5 Gal.	10/5/82	10:15 AM	R. Morris
4	24.3'	29.9'	2"	3 Gal.	10/5/82	11:15 AM	R. Morris

ANALYSES REQUESTED

Suitable Drinking Water Parameters	X
Groundwater Quality Parameters	X
Indicators of Groundwater Contamination Parameters	X

CHAIN-OF-CUSTODY SIGNATURES

Relinquished By	Relinquished To	Date Received	Time	Method of Transfer	Samples Properly Preserved	Seals Intact
R. Morris	John C. Schrader	10-6-82	11 AM	Air Freight	Yes	yes

Engineers
Architects
Planners

296 Interstate North
Suite 110
Atlanta
Georgia 30339
404 955-6005

TheChesterEngineers

Ref. No. 3276-03-90

MAR 0 8 1983

Mr. Cliff Griffin
Zone 255
Department 49-10
LOCKHEED-GEORGIA COMPANY
South Cobb Drive
Marietta, Georgia 30063

Dear Mr. Griffin:

Please find attached the original calculations for the average mean and variance of indicator parameters of your upgradient groundwater monitoring well #5-B. The parameters include pH, Specific Conductance, Total Organic Carbon, and Total Organic Halogens as listed in 40 CFR 265.92 (b) (3). The calculations were performed as per the requirements under 40 CFR 265.92 (c) (2).

This background data of your first years' groundwater monitoring program will be used for a comparison to determine statistically significant changes of the indicator parameters through Student-T-Tests during the second year monitoring.

The program is now set up in our in-house computers to readily calculate the Student-T-Tests comparisons immediately upon completion of the laboratory analysis.

I have received the LOCKHEED-GEORGIA COMPANY amended Purchase Order #RY88954 and all systems are go.

If you, or the Georgia Department of Natural Resources should require any additional information, please do not hesitate to call me.

Sincerely,

David M. Henderson

David M. Henderson
Southeast Regional Director

DMH:pa
Attachment

YEAR: 1

WELL: 5-B TYPE: UPGRADIENT

CLIENT: LOCKHEED-GEORGIA COMPANY
USAF PLANT #6
MARIETTA, GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS				BACKGROUND	
					AVERAGE	VARIANCE
DATE SAMPLE COLLECTED	1/28/82	4/7/82	7/7/82	10/5/82		
pH	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2	6.1	.015
Spec.Conductance-umhos/cm	47.	50.	39.	53.		
	47.	50.	39.	53.		
	47.	50.	39.	50.		
	47.	50.	39.	54.	47.1	28.1
Tot.Org.Carbon-mg/L C	1.2	9.6	11.	9.		
	1.3	9.9	11.	9.		
	1.3	9.5	11.	9.		
	1.3	9.7	12.	8.	7.7	15.3
Tot.Org.Halogens-ug/L Cl	2215.	780.	92.	123.		
	2550.	790.	39.	113.		
	2915.	790.	85.	120.		
	2545.	770.	96.	135.	888.6	1086256.9

The Chester Engineers

Engineers
Architects
Planners

296 [illegible]
Suite [illegible]
Atlanta
Georgia [illegible]
404 355-[illegible]

APR 29 1983

ChesterEngineers

April 27, 1983

Mr. Cliff Griffin
Zone 255
Department 49-10
LOCKHEED-GEORGIA COMPANY
South Cobb Drive
Marietta, Georgia 30063

Dear Mr. Griffin:

Please find enclosed data as a result of services rendered at your Lockheed Marietta facilities, inorder to bring you in compliance with 40 CFR 265.92(d)(1),(2) and 40 CFR 265.93 (b). This represents the first semi-annual sampling and analyses as required under the Resource Conservation and Recovery Act (RCRA). The data is as follows:

A. Monitoring Well Analyses Report for indicator parameters and cadmium.

B. Chain-of-Custody document for samples.

C. Computer Printout for t-testing performed on results of samples collected 3/31/83 (procedures outlined in 40 CFR 265.93(b) and 40 CFR 264 Appendix IV were followed in completing these statistical comparisions. Level of significance used 0.01).

Unless receiving special instructions or compensations from the Georgia Environmental Protection Division, Federal Regulations, 40 CFR 265.93(c)(1), instruct that the downgradient wells showing significant increase or pH decrease be resampled and analyzed for only those parameters showing a significant increase. These samples must also be split and separate sets of analyses be obtained to determine whether the significant difference was a result of laboratory error.

When you have had time to review the attachments I will be in touch with you in the next couple of days to discuss the procedure you wish to follow. In the meantime, if you should have any questions, please feel free to contact.

Very truly yours,

David M. Henderson
Southeast Regional Director

DMH:sd

CLIENT

Facility	LOCKHEED-GEORGIA
Location	Marietta, Georgia
Contact	Mr. Cliff Griffin
Phone	(404) 424-3577

LABORATORY

Lab Name	THE CHESTER ENGINEERS
Location	Coraopolis, Penna.
Project No.	3276-03/90
Date Received	4/1/83

WELL NO.	DEPTH TO WATER	DEPTH TO BOTTOM	WELL DIAMETER	VOLUME PURGED	DATE OF SAMPLING	TIME	SAMPLING PERSONNEL
2	15.5'	27.4'	2"	5.0 gal.	3/31/83	9:30 AM	R. Morris
3	19.4'	30.6'	2"	5.0 gal.	3/31/83	9:55 AM	R. Morris
4	19.1'	29.9'	2"	5.0 gal.	3/31/83	10:15 AM	R. Morris
5-B	22.3'	29.4'	2"	3.5 gal.	3/31/83	9:00 AM	R. Morris

G-237

ANALYSES REQUESTED

Suitable Drinking Water Parameters	
Groundwater Quality Parameters	
Indicators of Groundwater Contamination Parameters	x

CHAIN-OF-CUSTODY SIGNATURES

Relinquished By	Relinquished To	Date Received	Time	Method of Transfer	Samples Properly Preserved	Seals Intact
R. Morris	[illegible]	4-1-83	11 AM	Air Freight	YES	YES

ChesterLaboratories

A Division Of
TheChesterEngineers
545 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone (412) 262-1035

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 4/1/83
Report Date: 4/13/83

Source	Well #2 Replicate #1	Well #2 Replicate #2	Well #2 Replicate #3	Well #2 Replicate #4
Log No. 83-	1549	1550	1551	1552
Date Collected	3/31/83 @ 9:30 AM	3/31/83 @ 9:30 AM	3/31/83 @ 9:30 AM	3/31/83 @ 9:30 AM
pH	6.7	6.6	6.6	6.6
Specific Conductance, µmhos/cm	1,190	1,195	1,190	1,195
Total Organic Carbon, mg/L C	42	36	40	40
Total Organic Halogens, µg/L Cl	490	510	466	441
Cadmium, mg/L Cd	0.008	--	--	--

Source	Well #3 Replicate #1	Well #3 Replicate #2	Well #3 Replicate #3	Well #3 Replicate #4
Log No. 83-	1553	1554	1555	1556
Date Collected	3/31/83 @ 9:55 AM	3/31/83 @ 9:55 AM	3/31/83 @ 9:55 AM	3/31/83 @ 9:55 AM
pH	5.3	5.3	5.3	5.3
Specific Conductance, µmhos/cm	1,400	1,395	1,400	1,400
Total Organic Carbon, mg/L C	35	40	43	41
Total Organic Halogens, µg/L Cl	1,985	2,279	2,010	2,255
Cadmium, mg/L Cd	0.012	--	--	--

3374-90

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

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ChesterLaboratories

A Division Of

TheChesterEngineers

845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone: (412) 262-1035

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 4/1/83
Report Date: 4/13/83

<u>Monitoring Well Analyses</u>

Source	Well #4 Replicate #1	Well #4 Replicate #2	Well #4 Replicate #3	Well #4 Replicate #4
Log No. 83-	1557	1558	1559	1560
Date Collected	3/31/83 @ 10:15 AM	3/31/83 @ 10:15 AM	3/31/83 @ 10:15 AM	3/31/83 @ 10:15 AM
pH	5.1	5.1	5.0	5.0
Specific Conductance, μmhos/cm	880	865	865	875
Total Organic Carbon, mg/L C	20	17	4	11
Total Organic Halogens, μg/L Cl	980	858	784	858
Cadmium, mg/L Cd	0.015	--	--	--

Source	Well #5B Replicate #1	Well #5B Replicate #2	Well #5B Replicate #3	Well #5B Replicate #4
Log No. 83-	1561	1562	1563	1564
Date Collected	3/31/83 @ 9:00 AM	3/31/83 @ 9:00 AM	3/31/83 @ 9:00 AM	3/31/83 @ 9:00 AM
pH	5.8	5.8	5.9	5.9
Specific Conductance, μmhos/cm	55	58	58	68
Total Organic Carbon, mg/L C	11	10	9	11
Total Organic Halogens, μg/L Cl	24	35	50	57
Cadmium, mg/L Cd	0.008	--	--	--

3276-90

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environm- Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

CHEM-MET LAB
D/59-13

4-5-83
DATE

C1881
LAB NO.

WATER ANALYSIS Well Samples

TO: Jerry Hyde
D/ 49-25 Z/ 255

ANALYSIS METHOD: ATOMIC ABSORPTION
PERKIN-ELMER MODEL 5000

TEST RESULTS (Mg/L)

STAMP DATE	CIRCLE ALL ELEMENTS DETERMINED ON GRAPHITE FURNACE								
	Hg	Cd	Cu	Cr	Ni	Pb	Zn	Ag	Al	Ce
DISCHARGE LIMITS	.0002	.020	.20	.10	.01	.05	.5	.05	.4	
#2		.015								.0
#3		.014								.0
#4		.016								.0
#5B		.025								.0C

J. L. Hutchins

Q-240

CHEM-MET LAB
D/59-13

4-5-83
DATE

C1881
LAB NO.

WATER ANALYSIS Well Samples

TO: Jerry Hyde
D/ 45-25 Z/ 255

ANALYSIS METHOD: ATOMIC ABSORPTION
PERKIN-ELMER MODEL 5000

TEST RESULTS (Mg/L)										
STAMP DATE	CIRCLE ALL ELEMENTS DETERMINED ON GRAPHITE FURNACE									
	Hg	Cd	Cu	Cr	Ni	Pb	Zn	Ag	Al	
DISCHARGE LIMITS	.0002	.020	.20	.10	.01	.05	.5	.05	.4	
#2		.015								
#3		.014								
#4		.016								
#5B		.025								

J. S. Hutchins

```
]RUN
THIS PROGRAM PERFORMS A STATISTICAL
ANALYSIS USING COCHRAN'S APPROXIMATION
TO THE BEHRENS-FISHER STUDENT'S T-TEST.


CHOOSE THE LEVEL OF SIGNIFICANCE:

    1  .01
    2  .05
?1
RCRA MONITORING PROGRAM
MENU
     NEW JOB

     ADD DATA

     GENERATE REPORTS

     END
ENTER FIRST LETTER OF CHOICE .....REPORT GENERATOR
 ENTER CHOICE:
   1 ALL REPORTS TO DATE
   2 LATEST REPORT W/FIRST YEAR
   3 LATEST REPORT W/O FIRST YEAR
   ?2
```

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:3/31/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:5-B TYPE:UPGRADIENT USAF PLANT #6
MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	5.8							
	5.8							
	5.9							
	5.9	5.8	.003	6.1	.015	-5.938	4.2	SL
Spec.Conductance-umhos/cm	55.							
	58.							
	58.							
	68.	59.7	32.2	47.1	23.1	4.0	4.1	N
Tot.Org.Carbon-mg/L C	11.							
	10.							
	9.							
	11.	10.2	.916	7.7	15.8	2.2	2.9	N
Tot.Org.Halogens-ug/L Cl	24.							
	35.							
	50.							
	57.	41.5	220.3	889.6	1035256.9	-3.249	2.6	N

The Chester Engineers

SH - Significantly Higher
SL - Significantly Lower
N - No Significant Change

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:3/31/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:2 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	6.7							
	6.6							
	6.6							
	6.6	6.6	.002	5.1	.015	13.0	4.0	SH
Spec.Conductance-umhos/cm	1190.							
	1195.							
	1190.							
	1195.	1192.5	8.3	47.1	23.1	534.4	3.6	SH
Tot.Org.Carbon-mg/L C	42.							
	36.							
	40.							
	40.	39.5	6.3	7.7	15.8	19.3	3.7	SH
Tot.Org.Halogens-ug/L Cl	490.							
	510.							
	466.							
	441.	476.7	891.5	839.6	1086256.9	-1.578	2.6	N

The Chester Engineers

SH - Significantly Higher
SL - Significantly Lower
N - No Significant Change

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:3/31/83 CLIENT: LOCKHEED-GEORGIA COMPANY

WELL:3 TYPE:DOWNGRADIENT USAF PLANT #6

MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	5.3							
	5.3							
	5.3							
	5.3	5.3	0.	6.1	.015	-25.298	2.9	SL
Spec.Conductance-umhos/cm	1400.							
	1395.							
	1400.							
	1400.	1398.7	6.2	47.1	23.1	741.3	3.5	SH
Tot.Org.Carbon-mg/L C	35.							
	40.							
	43.							
	41.	39.7	11.5	7.7	15.3	16.2	4.0	SH
Tot.Org.Halogens-ug/L Cl	1935.							
	2279.							
	2010.							
	2255.	2132.2	24410.2	339.5	1026256.9	4.5	2.7	SH

The Chester Engineers

SH - Significantly Higher
SL - Significantly Lower
N - No Significant Change

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:3/31/93 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:4 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	5.1							
	5.1							
	5.							
	5.	5.0	.003	5.1	.015	-24.522	4.2	SL
Spec.Conductance-umhos/cm	390.							
	365.							
	365.							
	375.	371.2	56.2	47.1	23.1	207.2	4.3	SH
Tot.Org.Carbon-mg/L C	20.							
	17.							
	4.							
	11.	13.	50.	7.7	15.3	1.4	4.3	N
Tot.Org.Halogens-ug/L Cl	990.							
	858.							
	794.							
	853.	870.	6594.5	338.5	138255.9	-.070	2.5	N

The Chester Engineers

SH - Significantly Higher
SL - Significantly Lower
N - No Significant Change

YEAR:1 CLIENT: LOCKHEED-GEORGIA COMPANY

WELL:5-9 TYPE:UPGRADIENT USAF PLANT #6

MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS				BACKGROUND AVERAGE	BACKGROUND VARIANCE
DATE SAMPLE COLLECTED	1/28/82	4/7/82	7/7/82	10/5/82		
pH	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2	6.1	.015
Spec.Conductance-umhos/cm	47.	50.	39.	53.		
	47.	50.	39.	53.		
	47.	50.	39.	50.		
	47.	50.	39.	54.	47.1	23.1
Tot.Org.Carbon-mg/L C	1.2	9.6	11.	9.		
	1.3	9.9	11.	9.		
	1.3	9.5	11.	9.		
	1.3	9.7	12.	8.	7.7	15.3
Tot.Org.Halogens-ug/L Cl	2215.	790.	92.	123.		
	2550.	790.	89.	117.		
	2315.	790.	85.	120.		
	2545.	770.	96.	125.	888.6	1083256.9

The Chester Engineers

SH - Significantly Higher
SL - Significantly Lower
N - No Significant Change

Lockheed-Georgia Company
A Division of Lockheed Corporation
Marietta, Georgia 30063

July 1, 1983 LM/32417

SUBJECT: Second Year RCRA Ground Water Monitoring Analyses - Second Report

TO : Georgia Department of Natural Resources
Land Protection Branch
Environmental Protection Division
270 Washington Street, S. W.
Atlanta, Georgia 30334

ATTN : J. R. Kaduck

THRU : AFPR/PDP
Lockheed-Georgia Company
Marietta, Georgia 30063

ENCLS : (A) Chester Engineers, Lab Analysis Report and Calculations, dated 5-17-83
(B) Law Engineering Testing Company, Lab Analysis Report and Calculations, dated 6-21-83

1. Enclosed are the results of the second sample tests in this year's ground water monitoring program. This sample was necessitated by the first sample results that revealed significant differences in the ground water quality parameters.

2. The second sample results do not provide a clear assessment of our ground water conditions, due to inconsistencies in the two findings. However, we are encouraged by the fact that both lab results indicate that the cadmium concentration is continuing to decline. We will continue the second year sampling and analysis program as agreed to previously.

3. If you have any questions or recommendations for future action at this time please contact the undersigned at 424-3760.

LOCKHEED-GEORGIA COMPANY

J. Arnold
Director of Safety Assurance

JA:bp

APPROVED FOR TRANSMITTAL P.E. DATE 6 JULY 83
AFPR/PDP
Facility Engineer

ENCLOSURE (A)

CHESTER ENGINEERS
LAB ANALYSIS REPORT AND CALCULATIONS
DATED 5-17-83

The Chester Engineers

A COMPUTER PROGRAM
FOR THE MANAGEMENT AND STATISTICAL EVALUATION
OF HAZARDOUS WASTE SITE DATA

The basis for the statistical analysis that follows is Cochran's Approximation to the Behrens-Fisher Students' t-test. For an excellent programmed description of the procedure, see 40 CFR Part 264 Appendix IV.

This analysis was conducted at the 0.01 level of significance.

INTERPRETATION OF RESULTS

In a single-tailed test, only a significant increase in the parameter is of interest. Therefore, if t^* is negative it can be concluded immediately that there has been no significant increase in the parameter. If t^* is positive, there is no significant increase in the parameter unless t^* is greater than or equal to tc.

In a two-tailed test, either an increase or decrease in the parameter is of interest. Therefore, the absolute value of t^* is compared with tc. If the absolute value of t^* is greater than or equal to tc, then there most likely has been a significant change in the parameter. Whether the change is significantly higher or lower depends upon the original sign of t^* (i.e., negative/lower or positive/higher).

CODE SUMMARY

N no significant change
SH significantly higher
SL significantly lower

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:5/17/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:B-5 TYPE:UPGRADIENT USAF PLANT #6
MARIETTA,GEORGIA
ANALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	5.1							
	5.							
	5.1							
	5.2	5.1	.006	6.1	.015	-19.364	4.7	SL
Spec.Conductance-umhos/cm	41.5							
	41.5							
	40.5							
	41.	41.1	.229	47.1	28.1	-4.454	2.6	N
Tot.Org.Carbon-mg/L C	5.							
	7.							
	5.							
	7.	6.	1.3	7.7	15.8	-1.511	3.0	N
Tot.Org.Halogens-ug/L Cl	23.							
	21.							
	23.							
	28.	23.7	8.9	888.6	1086256.9	-3.319	2.6	N

The Chester Engineers

EAR:2 PERIOD:1 DATE SAMPLE COLLECTED:5/17/83 CLIENT: LOCKHEED-GEORGIA COMPANY
ELL:2 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA
NALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	6.3							
	6.3							
	6.3							
	6.2	6.2	.002	6.1	.015	4.3	4.0	SH
Spec.Conductance-umhos/cm	1330.							
	1330.							
	1340.							
	1340.	1345.	33.3	47.1	23.1	408.3	4.2	SH
Tot.Org.Carbon-mg/L C	90.							
	82.							
	90.							
	93.	88.7	22.2	7.7	15.8	31.6	4.2	SH
Tot.Org.Halogens-ug/L Cl	470.							
	550.							
	510.							
	490.	505.	1166.6	388.6	1086256.9	-1.469	2.6	N

The Chester Engineers

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:5/17/83 CLIENT: LOCKHEED-GEORGIA COMPANY

WELL:3 TYPE:DOWNGRADIENT USAF PLANT #6

MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	5.							
	4.9							
	4.9							
	4.9	4.9	.002	6.1	.015	-29.148	4.0	SL
Spec.Conductance-umhos/cm	1415.							
	1410.							
	1405.							
	1395.	1406.2	72.9	47.1	28.1	304.0	4.3	SH
Tot.Org.Carbon-mg/L C	56.							
	51.							
	60.							
	53.	55.	15.3	7.7	15.8	21.5	4.1	SH
Tot.Org.Halogens-ug/L Cl	1500.							
	1425.							
	1375.							
	1375.	1418.7	3489.5	388.6	1086256.9	2.0	2.6	N

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:5/17/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:4 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA
ANALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	4.6							
	4.6							
	4.5							
	4.6	4.5	.002	6.1	.015	-37.830	4.0	SL
Spec.Conductance-umhos/cm	800.							
	795.							
	795.							
	795.	796.2	6.2	47.1	28.1	411.1	3.5	SH
Tot.Org.Carbon-mg/L C	28.							
	24.							
	28.							
	28.	27.	4.	7.7	15.8	13.6	3.5	SH
Tot.Org.Halogens-ug/L Cl	200.							
	210.							
	260.							
	255.	231.2	[illegible]39.5	389.6	1086256.9	-2.518	2.6	N

McChester Engineers

YEAR:1		CLIENT:	LOCKHEED-GEORGIA COMPANY
WELL:B-5	TYPE:UPGRADIENT		USAF PLANT #6
			MARIETTA,GEORGIA
ANAL...CAL RESULTS FOR INDICATOR PARAMETERS			(SECOND YEAR RESAMPLING)

		ANALYTICAL RESULTS			BACKGROUND AVERAGE	BACKGROUND VARIANCE
DATE SAMPLE COLLECTED	1/28/82	4/7/82	7/7/82	10/5/82		
pH	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2	6.1	.015
Spec.Conductance-umhos/cm	47.	50.	39.	53.		
	47.	50.	39.	53.		
	47.	50.	39.	50.		
	47.	50.	39.	54.	47.1	28.1
Tot. j.Carbon-mg/L C	1.2	9.6	11.	9.		
	1.3	9.9	11.	9.		
	1.3	9.5	11.	9.		
	1.3	9.7	12.	8.	7.7	15.8
Tot.Org.Halogens-ug/L Cl	2215.	780.	92.	123.		
	2550.	790.	89.	113.		
	2915.	[illegible]	85.	130.		
	2545.	[illegible]	[illegible]	125.	888.6	1086256.9

McChester Engineers

ChesterLaboratories
A Division Of
TheChesterEngineers

Laboratory Analysis Report
For
Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 5/18/83
Report Date: 6/27/83

Source	Well #2 Sample #1	Well #2 Sample #2	Well #2 Sample #3	Well #2 Sample #4
Log No. 83-	2493	2494	2495	2496
Date Collected	5/17/83 @ 10:45 AM	5/17/83 @ 10:45 AM	5/17/83 @ 10:45 AM	5/17/83 @ 10:45 AM
pH	6.3	6.3	6.3	6.2
Specific Conductance, umhos/cm	1,350	1,350	1,340	1,340
Total Organic Carbon, mg/L C	90	82	90	93
Total Organic Halogens, ug/L Cl	470	550	510	490
Cadmium, mg/L Cd	0.006	—	—	—

Source	Well #3 Sample #1	Well #3 Sample #2	Well #3 Sample #3	Well #3 Sample #4
Log No. 83-	2497	2498	2499	2500
Date Collected	5/17/83 @ 11:15 AM	5/17/83 @ 11:15 AM	5/17/83 @ 11:15 AM	5/17/83 @ 11:15 AM
pH	5.0	4.9	4.9	4.9
Specific Conductance, umhos/cm	1,415	1,410	1,405	1,395
Total Organic Carbon, mg/L C	56	51	60	53
Total Organic Halogens, ug/L Cl	1,500	1,425	1,375	1,375
Cadmium, mg/L Cd	0.012	—	—	—

3276-90

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

Ann Arbor • Atlanta • Chadds Ford • Dallas • Kingston • Nashville

ChesterLaboratories
A Division Of
TheChesterEngineers

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 5/18/83
Report Date: 6/27/83

Source	Well #4 Sample #1	Well #4 Sample #2	Well #4 Sample #3	Well #4 Sample #4
Log No. 83-	2501	2502	2503	2504
Date Collected	5/17/83 @ Noon	5/17/83 @ Noon	5/17/83 @ Noon	5/17/83 @ Noon
pH	4.6	4.6	4.5	4.6
Specific Conductance, umhos/cm	800	795	795	795
Total Organic Carbon, mg/L C	28	24	28	28
Total Organic Halogens, ug/L Cl	200	210	260	255
Cadmium, mg/L Cd	0.020	—	—	—

Source	Well #B-5 Sample #1	Well #B-5 Sample #2	Well #B-5 Sample #3	Well #B-5 Sample #4
Log No. 83-	2505	2506	2507	2508
Date Collected	5/17/83 @ 10:00 AM	5/17/83 @ 10:00 AM	5/17/83 @ 10:00 AM	5/17/83 @ 10:00 AM
pH	5.1	5.0	5.1	5.2
Specific Conductance, umhos/cm	41.5	41.5	40.5	41.0
Total Organic Carbon, mg/L C	5	7	5	7
Total Organic Halogens, ug/L Cl	23	21	23	28
Cadmium, mg/L Cd	0.010	—	—	—

3278-90

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmen Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit

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ENCLOSURE (8)

LAW ENGINEERING TESTING COMPANY
LAB ANALYSIS REPORT AND CALCULATIONS
DATED 6-21-83

The Chester Engineers

A COMPUTER PROGRAM
FOR THE MANAGEMENT AND STATISTICAL EVALUATION
OF HAZARDOUS WASTE SITE DATA

The basis for the statistical analysis that follows is Cochran's Approximation to the Behrens-Fisher Students' t-test. For an excellent programmed description of the procedure, see 40 CFR Part 264 Appendix IV.

This analysis was conducted at the 0.01 level of significance.

INTERPRETATION OF RESULTS

In a single-tailed test, only a significant increase in the parameter is of interest. Therefore, if t* is negative it can be concluded immediately that there has been no significant increase in the parameter. If t* is positive, there is no significant increase in the parameter unless t* is greater than or equal to tc.

In a two-tailed test, either an increase or decrease in the parameter is of interest. Therefore, the absolute value of t* is compared with tc. If the absolute value of t* is greater than or equal to tc, then there most likely has been a significant change in the parameter. Whether the change is significantly higher or lower depends upon the original sign of t* (i.e., negative/lower or positive/higher).

CODE SUMMARY

N no significant change
SH significantly higher
SL significantly lower

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:6/21/83 CLIENT: LOCKHEED-GEORGIA COMPANY

WELL:B-5 TYPE:UPGRADIENT USAF PLANT #6

MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	5.6							
	5.6							
	5.6							
	5.6	5.6	0.	6.1	.015	-15.811	2.9	SL
Spec.Conductance-umhos/cm	44.							
	44.							
	43.							
	44.	43.7	.25	47.1	28.1	-2.501	2.6	N
Tot.Org.Carbon-mg/L C	1.2							
	3.1							
	1.7							
	2.1	2.0	.649	7.7	15.8	-5.326	2.8	N
Tot.Org.Halogens-ug/L Cl	300.							
	290.							
	300.							
	310.	300.	66.6	888.6	1084256.9	-2.258	2.6	N

The Chester Engineers

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:6/21/83 CLIENT: LOCKHEED-GEORGIA COMPANY

WELL:W-2 TYPE:DOWNGRADIENT USAF PLANT #6

MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TE RESU
pH	6.5							
	6.5							
	6.5							
	6.6	6.5	.002	6.1	.015	10.5	4.0	SH
Spec.Conductance-umhos/cm	1400.							
	1400.							
	1400.							
	1400.	1400.	0.	47.1	28.1	1020.5	2.6	SH
Tot.Org.Carbon-mg/L C	24.							
	35.							
	31.							
	36.	31.5	29.6	7.7	15.8	8.1	4.3	S
Tot.Org.Halogens-ug/L Cl	1900.							
	2000.							
	2000.							
	1700.	1900.	20000.	888.6	1086256.9	3.7	2.7	S

The Chester Engineers

YEAR:2 PERIOD:1	DATE SAMPLE COLLECTED:6/21/83	CLIENT:	LOCKHEED-GEORGIA COMPANY
WELL:M-3	TYPE:DOWNGRADIENT		USAF PLANT #6
			MARIETTA,GEORGIA
ANALYTICAL RESULTS FOR INDICATOR PARAMETERS			(SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-RE
pH	5.2							
	5.2							
	5.2							
	5.2	5.2	0.	6.1	.015	-28.460	2.9	
Spec.Conductance-umhos/cm	1500.							
	1500.							
	1500.							
	1510.	1502.5	25.	47.1	28.1	514.3	4.1	
Tot.Org.Carbon-mg/L C	26.							
	32.							
	24.							
	22.	26.	18.6	7.7	15.8	7.6	4.2	
Tot.Org.Halogens-ug/L Cl	1500.							
	1700.							
	1300.							
	1500.	1500.	26666.6	888.6	1086256.9	2.2	2.7	

The Chester Engineers

YEAR:2 PERIOD:1 DATE SAMPLE COLLECTED:6/21/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:W-4 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA
ANALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-RE
pH	4.9							
	4.9							
	5.							
	4.9	4.9	.002	6.1	.015	-29.148	4.0	
Spec.Conductance-umhos/cm	920.							
	920.							
	910.							
	920.	917.5	25.	47.1	28.1	307.5	4.1	
Tot.Org.Carbon-mg/L C	11.							
	15.							
	9.4							
	12.	11.8	5.3	7.7	15.8	2.6	3.7	
Tot.Org.Halogens-ug/L Cl	560.							
	580.							
	560.							
	500.	550.	1200.	888.6	1086256.9	-1.296	2.6	

TheChester Engineers

YEAR: 1 CLIENT: LOCKHEED-GEORGIA COMPANY

WELL: B-5 TYPE: UPGRADIENT USAF PLANT #6

MARIETTA, GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS (SECOND YEAR RESAMPLING)

	ANALYTICAL RESULTS				BACKGROUND	
					AVERAGE	VARIANCE
DATE SAMPLE COLLECTED	1/28/82	4/7/82	7/7/82	10/5/82		
pH	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2	6.1	.015
Spec.Conductance-umhos/cm	47.	50.	39.	53.		
	47.	50.	39.	53.		
	47.	50.	39.	50.		
	47.	50.	39.	54.	47.1	28.1
Tot.Org.Carbon-mg/L C	1.2	9.6	11.	9.		
	1.3	9.9	11.	9.		
	1.3	9.5	11.	9.		
	1.3	9.7	12.	8.	7.7	15.8
Tot.Org.Halogens-ug/L Cl	2215.	780.	92.	123.		
	2550.	790.	89.	113.		
	2915.	790.	85.	130.		
	2545.	770.	96.	135.	888.6	1086256.9

The Chester Engineers

Job Number: MY 3801
Lab Number: 83-05-17-05
Client ID: B-5 5/17/83

Parameter	Results			
	Bottle 1	Bottle 2	Bottle 3	Bottle 4
pH	5.6	5.6	5.6	5.6
Specific Conductance (µmho/cm @ 25°C)	44.	44.	43.	44.
Total Organic Carbon (mg/l)	1.2	3.1	1.7	2.1
Total Organic Halogen (mg/l as Cl)	0.30	0.29	0.30	0.31
Total Cadmium (mg/l)	0.008			

Job Number: MY 3801
Lab Number: 83-05-17-06
Client ID: W-2 5/17/83

Parameter	Results			
	Bottle 1	Bottle 2	Bottle 3	Bottle 4
pH	6.5	6.5	6,5	6.6
Specific Conductance (µmho/cm @ 25°C)	1400	1400	1400	1400
Total Organic Carbon (mg/l)	24.	35.	31.	36.
Total Organic Halogen (mg/l as Cl)	1.9	2.0	2.0	1.7
Total Cadmium (mg/l)	0.006			

Job Number: MY 3801
Lab Number: 83-05-17-07
Client ID: W-3 5/17/83

Parameter	Results			
	Bottle 1	Bottle 2	Bottle 3	Bottle 4
pH	5.2	5.2	5.2	5.2
Specific Conductance (µmho/cm @ 25°C)	1500	1500	1500	1510
Total Organic Carbon (mg/l)	26.	32.	24.	22.
Total Organic Halogen (mg/l as Cl)	1.5	1.7	1.3	1.5
Total Cadmium (mg/l)	0.012			

Job Number: MY 3801
Lab Number: 83-05-17-08
Client ID: W-4 5/17/83

Parameter	Results			
	Bottle 1	Bottle 2	Bottle 3	Bottle 4
pH	4.9	4.9	5.0	4.9
Specific Conductance (μmho/cm @ 25°C)	920	920	910	920
Total Organic Carbon (mg/l)	11.	15.	9.4	12.
Total Organic Halogen (mg/l as Cl)	0.56	0.58	0.56	0.50
Total Cadmium (mg/l)	0.018			

Lockheed-Georgia Company

A Division of Lockheed Corporation
Marietta, Georgia 30063

November 9, 1983 LM/32734

SUBJECT: Second Year RCRA Ground Water Monitoring Analyses — Third Report 1983

TO : Georgia Department of Natural Resources
Land Protection Branch
Environmental Protection Division
270 Washington Street, S. W.
Atlanta, Georgia 30334

ATTN : J. R. Kaduck

THRU : AFPR/PDP
Lockheed-Georgia Company
Marietta, Georgia 30063

ENCLS : (A) Monitoring Well Analyses Report for Indicator Parameters, Cadmium and Quality Parameters. (3 pgs.)

(B) Chain-of-Custody Document for Sample Handling. (1 pg.)

(C) Computer Printout for T-Testing performed on results of samples obtained. Procedures outlined in 40 CFR 265.93 (B) and 40 CFR 264 Appendix IV were followed in completing these statistical comparisons. (Level of Used: 0.01.) (6 pgs.)

1. Enclosed are the results of the third sample tests in this year's Ground Water Monitoring Program. This represents the second semi-annual analytical period as required by RCRA.

2. As you are aware, Lockheed has retained the services of The Chester Engineers. Chester is now engaged in the development of a Ground Water Quality Assessment Plan per Chapter 391-3-11-.10 of the Georgia Rules for Hazardous Waste Management which adopts and incorporates, by reference, 40 CFR Part 265.93 (d) (2).

LGC letter dated November 9, 1983 to Georgia Department of Natural Resources,

Subject: Second Year RCRA Ground Water Monitoring Analyses — Third Report, 1983, LM/32734

3. If you have any questions, please contact the Director of Safety Assurance, J. Arnold, at 424-3760.

Very truly yours,

LOCKHEED-GEORGIA COMPANY

Charles P Cochran

Charles P. Cochran
Vice President - Operations

APPROVED FOR TRANSMITTAL: J. W. Caldwell DATE: 16 Nov 83
AFPR/PDP
Facility Engineer

CPC:DAR:bp

cc : Mr. Charles H. Alford — with enclosures
Environmental Program Manager
Air Force Aeronautical Systems Division
Wright-Patterson Air Force Base, Ohio 45433

Mr. James H. Scarbrough — with enclosures
Residuals Management Branch
U. S. Environmental Protection Agency, Revion IV
345 Courtland Street
Atlanta, Georgia 30365

Internal Distribution:

J. Arnold	D/55-01	Z- 54		with enclosure
M. M. Blankenship	85-01	35		"
J. W. Caldwell	AFPR/PDP	14		"
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ChesterLaboratories

A Division Of
TheChesterEngineers

ENCLOSURE (A)

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 10/6/83
Report Date: 10/28/83

Source	Well #2 Replicate #1	Well #2 Replicate #2	Well #2 Replicate #3	Well #2 Replicate #4
Log No. 83-	5304	5304	5304	5304
Date Collected	10/5/83 @ 12:30 PM	10/5/83 @ 12:30 PM	10/5/83 @ 12:30 PM	10/5/83 @ 12:30 PM
pH	6.8	6.8	6.8	6.8
Specific Conductance, umhos/cm	1,390	1,400	1,380	1,390
Total Organic Halogens, µg/L Cl	639	620	602	602
Total Organic Carbon, mg/L C	33	31	33	39

Source	Well #3 Replicate #1	Well #3 Replicate #2	Well #3 Replicate #3	Well #3 Replicate #4
Log No. 83-	5305	5305	5305	5305
Date Collected	10/5/83 @ 12:45 PM	10/5/83 @ 12:45 PM	10/5/83 @ 12:45 PM	10/5/83 @ 12:45 PM
pH	5.6	5.6	5.6	5.6
Specific Conductance, uhmos/cm	1,215	1,215	1,220	1,215
Total Organic Halogens, µg/L Cl	1,093	1,074	1,148	1,185
Total Organic Carbon, mg/L C	25	23	22	24

3274-90

…less otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental …otection Agency and conform to quality assurance protocol.
• "Less-than" (<) values are indicative of the detection limit.

ChesterLaboratories

A Division Of
TheChesterEngineers

ENCLOSURE (A)

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 10/6/83
Report Date: 10/28/83

Monitoring Well Analyses

Source	Well #4 Replicate #1	Well #4 Replicate #2	Well #4 Replicate #3	Well #4 Replicate #4
Log No. 83-	5306	5306	5306	5306
Date Collected	10/5/83 @ 1:05 PM	10/5/83 @ 1:05 PM	10/5/83 @ 1:05 PM	10/5/83 @ 1:05 PM
pH	5.3	5.3	5.3	5.3
Specific Conductance, µmhos/cm	770	780	780	775
Total Organic Halogens, µg/L Cl	278	300	296	311
Total Organic Carbon, mg/L C	8	4	5	3

Source	Well #5-B Replicate #1	Well #5-B Replicate #2	Well #5-B Replicate #3	Well #5-B Replicate #4
Log No. 83-	5307	5307	5307	5307
Date Collected	10/5/83 @ NOON	10/5/83 @ NOON	10/5/83 @ NOON	10/5/83 @ NOON
pH	6.3	6.3	6.3	6.3
Specific Conductance, µmhos/cm	44	44	44	44
Total Organic Halogens, µg/L Cl	26	28	26	24
Total Organic Carbon, mg/L C	<1	<1	1	<1

3274-90

* Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental ...otection Agency and conform to quality assurance protocol.
...ss-than" (<) values are indicative of the detection limit.

ChesterLaboratories

ENCLOSURE (A)

A Division Of
TheChesterEngineers
Phone: (412) 262-1035

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 10/6/83
Report Date: 10/28/83

Source	Well #2	Well #3	Well #4	Well #5-B
Log No. 83-	5304	5305	5306	5307
Date Collected	10/5/83 @ 12:30 PM	10/5/83 @ 12:45 PM	10/5/83 @ 1:05 PM	10/5/83 @ NOON
Chlorides, mg/L Cl	55	49	51	2
Sulfates, mg/L SO_4	402	644	230	<3
Phenols, mg/L PhOH	0.016	0.006	0.006	0.006
Iron, mg/L Fe	0.68	0.73	0.81	0.75
ganese, mg/L Mn	2.8	8.8	5.4	0.20
Cadmium, mg/L Cd	0.018	0.018	0.038	0.015
Sodium, mg/L Na	365	280	135	4

3274-90

'Inless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental otection Agency and conform to quality assurance protocol.
.ess-than" (<) values are indicative of the detection limit.

Ann Arbor • Atlanta • Chadds Ford • Dallas • Kingston • Nashville

ENCLOSURE (B)

CLIENT

Facility	Lockheed - Georgia
Location	Marietta, Georgia
Contact	Mr. Cliff Griffin
Phone	(404) 424-3577

LABORATORY

Lab Name	Chester Labs
Location	Coraopolis, Pennsylvania
Project No.	3276-03/90
Date Received	

WELL NO.	DEPTH TO WATER	DEPTH TO BOTTOM	WELL DIAMETER	VOLUME PURGED	DATE OF SAMPLING	TIME	SAMPLING PERSONNEL
B-5	27'	29.4'	2"	1.5 gal	10/5/83	12 NOON	R. Morris
2	18.25'	27.4'	2"	5 gal	10/5/83	12:30 PM	R. Morris
3	23.75'	30.6'	2"	3.5 gal	10/5/83	12:45 PM	R. Morris
4	24.33'	29.9'	2"	3 gal	10/5/83	1:05 PM	R. Morris

Q-272

ANALYSES REQUESTED

Suitable Drinking Water Parameters	
Groundwater Quality Parameters	X
Indicators of Ground-water Contamination Parameters	X

Additional Analyses: All indicators of groundwater contamination parameters to be run in replicate for all four (4) wells. Cadmium to be analyzed on all four (4) wells.

CHAIN-OF-CUSTODY SIGNATURES

Relinquished By	Relinquished To	Date Received	Time	Method of Transfer	Samples Properly Preserved	Seals Intact
	John C. Schrade	10-06-83	10 Am	Air Freight	Yes	Yes

The Chester Engineers

A COMPUTER PROGRAM
FOR THE MANAGEMENT AND STATISTICAL EVALUATION
OF HAZARDOUS WASTE SITE DATA

The basis for the statistical analysis that follows is Cochran's Approximation to the Behrens-Fisher Students' t-test. For an excellent programmed description of the procedure, see 40 CFR Part 264 Appendix IV.

This analysis was conducted at the 0.01 level of significance.

INTERPRETATION OF RESULTS

In a single-tailed test, only a significant increase in the parameter is of interest. Therefore, if t* is negative it can be concluded immediately that there has been no significant increase in the parameter. If t* is positive, there is no significant increase in the parameter unless t* is greater than or equal to tc.

In a two-tailed test, either an increase or decrease in the parameter is of interest. Therefore, the absolute value of t* is compared with tc. If the absolute value of t* is greater than or equal to tc, then there most likely has been a significant change in the parameter. Whether the change is significantly higher or lower depends upon the original sign of t* (i.e., negative/lower or positive/higher).

CODE SUMMARY

N no significant change
SH significantly higher
SL significantly lower

ENCLOSURE (C)

YEAR:2 PERIOD:2 DATE SAMPLE COLLECTED:10/5/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:5-B TYPE:UPGRADIENT USAF PLANT #6
MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	6.3							
	6.3							
	6.3							
	6.3	6.3	0.000	6.1	.015	6.3	2.9	SH
Spec.Conductance-umhos/cm	44.							
	44.							
	44.							
	44.	44.	0.	47.1	28.1	-2.357	2.6	N
Tot.Org.Carbon-mg/L C	1.							
	1.							
	1.							
	1.	1.	0.	7.7	15.8	-6.778	2.6	N
Tot.Org.Halogens-ug/L Cl	26.							
	28.							
	26.							
	24.	26.	2.6	888.6	1086256.9	-3.310	2.6	N

The Chester Engineers

ENCLOSURE (C)

YEAR:2 PERIOD:2 DATE SAMPLE COLLECTED:10/5/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:2 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	6.8							
	6.8							
	6.8							
	6.8	6.8	0.000	6.1	.015	22.1	2.9	SH
Spec.Conductance-umhos/cm	1390.							
	1400.							
	1380.							
	1390.	1390.	66.6	47.1	28.1	312.8	4.3	SH
Tot.Org.Carbon-mg/L C	33.							
	31.							
	33.							
	39.	34.	12.	7.7	15.8	13.1	4.0	SH
Tot.Org.Halogens-ug/L Cl	639.							
	620.							
	602.							
	602.	615.7	312.2	888.6	1086256.9	-1.046	2.6	N

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ENCLOSURE (C)

YEAR:2 PERIOD:2 DATE SAMPLE COLLECTED:10/5/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:3 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	ti	tc	t-TEST RESULTS
pH	5.6							
	5.6							
	5.6							
	5.6	5.6	0.	6.1	.015	-15.811	2.9	SL
Spec.Conductance-umhos/cm	1215.							
	1215.							
	1220.							
	1215.	1216.2	6.2	47.1	28.1	641.6	3.5	SH
Tot.Org.Carbon-mg/L C	25.							
	23.							
	22.							
	24.	23.5	1.6	7.7	15.8	13.2	3.1	SH
Tot.Org.Halogens-ug/L Cl	1093.							
	1074.							
	1148.							
	1185.	1125.	2584.6	888.6	1086256.9	.902	2.6	N

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ENCLOSURE (C)

YEAR:2 PERIOD:2 DATE SAMPLE COLLECTED:10/5/83 CLIENT: LOCKHEED-GEORGIA COMPANY
WELL:4 TYPE:DOWNGRADIENT USAF PLANT #6
MARIETTA,GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS	AVERAGE	VARIANCE	BACKGROUND AVERAGE	BACKGROUND VARIANCE	t*	tc	t-TEST RESULTS
pH	5.3							
	5.3							
	5.3							
	5.3	5.3	0.	6.1	.015	-25.298	2.9	SL
Spec.Conductance-umhos/cm	770.							
	780.							
	780.							
	775.	776.2	22.9	47.1	28.1	266.4	4.0	SH
Tot.Org.Carbon-mg/L C	8.							
	4.							
	5.							
	3.	5.	4.6	7.7	15.8	-1.864	3.6	N
Tot.Org.Halogens-ug/L Cl	278.							
	300.							
	296.							
	311.	296.2	188.2	888.6	1086256.9	-2.272	2.6	N

The Chester Engineers

ENCLOSURE (C)

YEAR: 1
WELL: 5-8 TYPE: UPGRADIENT
CLIENT: LOCKHEED-GEORGIA COMPANY
USAF PLANT #6
MARIETTA, GEORGIA

ANALYTICAL RESULTS FOR INDICATOR PARAMETERS

	ANALYTICAL RESULTS				BACKGROUND AVERAGE	BACKGROUND VARIANCE
DATE SAMPLE COLLECTED	1/28/82	4/7/82	7/7/82	10/5/82		
pH	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2		
	5.9	6.1	6.2	6.2	6.1	.015
Spec.Conductance-umhos/cm	47.	50.	39.	53.		
	47.	50.	39.	53.		
	47.	50.	39.	50.		
	47.	50.	39.	54.	47.1	28.1
Tot.Org.Carbon-mg/L C	1.2	9.6	11.	9.		
	1.3	9.9	11.	9.		
	1.3	9.5	11.	9.		
	1.3	9.7	12.	8.	7.7	15.8
Tot.Org.Halogens-ug/L Cl	2215.	780.	92.	123.		
	2550.	790.	89.	113.		
	2915.	790.	85.	130.		
	2545.	770.	96.	135.	888.6	1086256.9

The Chester Engineers

2.2 B-10 AERATION BASIN--SITE G6, ZONE 4

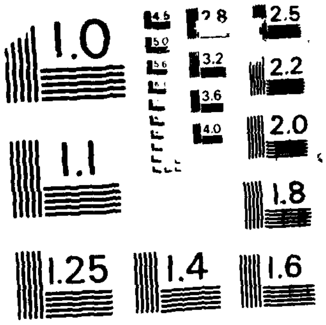
APPENDIX A

GROUNDWATER QUALITY INFORMATION

B-1C Aeration Basin

AD-A190 453 INSTALLATION RESTORATION PROGRAM PHASE 2 CONFIRMATION/QUANTIFICATION STAG..(U) ENVIRONMENTAL SCIENCE AND ENGINEERING INC GAINESVILLE FL 4/5

UNCLASSIFIED C R NEFF ET AL. 09 AUG 86 F/G 24/3 NL


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0

ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.
P. O. Box ESE
GAINESVILLE, FLORIDA 32602-3053
(904) 332-3318 TWX 810-825-6310

JOB
SHEET NO OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Monitoring Well

mw 22 upgradient

mw 23

mw 25

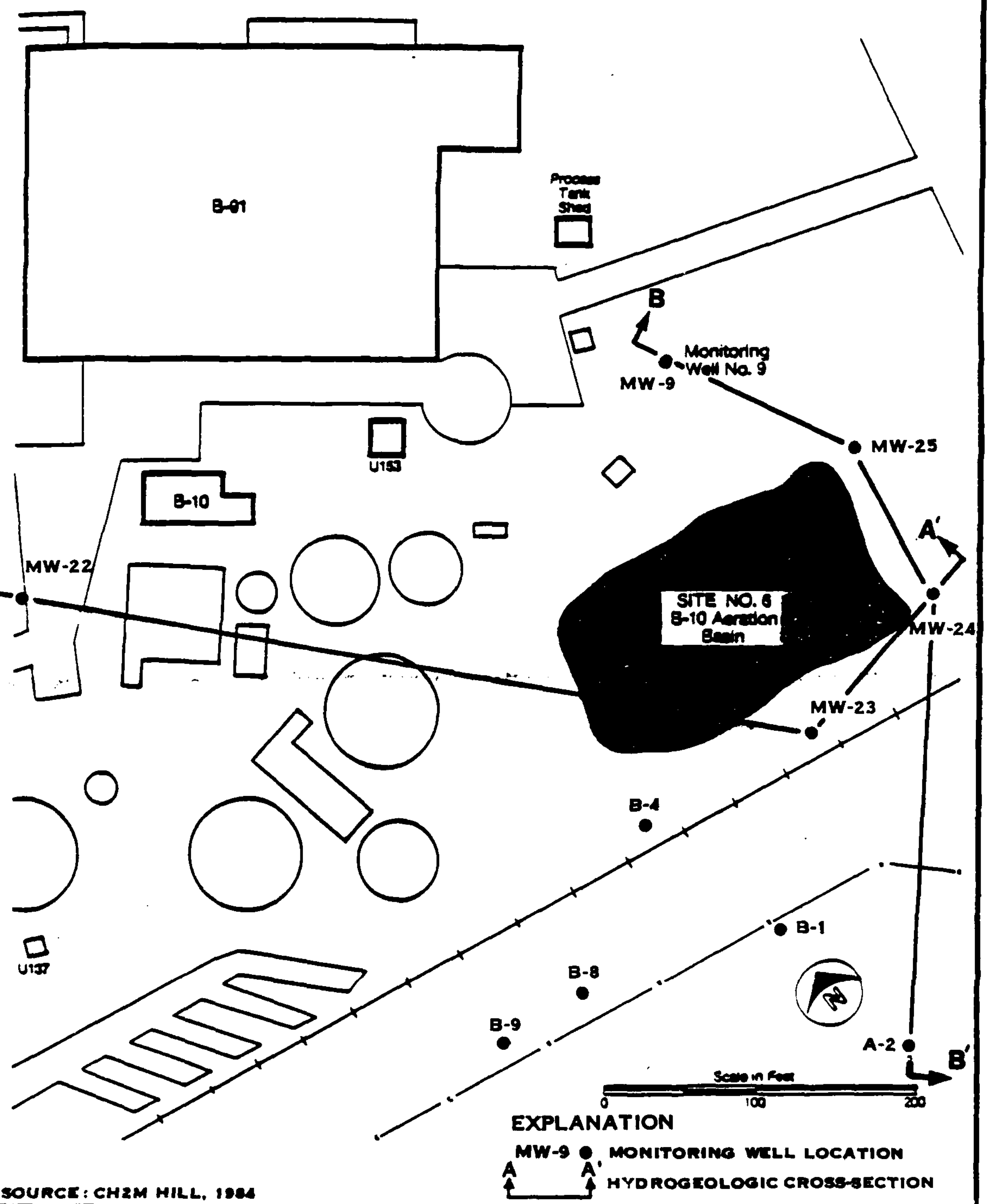
mw 24

mw 23

A-2

Truck Fuel Farm (JP-5 Fuel Spill No 2, Site 610)

B-4
B-9
B-8
B-1



SITE 6 B-10 AERATION BASIN MONITORING WELL LOCATION PLAN LETCO JOB NO. MA4352	INSTALLATION RESTORATION PROGRAM GOCO Plant 6

Chester Laboratories
A Division Of
The Chester Engineers
P.O. Box 9356
Pittsburgh
Pennsylvania 15225
Phone (412) 268-5700

Laboratory Analysis Report For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 4/5/84
Report Date: 5/21/84

Analyses

Source	B-10 Aeration Basin Sediment Area 1	B-10 Aeration Basin Sediment Area 2	B-10 Aeration Basin Sediment Area 3	B-10 Aeration Basin Sediment Area 4	B-10 Aeration Basin Sediment Area 5	Recovery of Spike, %
Log No. 84-	2033	2034	2035	2036	2037	--
Date Collected	4/4/84 @ 12:45 PM	4/4/84 @ NOON	4/4/84 @ 11:15 AM	4/4/84 @ 10:45 AM	4/4/84 @ 10:00 AM	--
pH	8.0	8.1	7.8	8.8	8.8	--
Flash Point, °F	>200	>200	>200	>200	Solid; Does Not Burn	--
Corrosivity	Non-Corrosive	Non-Corrosive	Non-Corrosive	Non-Corrosive	Non-Corrosive	--
Reactivity	Non-Reactive	Non-Reactive	Non-Reactive	Non-Reactive	Non-Reactive	--
Total Solids, wt %	14.7	9.7	13.9	25.6	56.0	--
Freon Extractables, wt %	1.14	0.75	0.44	1.58	0.65	--
Total Cyanide, ppm CN	5.3	3.8	4.1	3.1	5.7	--
Unamenable Cyanide, ppm CN	5.0	3.8	4.1	3.1	5.7	--
Amenable Cyanide, ppm CN	0.3	<0.01	<0.01	<0.01	<0.01	--
Arsenic, ppm As	<0.2	<0.2	<0.2	<0.2	<0.2	112
Barium, ppm Ba	20	20	5,450	6,050	100	--
Cadmium, ppm Cd	62	50	64	72	18	100
Total Chromium, ppm Cr	4,460	3,190	5,020	6,090	2,260	101
Hexavalent Chromium, ppm Cr	1.1	6.4	1.7	4.5	1.0	103
Lead, ppm Pb	22	10	58	72	12	—

• Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol

LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Analyses
(Continued)

Source	B-10 Aeration Basin Sediment Area 1	B-10 Aeration Basin Sediment Area 2	B-10 Aeration Basin Sediment Area 3	B-10 Aeration Basin Sediment Area 4	B-10 Aeration Basin Sediment Area 5	Recovery of Spike, %
Log No. 84-	2033	2034	2035	2036	2037	--
Date Collected	4/4/84	4/4/84	4/4/84	4/4/84	4/4/84	--
	@ 12:45 PM	@ NOON	@ 11:15 AM	@ 10:45 AM	@ 10:00 AM	--
Mercury, ppm Hg	<0.5	<0.5	<0.5	<0.5	<0.5	115
Nickel, ppm Ni	44	46	32	48	46	--
Selenium, ppm Se	<0.2	<0.2	<0.2	<0.2	<0.2	84
Silver, ppm Ag	2	6	4	4	<2	--
Sulfides, ppm S	<2	<2	<2	<2	<2	--
EP Toxicity Test:						
pH	6.3	*5.6	*5.3	5.2	5.1	--
Arsenic, mg/L As	<0.002	<0.002	<0.002	<0.002	<0.002	96
Barium, mg/L Ba	<0.1	<0.1	9.0	182	7.4	96
Cadmium, mg/L Cd	0.02	0.06	0.03	0.15	0.02	--
Total Chromium, mg/L Cr	0.03	0.69	0.07	1.4	3.7	101
Hexavalent Chromium, mg/L Cr	<0.02	<0.02	<0.02	<0.02	<0.02	--
Lead, mg/L Pb	0.26	0.28	0.24	0.10	0.14	112
Mercury, mg/L Hg	<0.001	<0.001	<0.001	<0.001	<0.001	114
Nickel, mg/L Ni	0.37	0.56	0.64	0.60	0.71	111
Selenium, mg/L Se	<0.002	<0.002	<0.002	<0.002	<0.002	110
Silver, mg/L Ag	0.01	0.01	0.01	0.01	0.01	102
Water Extract (EP Toxicity Method without Acetic Acid)						
Total Cyanide, mg/L CN	<0.005	<0.005	<0.005	0.008	<0.005	--
pH	7.9	8.0	7.7	8.8	8.1	--

*Maximum Amount of Acid Used.

Chester Laboratories
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P.O. Box 9356
Pittsburgh
Pennsylvania 15225
Phone: (412) 288-5700

Laboratory Analysis Report For

Lockheed-Georgia Company
Marietta, Georgia

Volatile Compounds

Samples Received: 4/5/84
Report Date: 5/21/84

Source	B-10 Aeration Basin Sediment Area 1	B-10 Aeration Basin Sediment Area 2	B-10 Aeration Basin Sediment Area 3	B-10 Aeration Basin Sediment Area 4	B-10 Aeration Basin Sediment Area 5
Log No. 84-	2033	2034	2035	2036	2037
Date Collected	4/4/84 @ 12:45 PM	4/4/84 @ NOON	4/4/84 @ 11:15 AM	4/4/84 @ 10:45 AM	4/4/84 @ 10:00 AM
Acrolein, µg/L	<10	<10	<10	<10	<10
Acrylonitrile, µg/L	<10	<10	<10	<10	<10
Benzene, µg/L	<10	<10	<10	<10	<10
Bromoform, µg/L	<10	<10	<10	<10	<10
Carbon Tetrachloride, µg/L	<10	<10	<10	<10	<10
Chlorobenzene, µg/L	<10	<10	<10	50	<10
Chlorodibromomethane, µg/L	<10	<10	<10	<10	<10
Chloroethane, µg/L	<10	<10	<10	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10	<10	<10	<10
Chloroform, µg/L	<10	<10	13	58	<10
Dichlorobromomethane, µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethane, µg/L	57	18	14	<10	<10
1,2-Dichloroethane, µg/L	50	<10	<10	450	<10
1,1-Dichloroethylene, µg/L	<10	13	<10	<10	<10
1,2-Dichloropropane, µg/L	<10	<10	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10	<10	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10	<10	<10	<10
Ethylbenzene, µg/L	<10	<10	14	720	<10
Methyl Bromide, µg/L	<10	<10	<10	<10	<10
Methyl Chloride, µg/L	<10	<10	<10	<10	<10
Methylene Chloride, µg/L	48	78	42	250	23
1,1,2,2-Tetrachloroethane, µg/L	<10	<10	<10	<10	<10
Tetrachloroethylene, µg/L	700	490	57	129	<10
Toluene, µg/L	43	32	29	1,350	11
1,2-Trans-Dichloroethylene, µg/L	46	13	21	440	<10
1,1,1-Trichloroethane, µg/L	74	100	13	<10	<10
1,1,2-Trichloroethane, µg/L	<10	<10	<10	<10	<10
Trichloroethylene, µg/L	89	49	90	7,420	<10
Vinyl Chloride, µg/L	<10	<10	<10	<10	<10
Recovery of Spike, %					
Ethyl Benzene D_{10} Surrogate	94	96	--	97	--
Benzene D_6 Surrogate	92	95	--	98	--
Bromochloromethane	--	--	101	--	96
2-Bromo-1-Chloropropane	--	--	110	--	108

3276-93

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

Chester Laboratories
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The Chester Engineers
P.O. Box 6356
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Pennsylvania 15225
Phone: (412) 268-6700

Laboratory Analysis Report
For

Lockheed Georgia Company
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 4/24/84
Report Date: 5/29/84

Source	Well 22 Upgradient	Well 23	Well 24	Well 25
Log No. 84-	2541	2542	2543	2544
Date Collected	4/23/84	4/23/84	4/23/84	4/23/84
Arsenic, mg/L As	<0.001	<0.001	<0.001	<0.001
Barium, mg/L Ba	0.02	0.02	<0.02	0.12
Cadmium, mg/L Cd	<0.003	<0.003	<0.003	<0.003
Chromium, mg/L Cr	<0.003	<0.003	<0.003	<0.003
Lead, mg/L Pb	0.01	0.003	0.01	0.004
Mercury, mg/L Hg	<0.001	<0.001	<0.001	<0.001
Selenium, mg/L Se	<0.001	<0.001	<0.001	<0.001
Sodium, mg/L Na	6	42	88	132
Iron, mg/L Fe	0.25	0.16	0.23	14
Manganese, mg/L Mn	0.45	0.92	0.17	1.4
Silver, mg/L Ag	<0.01	<0.01	<0.01	<0.01
Chlorides, mg/L Cl	4	11	14	50
Sulfates, mg/L SO_4	28	137	141	173
Fluorides, mg/L F	0.11	0.14	0.11	0.09
Phenols, mg/L PhOH	0.007	0.004	0.008	0.006
Nitrates and Nitrites, mg/L N	0.04	1.4	0.97	0.29
Nitrites, mg/L N	0.008	0.006	0.007	0.008
Nitrates, mg/L N	0.03	1.4	0.96	0.28
Radium 226, pCi/L	0.3	0.0	0.1	0.1
Gross Alpha, pCi/L	0	0	0	0
Gross Beta, pCi/L	0	0	0	2
Turbidity, NTU	20	10	16	38
Total Coliform, No./100 mL	<1	<1	<1	<1
Endrin, μg/L	<0.01	<0.01	<0.01	<0.01
Lindane, μg/L	<0.01	<0.01	<0.01	<0.01
Methoxychlor, μg/L	<0.1	<0.1	<0.1	<0.1
Toxaphene, μg/L	<0.5	<0.5	<0.5	<0.5
2,4-D, μg/L	<1	<1	<1	1.7
2,4,5-TP Silvex, μg/L	<1	<1	<1	<1

5276-96

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

LABORATORY ANALYSIS REPORT
FOR

Lockheed Georgia Company
Marietta, Georgia

Monitoring Well Analyses
(Continued)

Source	Well 22 Upgradient	Well 23	Well 24	Well 25
Log No. 84-	2541	2542	2543	2544
Date Collected	4/23/84	4/23/84	4/23/84	4/23/84
pH	7.5	7.3	6.7	6.4
Specific Conductance, μmhos/cm	90	535	450	800
Total Organic Halogens, μg/L Cl	108	117	190	11,300
Total Organic Carbon, mg/L C	3	12	19	24

Chester Laboratories
A Division Of
The Chester Engineers
P.O. Box 9356
Pittsburgh
Pennsylvania 15225
Phone: (412) 269-5700

Laboratory Analysis Report
For

Lockheed Georgia Company
Marietta, Georgia

Samples Received: 4/24/84
Report Date: 5/29/84

Replicate Analyses

Source	Well 22 Upgradient Replicate #2	Well 22 Upgradient Replicate #3	Well 22 Upgradient Replicate #4
Log No. 84-	2541	2541	2541
Date Collected	4/23/84	4/23/84	4/23/84
pH	7.5	7.6	7.5
Specific Conductance, umhos/cm	91	90	90
Total Organic Halogens, ug/L Cl	96	101	96
Total Organic Carbon, mg/L C	3	3	. 4

3276-96

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol. Q-288
- "Less-than" (<) values are indicative of the detection limit.

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The**Chester**Engineers
P.O. Box 9356
Pittsburgh
Pennsylvania 15225
Phone: (412) 269-5700

Laboratory Analysis Report
For

Lockheed Georgia Company
Marietta, Georgia

Volatile Compounds

Samples Received: 4/24/84
Report Date: 5/29/84

Source	Well 22 Upgradient	Well 23	Well 24	Well 25
Log No. 84-	2541	2542	2543	2544
Date Collected	4/23/84	4/23/84	4/23/84	4/23/84
Acrolein, µg/L	<10	<10	<10	<10
Acrylonitrile, µg/L	<10	<10	<10	<10
Benzene, µg/L	<10	<10	<10	<10
Bromoform, µg/L	<10	<10	<10	<10
Carbon Tetrachloride, µg/L	<10	<10	<10	<10
Chlorobenzene, µg/L	<10	<10	<10	<10
Chlorodibromomethane, µg/L	<10	<10	<10	<10
Chloroethane, µg/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10	<10	<10
Chloroform, µg/L	<10	<10	<10	<10
Dichlorobromomethane, µg/L	<10	<10	<10	<10
1,1-Dichloroethane, µg/L	<10	<10	<10	~~<10~~
1,2-Dichloroethane, µg/L	<10	<10	140	940
1,1-Dichloroethylene, µg/L	<10	<10	<10	13
1,2-Dichloropropane, µg/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
Ethylbenzene, µg/L	<10	<10	<10	<10
Methyl Bromide, µg/L	<10	<10	<10	<10
Methyl Chloride, µg/L	<10	<10	<10	<10
Methylene Chloride, µg/L	36	16	<10	14
1,1,2,2-Tetrachloroethane, µg/L	<10	<10	<10	<10
Tetrachloroethylene, µg/L	<10	<10	<10	15
Toluene, µg/L	<10	<10	<10	<10
1,2-Trans-Dichloroethylene, µg/L	<10	<10	125	870
1,1,1-Trichloroethane, µg/L	<10	<10	<10	<10
1,1,2-Trichloroethane, µg/L	<10	<10	<10	<10
Trichloroethylene, µg/L	<10	<10	98	2,500
Vinyl Chloride, µg/L	<10	<10	<10	<10

3276-96

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- "Less-than" (<) values are indicative of the detection limit.

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P.O. Box 9356
Pittsburgh
Pennsylvania 15225
Phone: (412) 269-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 6/7/84
Report Date: 7/9/84

Source	Well 22	Well 23	Well 24	Well 25
Log No. 84-	3892	3893	3894	3895
Date Collected	6/4/84	6/4/84	6/4/84	6/4/84
Acrolein, µg/L	<10	<10	<10	<10
Acrylonitrile, µg/L	<10	<10	<10	<10
Benzene, µg/L	<10	<10	<10	<10
Bromoform, µg/L	<10	<10	<10	<10
Carbon Tetrachloride, µg/L	<10	<10	<10	<10
Chlorobenzene, µg/L	<10	<10	<10	<10
Chlorodibromomethane, µg/L	<10	<10	<10	<10
Chloroethane, µg/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10	<10	<10
Chloroform, µg/L	<10	24	<10	620
Dichlorobromomethane, µg/L	<10	<10	<10	<10
1,1-Dichloroethane, µg/L	<10	<10	<10	<10
1,2-Dichloroethane, µg/L	<10	<10	162	1,300
1,1-Dichloroethylene, µg/L	<10	<10	<10	<10
1,2-Dichloropropane, µg/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
Ethylbenzene, µg/L	<10	<10	<10	<10
Methyl Bromide, µg/L	<10	<10	<10	<10
Methyl Chloride, µg/L	<10	<10	<10	<10
Methylene Chloride, µg/L	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane, µg/L	<10	<10	<10	<10
Tetrachloroethylene, µg/L	<10	<10	<10	<10
Toluene, µg/L	<10	<10	<10	<10
1,2-Trans-Dichloroethylene, µg/L	<10	<10	172	1,250
1,1,1-Trichloroethane, µg/L	<10	<10	<10	<10
1,1,2-Trichloroethane, µg/L	<10	<10	<10	<10
Trichloroethylene, µg/L	<10	<10	130	12,400
Vinyl Chloride, µg/L	<10	<10	<10	<10
Total Organic Halogens, µg/L	6	7	110	8,500

3276-93

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P O Box 9356
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Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 6/7/84
Report Date: 7/9/84

Source	B-10 Sedimentation Pond	B-10 Aeration Pond	B-10 Underdrain System	Well 9
Log No. 84-	3888	3889	3890	3891
Date Collected	6/5/84	6/5/84	6/5/84	6/5/84
Acrolein, µg/L	<10	<10	<10	<10
Acrylonitrile, µg/L	<10	<10	<10	<10
Benzene, µg/L	<10	<10	<10	<10
Bromoform, µg/L	<10	<10	<10	<10
Carbon Tetrachloride, µg/L	<10	<10	<10	<10
Chlorobenzene, µg/L	<10	<10	<10	<10
Chlorodibromomethane, µg/L	<10	<10	<10	<10
Chloroethane, µg/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10	<10	<10
Chloroform, µg/L	<10	<10	100	<10
Dichlorobromomethane, µg/L	<10	<10	<10	<10
1,1-Dichloroethane, µg/L	<10	<10	<10	66
1,2-Dichloroethane, µg/L	32	<10	196	<10
1,1-Dichloroethylene, µg/L	<10	<10	<10	<10
1,2-Dichloropropane, µg/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
Ethylbenzene, µg/L	<10	<10	<10	<10
Methyl Bromide, µg/L	<10	<10	<10	<10
Methyl Chloride, µg/L	<10	<10	<10	<10
Methylene Chloride, µg/L	<10	35	<10	<10
1,1,2,2-Tetrachloroethane, µg/L	<10	<10	<10	<10
Tetrachloroethylene, µg/L	124	<10	<10	<10
Toluene, µg/L	<10	<10	<10	<10
1,2-Trans-Dichloroethylene, µg/L	34	<10	173	<10
1,1,1-Trichloroethane, µg/L	85	<10	<10	<10
1,1,2-Trichloroethane, µg/L	<10	<10	<10	<10
Trichloroethylene, µg/L	<10	<10	6,480	<10
Vinyl Chloride, µg/L	<10	<10	<10	<10
Total Organic Halogens, µg/L	112	11	3,000	37

3274-93

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

0-291

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Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Samples Received: 8/11/84
Report Date: 9/12/84

Monitoring Well Analyses

Source	Well 22 Upgradient	Well 23 Upgradient	Well 24 Upgradient	Well 25 Upgradient
Log No. 84-	5387	5388	5389	5390
Date Collected	8/10/84	8/10/84	8/10/84	8/10/84
pH	6.8	7.4	7.2	6.7
Specific Conductance, μmhos/cm	66	645	630	1,080
Total Organic Halogens, μg/L Cl	16	38	84	2,550
Total Organic Carbon, mg/L C	6	12	30	50
Chlorides, mg/L Cl	3	11	12	55
Phenols, mg/L PhOH	<0.004	0.005	0.008	0.010
Sulfates, mg/L SO_4	<3	187	119	280
Total Fluorides, mg/L F	0.07	0.17	0.14	0.20
Nitrates, mg/L N	0.27	0.57	0.11	0.10
Endrin, μg/L	<0.01	<0.01	<0.01	<0.01
Lindane, μg/L	<0.01	<0.01	<0.01	<0.01
Methoxychlor, μg/L	<0.1	<0.1	<0.1	<0.1
Toxaphene, μg/L	<0.5	<0.5	<0.5	<0.5
2,4-D, μg/L	<1	<1	<1	<1
2,4,5-TP Silvex, μg/L	<1	<1	<1	<1
Gross Alpha, pCi/L	0	0.7	0	0.4
Gross Beta, pCi/L	0	0	0	4
Radium 226, pCi/L	0.04	0.22	0.05	0.38
Turbidity, NTU	18	50	80	60
Total Coliform, No./100 mL	<1	<1	<1	<1

3276-97

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- "Less-than" (<) values are indicative of the detection limit.

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Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Samples Received: 8/13/84
Report Date: 9/12/84

Monitoring Well Analyses

Source	Well 22 Upgradient	Well 23 Upgradient	Well 24 Upgradient	Well 25 Upgradient
Log No. 84-	5387	5388	5389	5390
Date Collected	8/10/84	8/10/84	8/10/84	8/10/84
Arsenic, mg/L As	<0.001	<0.001	<0.001	<0.001
Barium, mg/L Ba	0.03	0.05	0.05	0.15
Cadmium, mg/L Cd	<0.005	<0.005	<0.005	0.008
Total Chromium, mg/L Cr	0.005	0.008	0.008	0.010
Lead, mg/L Pb	0.010	0.003	0.005	0.005
Mercury, mg/L Hg	<0.001	<0.001	<0.001	<0.001
Selenium, mg/L Se	<0.001	<0.001	<0.001	<0.001
Silver, mg/L Ag	<0.01	<0.01	<0.01	<0.01
Iron, mg/L Fe	0.24	0.58	1.2	26
Manganese, mg/L Mn	0.15	0.54	0.31	1.6
Sodium, mg/L Na	3	36	131	195

3274-97

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- "Less-than" (<) values are indicative of the detection limit.

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Laboratory Analysis Report
For
Lockheed Corporation
Marietta, Georgia

Replicate Analyses

Samples Received: 8/13/84
Report Date: 9/12/84

Source	Well 22 Upgradient Replicate #2	Well 22 Upgradient Replicate #3	Well 22 Upgradient Replicate #4
Log No. 84-	5387	5387	5387
Date Collected	8/10/84	8/10/84	8/10/84
pH	6.7	6.8	6.8
Specific Conductance, μmhos/cm	65	66	67
Total Organic Halogens, μg/L Cl	14	16	16
Total Organic, Carbon, mg/L C	5	6	7

3274-97

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit.

APPENDIX B

GROUNDWATER SAMPLING AND ANALYSIS PLAN

B-1C Aeration Base

Site G9

III GROUNDWATER SAMPLING AND ANALYSIS PLAN

A. RCRA GROUNDWATER MONITORING NETWORK

RCRA groundwater monitoring regulations [40 CFR 265. 91(a)] require that at least one upgradient and three downgradient wells be utilized to monitor the uppermost aquifer at the limit of the waste management area. Since the waste management area has been defined as the B-10 Aeration Basin; and since the flow direction of the groundwater in the uppermost aquifer is in a general southeasterly direction; monitoring well 22 has been selected as the upgradient well and wells 23, 24, and 25 have been selected as the downgradient wells.

Ground surface and top of casing elevations relative to USGS datum are as follows:

Monitoring Well	Top of Casing (ft)	Ground Surface (ft)
22	1100.37	1097.96
23	1094.11	1090.81
24	1091.19	1088.31
25	1083.97	1081.51

B. GROUNDWATER SAMPLING

All groundwater sampling will be done after the wells have been properly developed. Because drilling and well construction disturb the natural groundwater system, samples should not be collected until the groundwater system returns to chemical equilibrium.

1. <u>Procedures for Sampling Wells</u>

a. Measure the depth from the top of the casing to the top of the water. Record the depth for future use in the development of the groundwater contour map. All measuring devices used in the well must be thoroughly rinsed with distilled water prior to use.

b. Measure the depth from the top of the casing to the bottom of the well casing (total depth of cased hole) for initial sampling of a new well or use the previously recorded depth for resampling of an established well.

c. Subtract the depth to top of the water from the depth to the bottom of the casing to determine the height of standing water in the casing. Calculate the volume of water standing in the well casing. (For a 2 in. well this equals approximately 0.2 gallons per foot of standing water.)

d. Remove a quantity of water from the well equal to three to five times the calculated volume of water in the well. For rapidly recharged wells, pumping or the recharge rate should ideally continue until the pH and/or conductivity of the water has stabilized. These measurements are not required.

e. If the well goes dry during pumping or bailing, allow the well to recover.

f. Obtain a sample for chemical analyses immediately after pumping or bailing is complete.

In case a well is pumped or bailed dry, obtain a groundwater sample as soon as possible after the well has recovered.

g. The sampling bailer or pump should be flushed with distilled water after sampling to prevent cross contamination between monitoring wells. Materials incidental to sampling such as bailer ropes and tubing must also be flushed with distilled water. Sampling equipment must be protected from the ground surface. No sampling should be accomplished when wind blown particles may contaminate the sample or sampling equipment.

h. All samples for extractable organic compound analyses should be placed in amber glass bottles with teflon lined lids. Samples for inorganic chemical analyses, on the other hand, may be placed in polyethylene bottles. Samples for purgeable organic compound analyses should be placed in glass containers such that no air bubbles pass through the sample as the container is filled. Those bottles should be sealed with teflon lined lids so that no air bubbles are entrapped.

i. For inorganic or metal analyses, the sample bottle may be prerinsed by partially filling the bottle with sample and discarding the contents. The cap may also be rinsed with the water to be sampled. For organic compound or microbiological analyses, the sample containers should not be prerinsed with the sample.

j. The sample bottle should be filled, capped securely and immediately placed in a chest where the temperature is about 4 deg C. The samples should be delivered to the laboratory as soon as possible.

C. SAMPLE PRESERVATION

Immediate analysis is ideal. Since this is usually impossible for most tests, storage at a low temperature (4 deg C) is perhaps the best way to preserve most samples until the next day. Chemical additions, on the other hand, will preserve the samples for a longer period of time. Chemical preservation of samples, however, is difficult because chemical additions used to preserve one constituent of the sample may interfere with the analyses of other constituents. As such, no single chemical preservation technique is entirely satisfactory. Samples may require splitting with different chemical additions made to each aliquot. The preservative should be chosen with due regard to the determinations that are to be made. Table 1 is a list of suggested preservation methods for various parameters plus the suggested maximum length of time the samples can be held prior to analysis.

1. Samples will be placed in the proper type of container; e.g., glass or plastic (refer to Table 1).

2. To prevent or retard the degradation/modification of constituents in samples during transportation and storage, the samples will be preserved and stored as outlined in Table 1 for the compounds of interest.

LOCKHEED-GEORGIA
AIR FORCE PLANT 6
MARIETTA, GEORGIA

TABLE III-1

CONTAINERS, PRESERVATION AND HOLDING TIMES

MEASUREMENT	CONTAINER[a]	PRESERVATIVE[b]	MAXIMUM HOLDING TIME[c]
Acidity	P, G	Cool, 4°C	14 days
Alkalinity	P, G	Cool, 4°C	14 days
Ammonia	P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Coliform	P, G	Cool, 4°C 0.008% $Na_2S_2O_3$[f]	6 hours
Fecal streptococci	P, G	Cool, 4°C 0.008% $Na_2S_2O_3$[f]	6 hours
Biochemical oxygen demand	P, G	Cool, 4°C	48 hours
Biochemical oxygen demand carbonaceous	P, G	Cool, 4°C	48 hours
Bromide	P, G	None Required	28 days
Chemical oxygen demand	P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Chloride	P, G	None Required	28 days
Chlorinated organic compounds	G, teflon-lined cap	Cool, 4°C 0.008% $Na_2S_2O_3$[f]	7 days (until extraction) 30 days (after extraction)
Chlorine, total residual	P, G	Determine on site	2 hours
Color	P, G	Cool, 4°C	48 hours

(continued)

TABLE III-1

CONTAINERS, PRESERVATION AND HOLDING TIMES
(continued)

MEASUREMENT	CONTAINER[a]	PRESERVATIVE[b]	MAXIMUM HOLDING TIME[c]
Cyanide, total and amenable to chlorination	P, G	Cool, 4°C NaOH to pH <12 0.008% $Na_2S_2O_3$ [f]	14 days
Dissolved oxygen			
Probe	G bottle and top	Determine on site	1 hour
Winkler	G bottle and top	Fix on site	8 hours
Fluoride	P	None Required	28 days
Hardness	P, G	HNO_3 to pH <2	6 months
Hydrogen ion (pH)	P, G	Determine on site	2 hours
Kjeldahl and organic nitrogen	P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Metals[d]			
Chromium VI	P, G	Cool, 4°C	48 hours
Mercury	P, G	HNO_3 to pH <2 0.05% $K_2Cr_2O_7$	28 days
Metals, other than above	P, G	HNO_3 to pH <2	6 months
Nitrate	P, G	Cool, 4°C	48 hours
Nitrate-nitrite	P, G	Cool, 4°C H_2SO_4 to pH <2	28 days 28 days
Nitrite	P, G	Cool, 4°C	48 hours

(continued)

Lockheed-GA
3276-10/5-84

TABLE III-1

CONTAINERS, PRESERVATION AND HOLDING TIMES
(continued)

MEASUREMENT	CONTAINER[a]	PRESERVATIVE[b]	MAXIMUM HOLDING TIME[c]
Oil and Grease	G	Cool, 4°C	28 days
Organic Carbon	P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Organic Compounds[e]			
Extractables (including): phthalates nitrosamines organochlorine pesticides PCB's nitroaromatics isophorone polynuclear armotic hydrocarbons haloethers chlorinated hydrocarbons TCDD	G, teflon-lined cap	Cool, 4°C 0.008% $Na_2S_2O_3$[f]	7 days (until extraction) 30 days (after extraction)
Extractables (phenols)	G, teflon-lined cap	Cool, 4°C H_2SO_4 to pH <2 0.008% $Na_2S_2O_3$[f]	7 days (until extraction) 30 days (after extraction)
Purgeables (Halocarbons and Aromatics)	G, teflon-lined septum	Cool, 4°C 0.008% $Na_2S_2O_3$[f]	14 days
Purgeables (Acrolein and Acrylonitrite)	G, teflon-lined septum	Cool, 4°C 0.008% $Na_2S_2O_3$[f]	3 days
Orthophosphate	P, G	Filter on site Cool, 4°C	48 hours

(continued)

TABLE III-1

CONTAINERS, PRESERVATION AND HOLDING TIMES
(continued)

MEASUREMENT	CONTAINER[a]	PRESERVATIVE[b]	MAXIMUM HOLDING TIME[c]
Pesticides	G, teflon-lined cap	Cool, 4°C 0.008% $Na_2S_2O_3$[f]	7 days (until extraction) 30 days (after extraction)
Phenols	P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Phosphorus	P, G	Cool, 4°C H_2SO_4 to pH <2	28 days
Alpha, Beta and Radium	P, G	HNO_3 to pH <2	6 months
Residue, total	P, G	Cool, 4°C	14 days
Residue, filterable	P, G	Cool, 4°C	14 days
Residue, nonfilterable	P, G	Cool, 4°C	7 days
Residue, settleable	P, G	Cool, 4°C	7 days
Residue, volatile	P, G	Cool, 4°C	7 days
Silica	P	Cool, 4°C	28 days
Specific conductance	P, G	Cool, 4°C	28 days
Sulfate	P, G	Cool, 4°C	28 days
Sulfide	P, G	Cool, 4°C Zinc Acetate	28 days
Sulfite	P, G	Cool, 4°C	48 hours
Surfactants	P, G	Cool, 4°C	48 hours
Temperature	P, G	Determine on site	Immediately
Turbidity	P, G	Cool, 4°C	48 hours

(continued)

[a] Polyethylene (P) or Glass (G)

[b] Sample preservation should be performed immediately upon sample collection. For composite samples each aliquot should be preserved at the time of collection. When use of an automatic sampler makes it impossible to preserve each aliquot, then samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

[c] Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis are still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of samples under study are stable for the longer time.

Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for shorter time if knowledge exists to show this is necessary to maintain sample stability.

[d] Samples should be filtered immediately on-site before adding preservative for dissolved metals.

[e] Guidance applies to samples to be analyzed by GC, LC, or GC/MS for specific organic compounds.

[f] Should only be used in the presence of residual chlorine.

3. Efforts to preserve the integrity of the samples will be initiated at the time of sampling and will continue until analyses are performed.

4. In the event that samples obtained from the well contain a great amount of sediment, they should be quiescently settled and only the supernatant liquors placed in the bottles before the chemical preservatives are added. For the measurement of dissolved constituents, the samples should be filtered on-site using a 0.45 μm membrane filter before the chemical preservatives are added. Quiescent settling should not be utilized on samples for volatile organic analysis.

D. CONTAINER PREPARATION

For the analysis of certain parameters, special cleaning procedures of the sample bottles or containers are required. It is advisable to use new containers. Previously used containers may require more thorough cleaning such as with a chromic acid solution before the following special cleaning procedures are utilized.

1. Organic Compounds

a. Purgeable

Detergent wash vials or bottles and cap liners. Rinse with tap and then distilled water. Dry at 105 deg C for at least one hour.

b. Extractables

Detergent wash bottles and cap liners. Rinse with tap and then distilled water. Rinse with acetone followed by hexane (pesticide grade). Drain and air dry.

2. Metals

Rinse containers with a solution of 1 part nitric acid to 4 parts water followed by distilled water.

3. Microbiological Analyses (Coliforms)

Sterilize container and its stopper or cap by autoclaving at 121 deg C for 15 minutes or by dry heat at 180 deg C for two hours. Prior to sterilization, the container should be wrapped in kraft paper or aluminum foil to protect against contamination during handling. Any chemical preservatives utilized (sodium thiosulfate) must be added to the container before the sterilization process.

E. SAMPLE MANAGEMENT AND CHAIN OF CUSTODY

1. The management of samples, from the point of collection to the point of analysis, should be carefully controlled. It is possible that analytical results could be used as evidence in legal proceedings. For this reason, it is important that an accounting of the sample be made from the time of collection until the sample is analyzed.

2. The accounting of samples is generally referred to as "chain of custody". Since most samples must be transported back to the laboratory for analysis, it is good practice to treat each sample as though the results will be used in legal proceedings.

A field notebook is an excellent and acceptable means of recording and recalling facts and circumstances of the sample collection in the event adjudication. Examples of information that should of be recorded are:

- Sampling Location
- Time and Date
- Weather Conditions
- Sampling Method - grab samples, automatic composites, etc.
- Method of Preservation
- Disposition of Sample - transferred to John Smith for transport to lab, mailed to lab, stored prior to transporting to lab, etc.
- Reason for Sampling
- Pertinent Well Data - depth to water surface, pumping date, etc.
- On-Site Analysis - pH, temperature, etc.

An example of field data record is attached as Figure 1.

The sampler should sign each page of his field notebook in order to strengthen the case for its authenticity. If the sampler transfers the samples to someone else,

FIELD DATA RECORD

Samplers: ____________________

Station	Sample Number	Date of Collection	Time: Sample Taken	Time: Sample Received	pH	Temperature	Other Parameters		

Figure III-1
Example of Field Data Record

the person receiving the samples should be indicated and should sign the field notebook. If samples are sent through the mail, the recipient should return a signed sheet indicating the receipt of the sample. Another good practice when shipping samples through the mail is to place a seal across the access point to the container. This seal is signed and dated by the person sending the samples. The person receiving the samples notes the condition of the seal and records his findings.

An example of chain of custody record tag is shown in Figure 2.

3. Internal laboratory identification numbers should be assigned to all incoming samples and quality control (QC) samples according to the format of the laboratory. The identification numbers will be sequential and will be recorded in a log book which identifies the sample with the assigned number.

   Also, although not always practiced, one of the people associated with the laboratory should be designated to safeguard the sample in the laboratory. The sample custodian should maintain a permanent record containing information such as:

   - Type of Sample
   - Sampling Location
   - Date Sampled
   - Date Received
   - Sample Number

CHAIN OF CUSTODY FOR GROUNDWATER MONITORING

LABORATORY

Facilitiy: Lockheed-Georgia (Aeration Basin)
Location: Marietta, Georgia
Contact: Mr. Cliff Griffin
Phone: (404) 424-3577

Lab Name: Chester Labs
Location: Coraopolis, Pennsylvania
Project No.:
Date Received:

WELL NO.	DEPTH TO WATER	DEPTH TO BOTTOM	WELL DIAMETER	VOLUME PURGED	DATE OF SAMPLING	TIME	SAMPLING PERSONNEL
B-22							
23							
24							
25							

ANALYSES REQUESTED

Suitable Drinking Water Parmeters ____________

Groundwater Quality Parameters ____________

Indicators of Ground-water Contamination Parameters ____________

CHAIN-OF-CUSTODY SIGNATURES

RELINQUISHED BY	RELINQUISHED TO	DATE RECEIVED	TIME	METHOD OF TRANSFER	SAMPLES PROPERLY PRESERVED	SEALS INTACT

Q-310

- Sample Assigned to Whom
- Date Assigned
- Analyses Made and Results
- Completion Date of Analyses

Unused portions of the sample should be stored for a specified time period until results have been verified.

F. NUMBER OF SAMPLES AND FREQUENCY

The number of groundwater samples required to meet RCRA well monitoring requirements for the first and second years are tabulated in Tables 2 and 3. These are based on a typical system of upgradient (Well 22) and three downgradient (Wells 23, 24, and 25) points.

The tables also indicate the type and number of analyses that are required. The number of determinations are based on existing regulations of the U. S. EPA. Table 4 lists the parameters designated as "primary drinking water standards" in the aforementioned tables. It should be noted that four replicate determinations for the "indicator parameters" are required in the first year on the upgradient well and on all wells in the second year as designated in the tabulations.

As shown on Tables 2 through 4, samples are required quarterly for all parameters during the first year of sampling. During the second and subsequent years, the frequency of sampling is diminished to semi-annually for the "indicator parameters" and to annually for the

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TABLE III-2
B-10 AERATION BASIN

NUMBER OF SAMPLES AND DETERMINATIONS
FIRST YEAR - RCRA WELL MONITORING

Parameter	Number of Individual Analyses Upgradient	Downgradient			Total Samples (Four Wells)	Total Number of Analyses
Well Number	22	23	24	25		
Suitability Parameters:						
Primary Drinking Water Standards*	84	84	84	84		336
Quality Parameters:						
Chloride	4	4	4	4		16
Iron	4	4	4	4		16
Manganese	4	4	4	4		16
Phenols	4	4	4	4		16
Sodium	4	4	4	4		16
Sulfate	4	4	4	4		16
Indicator Parameters:						
pH	16**	4	4	4		28
Sp. Cond.	16**	4	4	4		28
TOC	16**	4	4	4		28
TOX	16**	4	4	4		28
Total Samples for Four Wells - First Year					16***	
Total Determinations - First Year						544

* Refer to Table III-4 - 84 Analyses = 21 parameters x 4 samples.

** Four replicate analyses made for each quarterly sample taken for the upgradient well.

*** Quarterly Samples - one for each well per quarter.

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TABLE III-3
B-10 AERATION BASIN

NUMBER OF SAMPLES AND DETERMINATIONS
SECOND YEAR AND SUBSEQUENT YEARS - RCRA WELL MONITORING
FEDERAL EPA REQUIREMENTS

Parameter	Number of Individual Analyses per Year: Upgradient	Downgradient			Total Annual Samples (Four Wells)	Total Annual Number of Analyses
Suitability Parameters:	22	23	24	25		
Primary Drinking Water Standards	Not Req'd.	Not Req'd.			0	0
Quality Parameters:						
Chloride	1	1	1	1		4
Iron	1	1	1	1		4
Manganese	1	1	1	1		4
Phenols	1	1	1	1		4
Sodium	1	1	1	1		4
Sulfate	1	1	1	1		4
Total Samples for Four Wells					4*	
Indicator Parameters:**						
pH	8	8	8	8		32
Sp. Cond.	8	8	8	8		32
TOC	8	8	8	8		32
TOX	8	8	8	8		32
Total Samples for Four Wells					8***	
Total Determinations per year						152

* Annual samples -- one for each well per year.

** Four replicate determinations for each sample.

*** Semi-annual samples - two for each well per year.

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TABLE III-4

SUITABILITY PARAMETERS FOR GROUNDWATER ANALYSES

Primary Drinking Water Standards:

Parameter	Allowable Concentration (mg/L)	Parameter	Allowable Concentration (mg/L)
Arsenic	0.05	Lindane	0.004
Barium	1.0	Methoxychlor	0.01
Cadmium	0.01	Toxophene	0.005
Chromium	0.05	2,4,D	0.1
Fluoride	1.4-2.4	2,4,5 TP Silvex	0.01
Lead	0.05	Radium	5 pCi/1
Mercury	0.002	Gross Alpha	15 pCi/1
Nitrate (as N)	10	Gross Beta	4 millirem/yr
Selenium	0.01	Turbidity	1 TU
Silver	0.05	Coliform Bacteria	1/100 mL
Endrin	0.0002		

Total of 21 Parameters

"quality parameters". Analyses for the "primary drinking water parameters" are not required after the first year unless further assessment of the groundwater is required. It should be remembered that groundwater level measurements are required each time a well is sampled.

Tables 5 and 6 present typical sample container requirements for each first year, and second and subsequent years sampling, respectively.

G. RECORD KEEPING AND REPORTING

The results of all analyses performed on groundwater samples and water table elevation measurements must be kept on-site during the active life of the site. In addition, certain results must be reported to the Federal EPA and Georgia EPD as follows:

1. During the first year, report the results of analysis for the primary drinking water parameters listed in Table 4 within 15 days after completing each quarterly analysis. Also, separately identify for each monitoring well any parameters whose concentration or value has been found to exceed the allowable concentration listed in Table 4.

2. After the first year's sampling, calculate the initial background concentration by pooling the replicate measurements for each individual "indicator parameter" (see Table 2) concentration or

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TABLE III-5

SAMPLE CONTAINER REQUIREMENTS
FIRST YEAR - QUARTERLY SAMPLES

Container Type	Required Volume	Preservative	Parameters
Plastic	Liter	HNO_3	Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver, Iron, Manganese, Sodium
Plastic	Liter	HNO_3	Radium, Gross Alpha, Gross Beta
Plastic	Liter	None	Fluoride, Nitrate, Turbidity Chloride, Sulfate, pH, Specific Conductivity
Plastic	200 mL	HNO_3 & $K_2Cr_2O_7$	Mercury
Amber Glass, Teflon Lined Cap	Gallon	None	Total Organic Halogen (TOX); Endrin; Lindane; Methoxychlorine; Toxophene; 2,4,D; 2,4,5,TP Silvex
Plastic	Liter	H_2SO_4	Phenol, TOC
Sterile Bottle	100 mL	None	Coliform Bacteria

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TABLE III-6

SAMPLE CONTAINER REQUIREMENTS
SECOND AND SUBSEQUENT YEARS

Container Type	Required Volume	Preservative	Parameters
		FIRST SAMPLING DURING YEAR	
Plastic	Liter	HNO_3	Iron, Manganese, Sodium
Plastic	Liter	None	Chloride, Sulfate, pH, Specific Conductivity
Amber Glass, Teflon Lined Cap	2 Liters	None	Total Organic Halogen (TOX)
Plastic	Liter	H_2SO_4	Phenol, TOC
		SECOND SAMPLING DURING YEAR	
Plastic	500 mL	None	pH, Specific Conductivity
Amber Glass, Teflon Lined Cap	2 Liters	None	Total Organic Halogen (TOX)
Plastic	200 mL	H_2SO_4	TOC

value in samples obtained from upgradient wells (Well 22) during the first year, and calculating the average and variance.

3. After the first year, calculate the mean and variance, based on at least four replicate measurements on each sample, for each well for each individual "indicator parameter" (see Table 2). For each well, compare these results with the initial background arithmetic mean calculated in 2 above, utilizing the Student's t-test at the 0.01 level of significance to determine statistically significant increases (or decreases in the case of pH) over initial background.

4. Report all analyses, groundwater elevations and the results of required statistical comparisons annually in the annual report for the facility. Also, separately identify any significant differences from initial background found in upgradient wells.

5. Annually review groundwater elevation data to determine that at least one upgradient well and three downgradient wells are being monitored. If yes, continue monitoring. If no, immediately modify number, location, or depth of monitoring wells to bring the monitoring network into compliance.

Sample formats for compiling results are presented in Tables 7 and 8 for the first year and the second and subsequent years, respectively.

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TABLE III-7
B-10 AERATION BASIN

FIRST YEAR ANALYTICAL RESULTS - SUITABILITY PARAMETERS
WELL NUMBER ___

Parameter	Analytical Results - Quarterly Samples (mg/L)				Allowable Concentration (mg/L)	Date Violations Measured
Date Sample Collected	___	___	___	___	--	--
Arsenic	___	___	___	___	0.05	___
Barium	___	___	___	___	1.0	___
Cadmium	___	___	___	___	0.01	___
Chromium	___	___	___	___	0.05	___
Fluoride	___	___	___	___	1.4-2.4	___
Lead	___	___	___	___	0.05	___
Mercury	___	___	___	___	0.002	___
Nitrate (as N)	___	___	___	___	10	___
Selenium	___	___	___	___	0.01	___
Silver	___	___	___	___	0.05	___
Endrin	___	___	___	___	0.0002	___
Lindane	___	___	___	___	0.004	___
Methoxychlor	___	___	___	___	0.01	___
Toxophene	___	___	___	___	0.005	___
2,4,D	___	___	___	___	0.1	___
2,4,5 TP Silvex	___	___	___	___	0.01	___
Radium	___	___	___	___	5 pCi/1	___
Gross Alpha	___	___	___	___	15 pCi/1	___
Gross Beta	___	___	___	___	4 millirem/yr	___
Turbidity	___	___	___	___	1 TU	___
Fecal Coliform	___	___	___	___	1/100 mL	___

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TABLE III-7
B-10 AERATION BASIN
(continued)

FIRST YEAR ANALYTICAL RESULTS -
UPGRADIENT WELL 22

Parameter	Analytical Results Quarterly Samples (mg/L)				Initial Background Average (mg/L)	Initial Background Variance (mg/L)
Date Sample Collected					---	---
Quality Parameters						
Chloride					---	---
Iron					---	---
Manganese					---	---
Phenol					---	---
Sodium					---	---
Sulfate					---	---
Indicator Parameters						
pH						
Specific Conductivity						
Total Organic Carbon						
Total Organic Halogen						
Groundwater Elevation					---	---

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TABLE III-7
B-10 AERATION BASIN
(continued)

FIRST YEAR ANALYTICAL RESULTS -
DOWNGRADIENT WELL (____)

Parameter	Analytical Results Quarterly Samples (mg/L)			
Date Sampled Collected	____	____	____	____
Quality Parameters				
Chloride	____	____	____	____
Iron	____	____	____	____
Manganese	____	____	____	____
Phenol	____	____	____	____
Sodium	____	____	____	____
Sulfate	____	____	____	____
Indicator Parameters				
pH	____	____	____	____
Specific Conductivity	____	____	____	____
Total Organic Carbon	____	____	____	____
Total Organic Halogen	____	____	____	____
Groundwater Elevation	____	____	____	____

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TABLE III-8
B-10 AERATION BASIN
(continued)

SECOND AND SUBSEQUENT YEARS
ANALYTICAL RESULTS - INDICATOR PARAMETERS
WELL NUMBER ___
DATE SAMPLE COLLECTED ___

Parameter	Analytical Results (mg/L)	Average (mg/L)	Variance (mg/L)	Initial Background[1] Average (mg/L)	Initial Background[1] Variance (mg/L)	Statistically Significant Difference?
pH	___					
	___					
	___					
	___	___	___	___	___	___
Specific Conductivity	___					
	___					
	___					
	___	___	___	___	___	___
Total Organic Carbon	___					
	___					
	___					
	___	___	___	___	___	___
Total Organic Halogen	___					
	___					
	___					
	___	___	___	___	___	___

[1]From first year sampling of upgradient well.

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TABLE III-9
ANALYTICAL METHODS

Suitability Parameter	Method Reference	Method Number
Arsenic	U. S. EPA	206.3
Barium	U. S. EPA	208.1
Cadmium	U. S. EPA	213.1
Chromium	U. S. EPA	218.1
Fluoride	U. S. EPA	340.1
Lead	U. S. EPA	239.1
Mercury	U. S. EPA	245.4
Nitrate	U. S. EPA	353.3
Selenium	U. S. EPA	270.3
Silver	U. S. EPA	272.1
Endrin	Std. Meth.	509A
Lindane	Std. Meth.	509A
Methoxychlor	Std. Meth.	509A
Toxaphene	Std. Meth.	509A
2,4-D	Std. Meth.	509A
2,4,5-TP Silvex	Std. Meth.	509A
Radium 226	ASTM	D-1943
Gross Alpha	ASTM	D-1890
Gross Beta	ASTM	D-2460
Turbidity	U. S. EPA	180.1
Total Coliform	Std. Meth.	909A
Indicator Parameter		
pH	U. S. EPA	150.1
Specific Conductivity	U. S. EPA	120.1
Total Organic Carbon	U. S. EPA	415.1
Total Organic Halogen	O. I. Corp.	None
Quality Parameter		
Chloride	U. S. EPA	325.3
Iron	U. S. EPA	236.1
Manganese	U. S. EPA	243.1
Phenol	U. S. EPA	420.1
Sodium	U. S. EPA	273.1
Sulfate	U. S. EPA	375.4

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TABLE 2.1-1

AERATION BASIN SEDIMENT AND WATER SAMPLE ANALYSES
FOR RCRA WATER QUALITY PARAMETERS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

	BASIN SEDIMENTS					BASIN WATER
Sampling Date	09/06/85	09/06/85	09/06/85	09/06/85	09/06/85	9/05/85
Date Received	09/09/85	09/09/85	09/09/85	09/09/85	09/09/85	9/09/85
Date Analyzed	10/07/85	10/07/85	10/07/85	10/07/85	10/07/85	9/20/85
Sample ID	L0011	L0012	L0013	L0014	L0015	L0010
Location	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Composite from Zones 1 through 5
RCRA Drinking Water	Leachable, UNIT (mg/l)(a)					UNIT (mg/l)
Arsenic	<0.01(b)	<0.01	<0.01	<0.01	<0.01/<0.01(c)	<0.01/<0.01
Barium	0.46	0.56	0.56	7.9	1.1/1.1	0.06
Cadmium	1.3	1.6	0.03	0.02	0.03/0.03	0.008
Chromium	1.5	6.4	0.16	1.2	0.25/0.23	<0.01
Lead	0.33	0.22	0.22	0.22	0.22/0.22	0.02
Mercury	<.0002	<.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	0.05	0.05	0.03	0.03	0.04/0.04	<0.01
Fluoride	8.8	9.0	16/16	16	18	0.4
Nitrate and Nitrite	<1	<1/<1	<1/<1	<1/<1	<1	0.8/0.4
RCRA Quality						
Chloride	47	75	32	40	21	7.7
Sodium	5.7	5.0	5.3	12	4.4/4.4	27
Phenolics	7.0	6.2	3.4	2.2	0.78	0.03
Manganese	5.8	7.1	6.5	3.9	2.6/2.6	0.01
Iron	8.4	26	10	210	170/170	0.02
Sulfate	470	270	210	30	280	240
RCRA Indicator						
pH	8.3	9.2	8.1	7.5	7.4	8.0
Specific Conductance (umhos/cm)	364	486	519	751	691	643/620
Total Organic Carbon (mg/kg)(d)	12,000	11,000	9,500	10,000	6,500	3
Total Organic Halogens (mg/kg)	1.4	2.0	1.0	0.68	0.33	<0.05
Miscellaneous						
Freon Extractables (mg/kg)	960	32,000	144,000 154,000(e)	310	3,700	3.2

(a)mg/l = milligrams per liter, parts per million (ppm) or as indicated.

(b)Less than (<) values are indicative of detection limit.

(c)Indicates samples was analyzed in duplicate.

(d)mg/kg = milligrams per kilogram or parts per million (ppm).

TABLE 2.1-2

AERATION BASIN SEDIMENT AND WATER SAMPLE ANALYSES
FOR PRIORITY POLLUTANTS(a)
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		BASIN SEDIMENTS					BASIN WATER	
Date Sampled		09/06/85	09/06/85	09/06/85	09/06/85	09/06/85	09/06/85	09/06/85
Date Received		09/09/85	09/09/85	09/09/85	09/09/85	09/09/85	09/09/85	09/09/85
Date Analyzed		09/21/85	09/21/85	09/21/85	09/21/85	09/21/85	09/21/85	09/21/85
Sample ID		L0011	L0012	L0013	L0014	L0015	L0007	L0008
Location		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 1	Zone 2
Volatiles	CAS NO.(b)	UNIT (mg/kg)(c)					UNIT (ug/l)(d)	
Chlorobenzene	108-90-7	<0.01(e)	<0.01	<0.01	1.7	<0.01	<1.0	<1.0
Chloroform	67-66-3	<0.01	<0.01	0.018	<0.01	0.011	1.4	2.0
1,1-Dichloroethane	75-34-3	3.0	0.88	0.39	0.10	0.049	<1.0	<1.0
Ethylbenzene	100-41-4	0.024	1.2	1.4	2.9	<0.01	<1.0	<1.0
Tetrachloroethylene	127-18-4	9.9	70	15	0.34	0.12	5.5	8.8
Toluene	108-88-3	0.084	1.7	0.11	0.27	<0.01	<1.0	<1.0
trans-1,2-Dichloroethylene	156-60-5	0.21	0.48	0.19	0.10	0.022	<1.0	<1.0
1,1,1-Trichloroethane	71-55-6	0.59	1.5	0.33	<0.01	<0.01	6.0	7.6
Trichloroethylene	79-01-6	1.2	1.6	0.32	0.59	<0.01	<1.0	<1.0
Vinyl chloride	75-01-4	<0.1	0.32	0.14	<0.1	<0.1	<10	<10

Base-Neutral Extractables	CAS NO.(b)	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	WATER SAMPLE COMPOSITED(f) Zones 1-5, L0010
Acenaphthylene	208-96-8	<0.1	0.17	<0.1	<0.1	<0.1	<0.1
Bis(2-ethylhexyl)phthalate	117-81-7	<0.1	[illegible]	3.2	6.2	2.0	7.2
Butylbenzylphthalate	85-68-7	<0.1	<0.1	0.45	<0.1	<0.1	<1.0
Di-n-butylphthalate	84-74-2	<0.1	0.15	<0.1	0.11	<0.1	<1.0
2,6-Dinitrotoluene	606-20-2	0.32	0.50	0.27	<0.1	<0.1	<1.0
2,4-Dinitrotoluene	121-14-2	<0.1	<0.1	0.15	<0.1	<0.1	<1.0
Di-n-octylphthalate	117-84-0	<0.1	6.7	<0.1	<0.1	<0.1	<1.0
Fluoranthene	206-44-0	11	16	6.8	7.5	0.32	<1.0
Naphthalene	91-20-3	0.14	0.66	0.18	0.50	<0.1	<1.0
Nitrobenzene	98-95-3	0.34	1.3	<0.1	<0.1	<0.1	<1.0
N-Nitrosodiphenylamine (dipnenylamine)(g)	86-30-6	<0.1	0.86	<0.1	0.32	<0.1	<1.0
Phenanthrene	85-01-8	0.10	0.31	0.13	0.18	<0.1	<1.0
Pyrene	129-00-0	<0.1	0.33	<0.1	0.12	<0.1	<1.0
Acid Extractables							
2,4-Dimethylphenol	105-67-9	0.26	<0.1	<0.1	<0.1	<0.1	<1.0
Phenol	108-95-2	<0.1	2.3	<0.1	<0.1	<0.1	<1.0

(a)Only those constituents actually detected in the samples are listed.

(b)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for catagloging the indicated compounds in the Chemical Abstracts Index.

(c)mg/kg = milligrams per kilogram or parts per million (ppm).

(d)ug/l = micrograms per liter or parts per billion (ppb).

(e)Less than (<) values are indicative of detection limit.

(f)Water samples were composited corresponding to sediment sampling locations.

(g)Detected as compound in parenthesis.

TABLE 2.1-3

AERATION BASIN SEDIMENT AND WATER SAMPLE ANALYSES FOR JET FUEL INDICATOR COMPOUNDS B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY MARIETTA, GEORGIA PROJECT NO. 611059

		BASIN SEDIMENTS					BASIN WATER	
Date Sampled		09/06/85	09/06/85	09/06/85	09/06/85	09/06/85	09/06/85	09/06/85
Date Received		09/09/85	09/09/85	09/09/85	09/09/85	09/09/85	09/09/85	09/09/85
Date Analyzed		09/21/85	09/21/85	09/21/85	09/21/85	09/21/85	09/21/85	09/21/85
Sample ID		L0011	L0012	L0013	L0014	L0015	L0007	L0008
Location		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 2	Zone 4
PARAMETER	CAS NO.(a)			UNIT (mg/kg)(b)			UNIT ug/l(c)	
Benzene	71-43-2	<0.01(d)	<0.01	<0.01	<0.01	<0.01	<1.0	<1.0
Ethylbenzene	100-41-4	0.024	1.2	1.4	2.9	<0.01	<1.0	<1.0
Toluene	108-88-3	0.084	1.7	0.11	0.27	<0.01	<1.0	<1.0
Total xylenes	95-47-6	0.58	3.2	0.82	11	0.42	<1.0	<1.0

(a)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for catagloging the indicated compounds in the Chemical Abstracts Index.

(b)mg/kg = milligrams per kilogram or parts per million (ppm).

(c)ug/l = micrograms per liter or parts per billion (ppb).

(d)Less than (<) values are indicative of detection limit.

TABLE 2.1-4

SEDIMENTATION POND SEDIMENT AND WATER SAMPLE ANALYSES
FOR RCRA WATER QUALITY PARAMETERS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED - GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

	BASIN SEDIMENT	BASIN WATER
Date sampled	09/05/85	09/05/85
Date received	09/09/85	09/09/85
Date analyzed	09/24/85	09/24/85
Sample ID	L0003	L0003
	UNIT (mg/l)(a) Leachable	UNIT (mg/l)
<u>RCRA Drinking Water</u>		
Arsenic	<0.01(b)	<0.01/<0.01(c)
Barium	0.46	0.01
Cadmium	0.19	0.007
Chromium	0.07	0.04
Lead	0.12	<0.01
Mercury	<0.0002	<0.0002
Selenium	<0.01	<0.01
Silver	<0.01	<0.01
Fluoride	3.0	0.1/0.1
Nitrite & Nitrate	<1/0.1	<0.1/<0.1
<u>RCRA Quality</u>		
Chloride	4.8	4.7
Sodium	3.1	49
Phenolics	2.3	0.04
Manganese	.8	0.02
Iron	3.0	0.26
Sulfate	260	34
<u>RCRA Indicators</u>		
pH	7.5	9.3/9.28
Specific conductance umhos/cm	516	296
Total organic carbon mg/kg(d)	1100	9
Total organic halogen mg/kg	6.6	008
<u>Miscellaneous</u>		
Freon extractable mg/kg	8,200/8,100	3.6

(a)mg/l = milligrams per liter or parts per million (ppm) unless indicated.
(b)Less than (<) values are indicative of detection limits.
(c)Indicates that samples were analyzed in duplicate.
(d)mg/kg = milligrams per kilograms, parts per million (ppm).

TABLE 2.1-5

**SEDIMENTATION POND SEDIMENT AND WATER SAMPLE ANALYSES
FOR PRIORITY POLLUTANTS(a)
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059**

		BASIN SEDIMENT	BASIN WATER
Date Sampled		09/05/85	09/05/85
Date Received		09/09/85	09/09/85
Date Analyzed		09/24/85	09/24/85
Sample ID		L0003	L0003
	CAS NO.(b)	UNIT (mg/kg)(c)	UNIT (ug/l)(d)
Volatiles			
1,1-Dichloroethane	75-34-3	0.017	8.4
Tetrachloroethylene	127-18-4	0.12	31
Toluene	108-88-4	0.03	<1.0
trans-1,2-Dichloroethylene	156-60-5	<0.01(e)	1.4
1,1,1-Trichloroethane	71-55-6	<0.01	70
Trichloroethylene	79-01-6	0.024	10
Base Neutral Extractables			
Benzo(k)fluoranthene	207-08-9	0.26	<1.0
Bis(2-ethylhexyl)phthalate	117-81-7	2.6	<1.0
Butyl benzyl phthalate	85-68-7	0.83	<1.0
Chrysene	218-01-9	0.17	<1.0
3,3'-Dichlorobenzidine	91-94-1	0.13	<1.0
Fluoranthene	206-44-0	4.2	<1.0
Pyrene	129-00-0	0.14	<1.0
Acid Extractables			
None detected			

(a)Only those constituents actually detected in the sample are listed.

(b)The numbers presented in this column are the Chemical Abstract Services (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstract Index.

(c)mg/kg = milligram per kilogram or parts per million (ppm).

(d)ug/l = micrograms per liter or parts per billion (ppb).

(e)Less than (<) value is indicative of detection limits

TABLE 2.1-6

SEDIMENTATION POND SEDIMENT AND WATER SAMPLE ANALYSES FOR JET FUEL INDICATOR COMPOUNDS B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY MARIETTA, GEORGIA PROJECT NO. 611059

		BASIN SEDIMENT	BASIN WATER
Date Sampled		09/05/85	09/05/85
Date Received		09/09/85	09/09/85
Date Analyzed		09/24/85	09/24/85
Sample ID		L0003	L0003

PARAMETERS	CAS NO.(a)	UNIT (mg/kg)(b)	UNIT (ug/l)(b)
Benzene	71-43-02	<0.01(d)	<1.0
Ethylbenzene	100-41-4	<0.01	<1.0
Toluene	108-88-3	0.03	<1.0
Total xylenes	95-47-6	<0.01	<1.0

(a)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstracts Index.

(b)mg/kg = milligrams per kilogram or parts per million (ppm)

(c)ug/l = micrograms per liter or parts per billion (ppb)

(d)Less than (<) values are indicative of detection limits.

TABLE 2.1-7

STREAM SEDIMENTS AND WATER SAMPLE ANALYSES
FOR RCRA WATER QUALITY PARAMETERS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

	STREAM SEDIMENTS			STREAM WATER		
Date Sampled	9/07/85	9/07/85	9/07/85	9/05/85	9/05/85	9/05/85
Date Received	9/09/85	9/09/85	9/09/85	9/09/85	9/09/85	9/09/85
Date Analyzed	9/23/85	9/23/85	9/23/85	9/20/85	9/20/85	9/20/85
Sample ID	L0018	L0019	L0020	L0004	L0005	L0006
Location	culvert, under Atlantic Drive	stream midpoint, above confluence	at discharge point, 72-inch culvert	culvert, under Atlantic Drive	stream at mid-point, above confluence	discharge point, 72-inch culvert
	UNIT (mg/kg)(a)			UNIT (mg/l)(b)		
RCRA Drinking Water						
Chromium (Total)	160	180	190	0.22/0.23	0.43	2.0
Chromium (Dissolved)	-(c)	-	-	<0.01(d)	0.14	0.15
RCRA Quality						
Chloride	10/12(e)	12	12	7.3	7.1	7.9
Sodium (Total)	110	130	600	9.1/9.2	11.	11.
Sodium (Dissolved)	-	-	-	8.6	10.	10.
Phenolics	4.5/5.3	1.2	2.0	0.04/0.04	0.03	0.06/0.06
Manganese (Total)	120	230	270	0.33/0.35	0.18	0.32
Manganese (Dissolved)	-	-	-	0.2	0.2	0.2
Iron (Total)	27,000	160,000	400,000	-	-	-
Iron (Dissolved)	-	-	-	0.03	0.7	0.11
Sulfate	90/80	54	21/10	16	18	18
RCRA Indicator						
pH	5.9	6.5	7.3	6.5	6.7	6.8
Specific conductance umhos/cm	177	45	140	123	135/135	135

(a)mg/kg = milligrams per kilogram or parts per million (ppm) unless indicated.

(b)mg/l = milligrams per liter or parts per million (ppm) unless indicated.

(c)"-" indicates not analyzed.

(d)Less than (<) values are indicative of detection limits.

(e)Indicates that samples were analyzed in duplicate.

TABLE 2.1-8

STREAM SEDIMENTS AND WATER SAMPLE ANALYSES
FOR PRIORITY POLLUTANTS(a)
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		STREAM SEDIMENTS			STREAM WATER		
Date Sampled		9/07/85	9/07/85	9/07/85	9/05/85	9/05/85	9/05/85
Date Received		9/09/85	9/09/85	9/09/85	9/09/85	9/09/85	9/09/85
Date Analyzed		9/23/85	9/23/85	9/23/85	9/20/85	9/20/85	9/20/85
Sample ID		L0018	L0019	L0020	L0004	L0005	L0006
Location		culvert, under Atlantic Drive	stream mid-point, above confluence	at discharge point, 72-inch culvert	culvert, under Atlantic Drive	stream at mid-point, above confluence	discharge point, 72-inch culvert
VOLATILES	CAS NO.(b)		UNIT mg/kg(c)			UNIT ug/l(d)	
Chloroform	67-66-3	<0.01(e)	<0.01	<0.01	3.3	1.3	1.9
1,1-Dichloroethane	75-34-3	<0.01	<0.01	<0.01	1.5	<1.0	<1.0
1,2-Dichloroethane	107-06-2	<0.01	<0.01	<0.01	<1.0	<1.0	1.6
1,2-Dichloropropane	78-87-5	<0.01	<0.01	<0.01	1.9	1.2	<1.0
1,1,2,2-Tetrachloroethane	79-34-5	0.023/<0.01(f)	<0.01	<0.01	<1.0	<1.0	<1.0
Tetrachloroethylene	127-18-4	<0.01	<0.01	<0.01	3.5	<1.0	<1.0
trans-1,2-Dichloroethylene	156-60-5	<0.01/0.012	<0.01	0.029	26	22	32
1,1,1-Trichloroethane	71-55-6	<0.01	<0.01	<0.01	24	5.2	10
Trichloroethylene	79-01-6	<0.01/0.042	0.027	0.089	100	120	200

(a)Only those constituents actually detected in the sample are listed.

(b)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstracts Index.

(c)mg/kg = milligrams per kilogram or parts per million (ppm).

(d)ug/l = micrograms per liter or parts per billion (ppb).

(e)Less than (<) values are indicative of detection limit.

(f)Indicates that samples were analyzed in duplicate.

TABLE 2.1-9

STREAM SEDIMENTS AND WATER SAMPLE ANALYSES
FOR JET FUEL INDICATOR COMPOUNDS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		STREAM SEDIMENTS			STREAM WATER		
Date Sampled		9/07/85	9/07/85	9/07/85	9/05/85	9/05/85	9/05/85
Date Received		9/09/85	9/09/85	9/09/85	9/09/85	9/09/85	9/09/85
Date Analyzed		9/23/85	9/23/85	9/23/85	9/20/85	9/20/85	9/20/85
Sample ID		L0018	L0019	L0020	L0004	L0005	L0006
Location		culvert, under Atlantic Drive	stream midpoint above, confluence	at discharge point, 72-inch culvert	culvert, under Atlantic Drive	stream at mid-point, above confluence	at discharge point, of 72-inch culvert
PARAMETER	CAS NO.(a)	UNIT (mg/kg)(b)			UNIT (ug/l)(c)		
Benzene	71-43-02	<0.01(d)	<0.01	<0.01	<1.0	<1.0	<1.0
Ethylbenzene	100-41-4	<0.01	<0.01	<0.01	<1.0	<1.0	<1.0
Toluene	108-88-3	<0.01	<0.01	<0.01	<1.0	<1.0	<1.0
Total xylenes	95-47-6	<0.01	<0.01	<0.01	<1.0	<1.0	<1.0

(a)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstracts Index.

(b)mg/kg = milligrams per kilogram or parts per million (ppm).

(c)ug/l = micrograms per liter or parts per billion (ppb).

(d)Less than (<) values are indicative of detection limit.

TABLE 2.1-10

INDUSTRIAL WASTE TREATMENT FACILITY (IWTF)
UNDERDRAIN WATER SAMPLE ANALYSES
FOR RCRA WATER QUALITY PARAMETERS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

	WATER	
Date Sampled	9/07/85	9/07/85
Date Received	9/09/85	9/09/85
Date Analyzed	9/21/85	9/21/85
Sample ID	L0022	L0023
Location	underdrain	60-inch discharge pipe
	UNIT (mg/l)(a)	
<u>RCRA Drinking Water</u>		
Arsenic (dissolved)	<0.01(b)	<0.01
Barium (dissolved)	0.03	0.06
Cadmium (dissolved)	0.03	0.006/0.006(c)
Chromium (dissolved)	1.9	0.33/0.33
Lead (dissolved	<0.01	0.03/0.02
Mercury (dissolved)	<0.0002	<0.0002
Selenium (dissolved)	<0.01	<0.01
Silver (dissolved)	<0.01	<0.01
Fluoride (dissolved)	2.6	0.7
Nitrite and nitrate	<0.1/1.2	<0.1/1.0
<u>RCRA Quality</u>		
Chloride	11	7.8
Sodium (dissolved)	81	8.2/8.2
Phenolics	0.04	0.03
Manganese (dissolved)	0.68	0.18/0.18
Iron (dissolved)	0.02	0.6/0.6
Sulfate	160	9
<u>RCRA Indicators</u>		
pH	6.18	6.75
Specific conductance (umhos/cm)	552	130
Total organic carbon	2	4
Total organic halogen	0.56	0.18

(a)mg/l = milligrams per liter or parts per million (ppm); unless indicated
(b)Less than (<) values are indicative of detection limit.
(c)Indicates that samples were analyzed in duplicate.

TABLE 2.1-11

INDUSTRIAL WASTE TREATMENT FACILITY (IWTF)
UNDERDRAIN WATER SAMPLE ANALYSES
FOR PRIORITY POLLUTANTS(a)
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		WATER	
Date Sampled		9/07/85	9/07/85
Date Received		9/09/85	9/09/85
Date Analyzed		9/21/85	9/21/85
Sample ID		L0022	L0023
Location		underdrain	60-inch discharge pipe
PARAMETER	CAS NO.(b)	UNIT (ug/l)(c)	
Chlorobenzene	108-90-7	4.6	<1.0
Chloroform	67-66-3	<1.0(d)	1.3
1,1-Dichloroethane	75-34-3	30	<1.0
1,2-Dichloropropane	78-87-5	2.3	<1.0
Tetrachloroethylene	127-18-4	3.8	<1.0
Toluene	108-88-3	1.5	<1.0
trans-1,2-Dichloroethylene	156-60-5	170	32
1,1,1-Trichloroethane	71-55-6	32	<1.0
Trichloroethylene	79-01-6	1,300	210
Base Neutral Extractables			
Bis(2-ethylhexyl)phthalate	117-81-7	<1.0	2.0
1,2-Dichlorobenzene	95-50-1	19	<1.0
1,3-Dichlorobenzene	541-73-1	5.2	<1.0
1,4-Dichlorobenzene	106-46-7	13	<1.0
Di-n-butyl phthalate	84-74-2	1.8	1.8
Acid Extractables			
None detected			

(a)Only those constituent actually detected in samples are listed.

(b)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for catagloging the indicated compounds in the Chemical Abstracts Index.

(c)ug/l = micrograms per liter or parts per billion (ppb).

(d)Less than (<) values are indicative of detection limit.

TFARPD

TABLE 2.1-12

**INDUSTRIAL WASTE TREATMENT FACILITY (IWTF)
UNDERDRAIN WATER SAMPLE ANALYSES
FOR JET FUEL INDICATOR COMPOUNDS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059**

		WATER	
Date Sampled		9/07/85	9/07/85
Date Received		9/09/85	9/09/85
Date Analyzed		9/21/85	9/21/85
Sample ID		L0022	L0023
Location		underdrain	60-inch discharge pipe
PARAMETER	CAS NO.(a)	UNIT (ug/l)(b)	
Benzene	71-43-2	<1.0(c)	<1.0
Ethylbenzene	100-41-4	<1.0	<1.0
Toluene	108-88-3	<1.5	<1.0
Total xylenes	95-47-6	<1.0	<1.0

(a)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for catagloging the indicated compounds in the Chemical Abstracts Index.

(b)ug/l = micrograms per liter or parts per billion (ppb).

(c)Less than (<) values are indicative of detection limit.

TABLE 2.3-1

RCRA MONITORING WELL TEST DATA
GROUND WATER QUALITY ASSESSMENT
B-10 AERATION BASIN
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 61.059

MONITORING WELL	GROUND SURFACE ELEVATION (ft)	APPROXIMATE DEPTH TO NATURAL SOIL (FILL THICKNESS) (ft)	DEPTH TO BEDROCK (ft)	BEDROCK ELEVATION (ft msl)	DEPTH TO STATIC WATER LEVEL (ft)	ELEVATION OF STATIC WATER LEVEL (ft msl)	PERMEABILITY (cm/sec)	TOTAL DEPTH OF BORING (ft)	MATERIAL SCREENED
ITD-1	1098.21	7.0	45.0	1053.21	26.75	1071.46	4.8×10^{-6}	85.2	Rock(a)
ITD-2	1086.64	ND(b)	97.0	989.64	34.42	1052.22	5.7×10^{-5}	125.5	Rock
ITD-3	1075.61	22	27.0	1048.61	22.17	1053.44	4.6×10^{-6}	63.5	Rock
ITS-1	1083.29	13	ND	ND	19.35	1063.94	3.14×10^{-4}	30.5	Soil
ITS-2	1075.05	17	ND	ND	15.38	1059.67	7.25×10^{-4}	30	Soil
ITS-3	1088.15	25	ND	ND	34.12	1054.03	8.72×10^{-4}	40.5	Soil
ITS-4	1079.37	7	44.5	1034.87	6.74	1072.63	3.05×10^{-5}	44.5	Soil
ITS-5	1074.27	7	17.5	1056.77	15.57	1058.70	1.29×10^{-3}	27.5	Soil
ITS-6	1076.26	<5	ND	ND	24.65	1051.61	3.50×10^{-3}	40	Soil
ITS-7	1066.64	9	43.0	1023.64	15.73	1050.91	2.64×10^{-3}	43	Soil
ITS-8	1060.61	<5	21.1	1039.51	11.24	1049.37	3.78×10^{-3}	21.1	Soil
ITS-9	1056.30	13	65.5	990.8	7.69	1048.61	8.17×10^{-4}	65.5	Soil
ITS-10	1102.63	30	ND	ND	[illegible]	1065.16	6.22×10^{-4}	60	Soil
MW-9	1079.11	NA(c)	NA	NA	14.98	1064.13	5.39×10^{-3}	ND	Soil
MW-22	1097.96	NA	NA	NA	27.77	1070.19	1.58×10^{-4}	ND	Soil
MW-23	1090.81	NA	40.0	1050.81	26.23	1064.58	6.74×10^{-4}	ND	Soil
MW-24	1088.31	NA	45.5	1042.81	27.77	1060.54	1.43×10^{-4}	ND	Soil
MW-25	1081.51	NA	NA	NA	27.75	1053.76	2.15×10^{-3}	ND	Soil
B-1	1085	0.5	NA	NA	22.85	1062.15	1.73×10^{-3}	40	Soil
B-4	NA	NA	NA	NA	26.26	NA	1.25×10^{-3}	NA	Soil
B-5	1087	1	NA	NA	22.67	1064.33	6.06×10^{-3}	32	Soil
B-8	1088	8	NA	NA	24.54	1063.46	2.44×10^{-3}	35	Soil
B-9	1088	7	NA	NA	23.28	1064.72	1.67×10^{-3}	31	Soil

(a)Monitoring wells in rock consist of an open hole.

(b)ND - data not developed during investigation.

(c)NA - data not available and not part of this investigation.

TABLE 2.4-1

RCRA MONITORING WELL SAMPLE ANALYSES FOR RCRA WATER QUALITY PARAMETERS B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY MARIETTA, GEORGIA PROJECT NO. 611059

	WELL MW-22	WELL MW-23	WELL MW-24	WELL MW-25
Date Sampled	9/06/85	9/06/85	9/06/85	9/25/85
Date Received	9/09/85	9/09/85	9/09/85	9/30/85
Date Analyzed	9/21/85	9/21/85	9/21/85	9/30/85
Sample ID	MW-22	MW-23	MW-24	MW-25
Location	Upgradient	Downgradient	Downgradient	Downgradient
RCRA Drinking Water			UNIT (mg/l)(a)	
Chromium (dissolved)	<0.01(b)	<0.01	0.01	<0.01
RCRA Quality				
Chloride	3.1	12	12	58/59(c)
Sodium (dissolved)	3.1	43	140	330
Phenolics	0.05	0.05	0.05	0.03
Manganese (dissolved)	0.04	0.55	0.14	2.4
Iron (dissolved)	<0.01	0.03	0.05	8.0
Sulfate	2	100/120	92	330
RCRA Indicator				
pH	5.9	6.8	6.7	6.1/6.1
Specific conductance (umhos/cm at 25°C)	48	563	617	1,430
Total organic carbon	2(c)	3	7	1.6
Total organic halogen	<0.05	<0.05	0.28	5

(a)mg/l = milligrams per liter or parts per million (ppm) unless indicated.

(b)Less than (<) values are indicative of detection limit.

(c)Indicates samples were analyzed in duplicate.

TABLE 2.4-2

RCRA MONITORING WELL SAMPLE ANLAYSES
FOR PRIORITY POLLUTANTS(a)
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		WELL MW-22	WELL MW-23	WELL MW-24	WELL MW-25
Date Sampled		9/06/85	9/06/85	9/06/85	9/25/85
Date Received		9/09/85	9/09/85	9/09/85	9/30/85
Date Analyzed		9/21/85	9/21/85	9/21/85	9/30/85
Sample ID		MW-22	MW-23	MW-24	MW-25
Location		Upgradient	Downgradient	Downgradient	Downgradient
VOLATILES	CAS NO.(b)		UNIT (ug/l)(c)		
1,2-Dichloroethane	107-06-2	<1.0/<1.0(d)	27	3.4	<10
trans-1,2-Dichloroethylene	156-60-5	<1.0/<1.0	8.0	200	720
1,1,1-Trichloroethane	71-55-6	<1.0/<1.0	8.0	<1.0	<10
Trichloroethylene	79-01-6	<1.0/1.6	<1.0	130	6,300
Vinyl chloride	75-01-4	<10/10	<10	20	<100
<u>Base-Neutral Extractables</u>					
3,4-Benzofluoranthene	205-99-2	<1.0	1.4	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	<1.0	1.8	<1.0	<1.0
Bis(2-ethylhexyl)phthalate	117-81-7	<1.0	1.2	4.7	1.3
Butyl benzyl phthalate	85-68-7	<1.0	1.2	<1.0	2.2
1,2-Dichlorobenzene	95-50-1	<1.0	1.6	3.5	1.3
1,4-Dichlorobenzene	106-46-7	<1.0	<1.0	1.3	<1.0
Diethyl phthalate	84-66-2	<1.0	1.5	1.4	<1.0
Di-n-butyl phthalate	84-74-2	2.7	2.3	1.7	1.8
N-Nitrosodiphenylamine (Diphenylamine)(e)	86-30-6	<1.0	3.1	2.2	2.8
<u>Acid Extractables</u>					
Pentachlorophenol	87-86-5	<1.0	<1.0	2.3	<1.0

(a)Only those constituents actually detected in the sample are listed.

(b)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstracts Index.

(c)ug/l = micrograms per liter or parts per billion (ppb).

(d)Indicates samples were analyzed in duplicate; less than (<) values are indicative of detection limits.

(e)Detected as compounded in parentheses.

TABLE 2.4-3

RCRA MONITORING WELL SAMPLE ANALYSES
FOR JET FUEL INDICATOR COMPOUNDS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		WELL MW-22	WELL MW-23	WELL MW-24	WELL MW-25
Date Sampled		9/06/85	9/06/85	9/06/85	9/25/85
Date Received		9/09/85	9/09/85	9/09/85	9/30/85
Date Analyzed		9/21/85	9/21/85	9/21/85	9/30/85
Sample ID		MW-22	MW-23	MW-24	MW-25
Location		Upgradient	Downgradient	Downgradient	Downgradient
PARAMETER	CAS NO.(a)	UNIT (ug/l)(b)			
Benzene	71-43-02	<1.0/<1.0(c)	<1.0	<1.0	<10
Ethylbenzene	100-41-4	<1.0/<1.0	<1.0	<1.0	<10
Toluene	108-88-3	<1.0/<1.0	<1.0	<1.0	<10
Total xylenes	95-47-6	<1.0/1.8	<1.0	<1.0	<10

(a)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for cataloging the indicated compounds in the Chemical Abstracts Index.

(b)ug/l = micrograms per liter or parts per billion (ppb).

(c)Indicates samples were analyzed in duplicate; less than (<) values are indicative ot detection limit.

TABLE 2.4-4

EXISTING SUPPLEMENTAL WELL SAMPLE ANALYSES
FOR RCRA WATER QUALITY PARAMETERS
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		WELL A-1	WELL B-1	WELL B-2	WELL B-4	WELL MW-9
Date Sampled		09/06/85	09/06/85	09/06/85	09/06/85	09/06/85
Date Received		09/09/85	09/09/85	09/09/85	09/09/85	09/09/85
Date Analyzed		09/20/85	09/20/85	09/20/85	09/20/85	09/20/85
Sample ID		A-1	B-1	B-2	B-4	MW-9
			UNIT mg/l(a)			
RCRA Drinking Water						
Chromium (dissolved)		<0.01(b)	<0.01	0.75	<0.01	0.08
RCRA Quality						
Chloride		4.5	13/12(c)	8.2	12	14
Sodium (dissolved)		4.3	38	18	37	7.1
Phenolics		0.02	0.02	0.02	0.02	0.03
Manganese (dissolved)		0.43	0.20	1.3	0.61	8.5
Iron (dissolved)		0.08	0.13	0.11	<0.01/<0.01	27
Sulfate		6	110	44	160	46/40
RCRA Indicator						
pH	-	5.2/5.2	5.3	5.6	6.5	5.9
Specific Conductance	umhos/cm	67	381	158	545	296

(a)mg/l = milligrams per liter or parts per million (ppm) unless indicated.
(b)Less than (<) values are indicative of detection limit.
(c)Indicates that samples were analyzed in duplicate.

DRAFT

TABLE 2.4-5

EXISTING SUPPLEMENTAL WELL SAMPLE ANALYSES
FOR PRIORITY POLLUTANTS(a)
B-10 AERATION BASIN GROUND WATER ASSESSMENT PROGRAM
AIR FORCE PLANT 6, LOCKHEED-GEORGIA COMPANY
MARIETTA, GEORGIA
PROJECT NO. 611059

		WELL A-1	WELL B-1	WELL B-2	WELL B-4	WELL MW-9
Date Sampled		09/06/85	09/06/85	09/06/85	09/06/85	09/06/85
Date Received		09/09/85	09/09/85	09/09/85	09/09/85	09/09/85
Date Analyzed		09/20/85	09/20/85	09/20/85	09/20/85	09/20/85
Sample ID		A-1	B-1	B-2	B-4	MW-9
VOLATILES	CAS NO.(b)			UNIT ug/l(c)		
Chloroethane	75-00-3	<1.0(d)	<1.0	<1.0	<1.0	7.1
Chloroform	67-66-3	5.2	<1.0	3.1	5.2	<1.0
1,1-Dichloroethane	75-34-3	<1.0	<1.0	<1.0	18	120
1,1-Dichloroethylene	75-35-3	<1.0	<1.0	<1.0	<1.0	210
1,2-Dichloropropane	78-87-5	20	<1.0	1.5	<1.0	<1.0
Tetrachloroethylene	127-18-4	<1.0	<1.0	<1.0	2.7	<1.0
trans-1-2-Dichloroethylene	156-60-5	8.6	17	110	<1.0	70
1,1,1-Trichloroethane	71-55-6	<1.0	<1.0	1.1	79	22
Trichloroethylene	79-01-4	510	54	24	4.0	4.7
Vinyl chloride	75-01-4	<10.	<10.	<10.	<10.	60

(a)Only those constituents actually detected in the sample are listed.

(b)The numbers presented in this column are the Chemical Abstracts Service (CAS) numbers used for catagloging the indicated compounds in the Chemical Abstracts Index.

(c)ug/l = micrograms per liter or parts per billion (ppb).

(d)Less than (<) values are indicative of detection limit.

2.3 B-58 WING TANK SEAL TEST FACILITY--SITE G15, ZONE 3

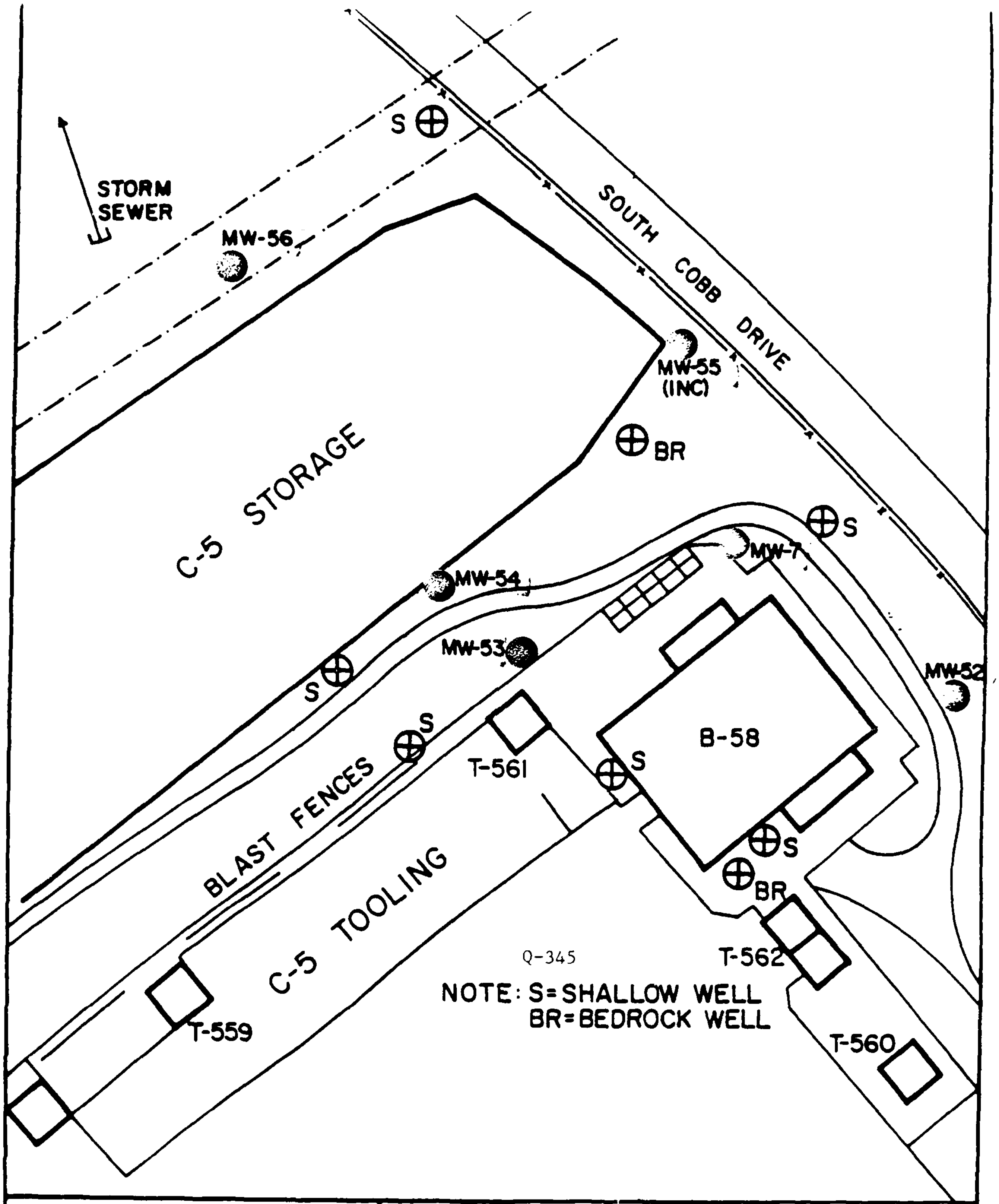
APPENDIX A

INDUSTRIAL AREA
B-58
WING TEST BUILDING

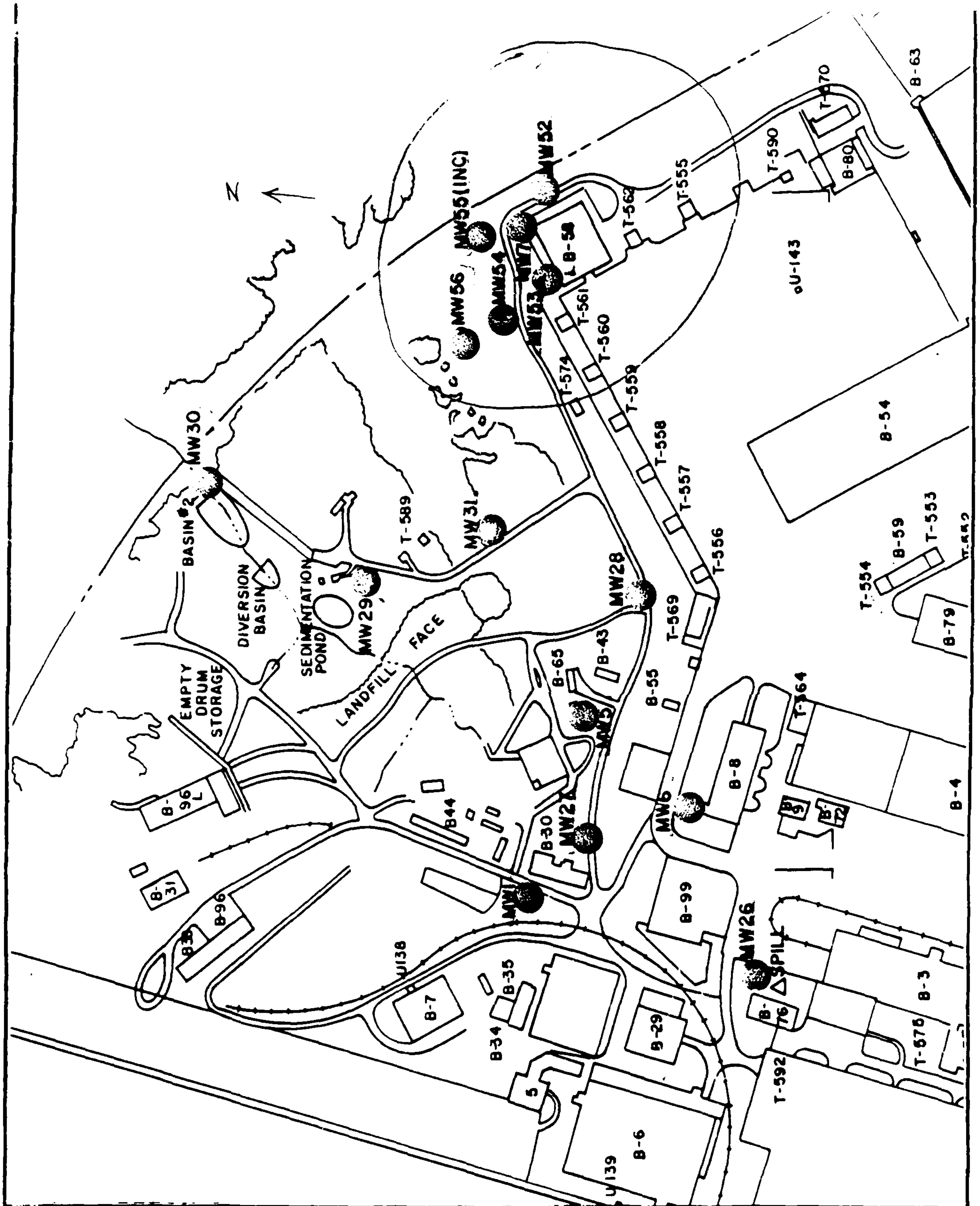
TABLE III-1

GROUNDWATER ELEVATIONS
B-58 WING SEAL BUILDING

WELL	8/20/84	9/28/84
MW-7	1076.91	1076.01
MW-52	1071.54	Not Accessible
MW-53	1076.19	Dry (<1071.5)
MW-54	1063.11	1061.61
MW-56	1046.22	Dry (<1044.2)
mw-55	Hit Bedrock ?	



The Chester Engineers			SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6
DWN.BY:	SCALE:	DATE	DWG. NO.	RECOMMENDED ADDITIONAL MONITORING WELLS
CHK'D.BY:	APPR.BY:		FIGURE III-6	



TheChesterEngineers			SHEET NO.	LOCKHEED-GEORGIA COMPANY
DWN.BY:	SCALE:	DATE	DWG. NO.	AIR FORCE PLANT 6
CHK'D.BY:	APPR.BY:		FIGURE III-1	LOCATION OF B-58 WING TEST FACILITY

Q-340

TABLE III-2

VOLATILE ORGANIC COMPOUNDS AT B-58
AUGUST 20, 1984

	MW-7	MW-52	MW-53	MW-54	MW-56	Storm Sewer
Log 84-	5640	5641	5642	5643	5644	5645
Chloroform, ug/L	<10	20	19	<10	10	<10
1,1-Dichloroethane, ug/L	56	<10	29	39	<10	<10
1,2-Dichloroethane, ug/L	16	<10	33	16	<10	<10
1,1-Dichloroethylene, ug/L	1654	<10	153	213	<10	<10
Methylene Chloride, ug/L	<10	35	34	<10	<10	10
1,2-Trans-Dichloroethylene, ug/L	<10	<10	20	<10	<10	<10
1,1,1-Trichloroethane, ug/L	11,900	15	767	1550	34	<10
1,1,2-Trichloroethane, ug/L	28	<10	<10	11	<10	<10
Trichloroethylene, ug/L	54	61	95	56	44	21

ChesterLaboratories

A Division Of

The**Chester**Engineers

845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone (412) 262 1035

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

<u>Volatile Compounds</u>

Samples Received: 3/6/84
Report Date: 3/20/84

Source	Well #7
Log No. 84-	1412
Date Collected	3/2/84
Acrolein, µg/L	<100
Acrylonitrile, µg/L	<100
Benzene, µg/L	<10
Bromoform, µg/L	<10
Carbon Tetrachloride, µg/L	3,510
Chlorobenzene, µg/L	<10
Chlorodibromomethane, µg/L	<10
Chloroethane, µg/L	<10
2-Chloroethylvinyl Ether, µg/L	<10
Chloroform, µg/L	<10
Dichlorobromomethane, µg/L	<10
1,1-Dichloroethane, µg/L	29
1,2-Dichloroethane, µg/L	<10
1,1-Dichloroethylene, µg/L	2,920
1,2-Dichloropropane, µg/L	<10
cis-1,3-Dichloropropene, µg/L	<10
trans-1,3-Dichloropropene, µg/L	<10
Ethylbenzene, µg/L	<10
Methyl Bromide, µg/L	<10
Methyl Chloride, µg/L	<10
Methylene Chloride, µg/L	<10
1,1,2,2-Tetrachloroethane, µg/L	<10
Tetrachloroethylene, µg/L	<10
Toluene, µg/L	<10
1,2-Trans-Dichloroethylene, µg/L	<10
1,1,1-Trichloroethane, µg/L	13,300
1,1,2-Trichloroethane, µg/L	<10
Trichloroethylene, µg/L	54
Vinyl Chloride, µg/L	<10

3276-93

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less than" (<) values are indicative of the detection limit

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Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Volatile Compounds

Samples Received: 4/9/84
Report Date: 4/16/84

Source	Well #7
Log No. 84-	2109
Date Collected	4/6/84
Acrolein, μg/L	<10
Acrylonitrile, μg/L	<10
Benzene, μg/L	<10
Bromoform, μg/L	<10
Carbon Tetrachloride, μg/L	<10*
Chlorobenzene, μg/L	<10
Chlorodibromomethane, μg/L	<10
Chloroethane, μg/L	<10
2-Chloroethylvinyl Ether, μg/L	<10
Chloroform, μg/L	<10
Dichlorobromomethane, μg/L	<10
1,1-Dichloroethane, μg/L	138
1,2-Dichloroethane, μg/L	<10
1,1-Dichloroethylene, μg/L	4,000
1,2-Dichloropropane, μg/L	<10
cis-1,3-Dichloropropene, μg/L	<10
trans-1,3-Dichloropropene, μg/L	<10
Ethylbenzene, μg/L	<10
Methyl Bromide, μg/L	<10
Methyl Chloride, μg/L	<10
Methylene Chloride, μg/L	189
1,1,2,2-Tetrachloroethane, μg/L	<10
Tetrachloroethylene, μg/L	<10
Toluene, μg/L	<10
1,2-Trans-Dichloroethylene, μg/L	<10
1,1,1-Trichloroethane, μg/L	16,700
1,1,2-Trichloroethane, μg/L	<10
Trichloroethylene, μg/L	<10
Vinyl Chloride, μg/L	<10

* Method Procedure indicates presence, but confirmation work indicates absence.

3276-93

• Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
• "Less-than" (<) values are indicative of the detection limit.

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Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 8/24/84
Report Date: 9/17/84

Source	Well 7	Well 52	Well 53
Log No. 84-	5640	5641	5642
Date Collected	8/20/84	8/20/84	8/20/84
Acrolein, ug/L	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10
Benzene, ug/L	<10	<10	<10
Bromoform, ug/L	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10
Chloroform, ug/L	<10	20	19
Dichlorobromomethane, ug/L	<10	<10	<10
1,1-Dichloroethane, ug/L	56	<10	29
1,2-Dichloroethane, ug/L	16	<10	33
1,1-Dichloroethylene, ug/L	1,654	<10	153
1,2-Dichloropropane, ug/L	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10
Ethylbenzene, ug/L	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10
Methylene Chloride, ug/L	<10	35	34
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10
Tetrachloroethylene, ug/L	<10	<10	<10
Toluene, ug/L	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	<10	20
1,1,1-Trichloroethane, ug/L	11,900	15	767
1,1,2-Trichloroethane, ug/L	28	<10	<10
Trichloroethylene, ug/L	54	61	95
Vinyl Chloride, ug/L	<10	<10	<10

3276-98

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit

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Phone (412) 268-5700

Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 8/24/84
Report Date: 9/17/84

Source	Well 54	Well 56	Building Stream
Log No.	5643	5644	5645
Date Collected	8/20/84	8/20/84	8/21/84
Acrolein, ug/L	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10
Benzene, ug/L	<10	<10	<10
Bromoform, ug/L	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10
Chloroform, ug/L	<10	10	<10
Dichlorobromomethane, ug/L	<10	<10	<10
1,1-Dichloroethane, ug/L	39	<10	<10
1,2-Dichloroethane, ug/L	16	<10	<10
1,1-Dichloroethylene, ug/L	213	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10
Ethylbenzene, ug/L	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10
Methylene Chloride, ug/L	<10	<10	10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10
Tetrachloroethylene, ug/L	<10	<10	<10
Toluene, ug/L	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	<10	<10
1,1,1-Trichloroethane, ug/L	1,550	34	<10
1,1,2-Trichloroethane, ug/L	11	<10	<10
Trichloroethylene, ug/L	56	44	21
Vinyl Chloride, ug/L	<10	<10	<10

3276-98

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environme Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit

BORING NO. MW-52C

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 1097.04
Top of Casing 1099.90
FEATURE Monitoring Well B-58
DATE STARTED 8/16/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS Dry 24 HRS 25.5'
DATE COMPLETED 8/16/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Sunny, Hot CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-8.0	Silt, some clay, some sand	Reddish Brown	Damp	Hard	19-29-70		S-1	5.0-6.5			
8.0-16.0	Silt, some clay, some sand	Pinkish White	Moist	Hard to Very Stiff	100/.5 5-8-13		S-2 S-3	10.0-10.5 15.0-16.5			
16.0-24.0	Sand and silt, little clay, little rock fragments	Pinkish White	Moist	Very Dense	25-55-97		S-4	20.0-21.5			
24.0-27.0	Sand and rock fragments, little silt, little clay Auger refusal at 27.0'	Gray	Dry	Very Dense	104/.8		S-5	25.0-25.8			
	Bottom of Hole 27.0' Well Installation Machine slotted screen from 27.0' to 17.0', sand pack brought to 10.0', bentonite seal to 7.0', then grouted to the surface										

Q3352

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Dixie Well Drilling DRILLER Don Watson INSPECTOR Frank A. Jones

BORING NO. MW-53

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 1100.09
FEATURE Monitoring Well B-58 Top of Casing 1102.64
DATE STARTED 8/16/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 28.0 24 HRS 23.9'
DATE COMPLETED 8/16/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Sunny, Hot CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CON-SISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-20.0	Silt, some clay, little sand, little rock fragments	Reddish Brown	Moist	Stiff	3-3-6 5-6-7 3-4-7		S-1 S-2 S-3	5.0-6.5 10.0-11.5 15.0-16.5			
20.0-26.0	Coarse to medium sand, some silt, little clay, little rock fragments	White & Orange	Damp	Medium to Very Dense	10-8-11 45-70		S-4 S-5	20.0-21.5 25.0-26.0			
26.0-29.0	Sand and rock fragments Auger refusal at 29.0'	Dark Gray	Damp Wet at 28.0'	Very Dense							
	Bottom of Hole 29.0' Well Installation Machine slotted screen from 28.5' to 18.5', sand pack brought to 12.0', bentonite seal to 10.0', then grouted to the surface.										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Dixie Well Drilling DRILLER Don Watson INSPECTOR Frank A. Jones

BORING NO. MW-54

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 1082.81
Top of Casing 1085.03
FEATURE Monitoring Well B-58
DATE STARTED 8/17/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 26.0 24 HRS 19.7
DATE COMPLETED 8/18/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Sunny, Hot CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CON-SISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-10.0	Silt, some clay, some sand, little rock fragments	Reddish Brown	Damp	Very Stiff	4-7-11		S-1	5.0-6.5			
10.0-19.0	Silt, some sand, little clay, little rock fragments	Brown	Damp	Medium	4-4-7 7-7-15		S-2 S-3	10.0-11.5 15.0-16.5			
19.0-26.0	Sand and rock fragments, little silt, little clay	Gray	Damp	Very Dense to Loose	10-56-35 7-5-4		S-4 S-5	20.0-21.5 25.0-26.5			
26.0-30.5	Sand, some silt, little clay Auger refusal at 30.5'	White & Orange	Moist Wet at 26.0'	Very Dense	100/.5		S-6	30.0-30.5			
	Bottom of Hole 30.5' Well Installation Machine slotted screen from 30.0' to 20.0', sand pack brought to 18.0', bentonite seal to 15.0', then grouted to the surface.										

[illegible] required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

BORING NO. MW-56

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 1068.22
FEATURE Monitoring Well B-58 Top of Casing 1070.55
DATE STARTED 8/18/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 24.5 24 HRS 22.0
DATE COMPLETED 8/19/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Sunny, Hot CASING SIZE N/A WEIGHT OF HAMMER FALL

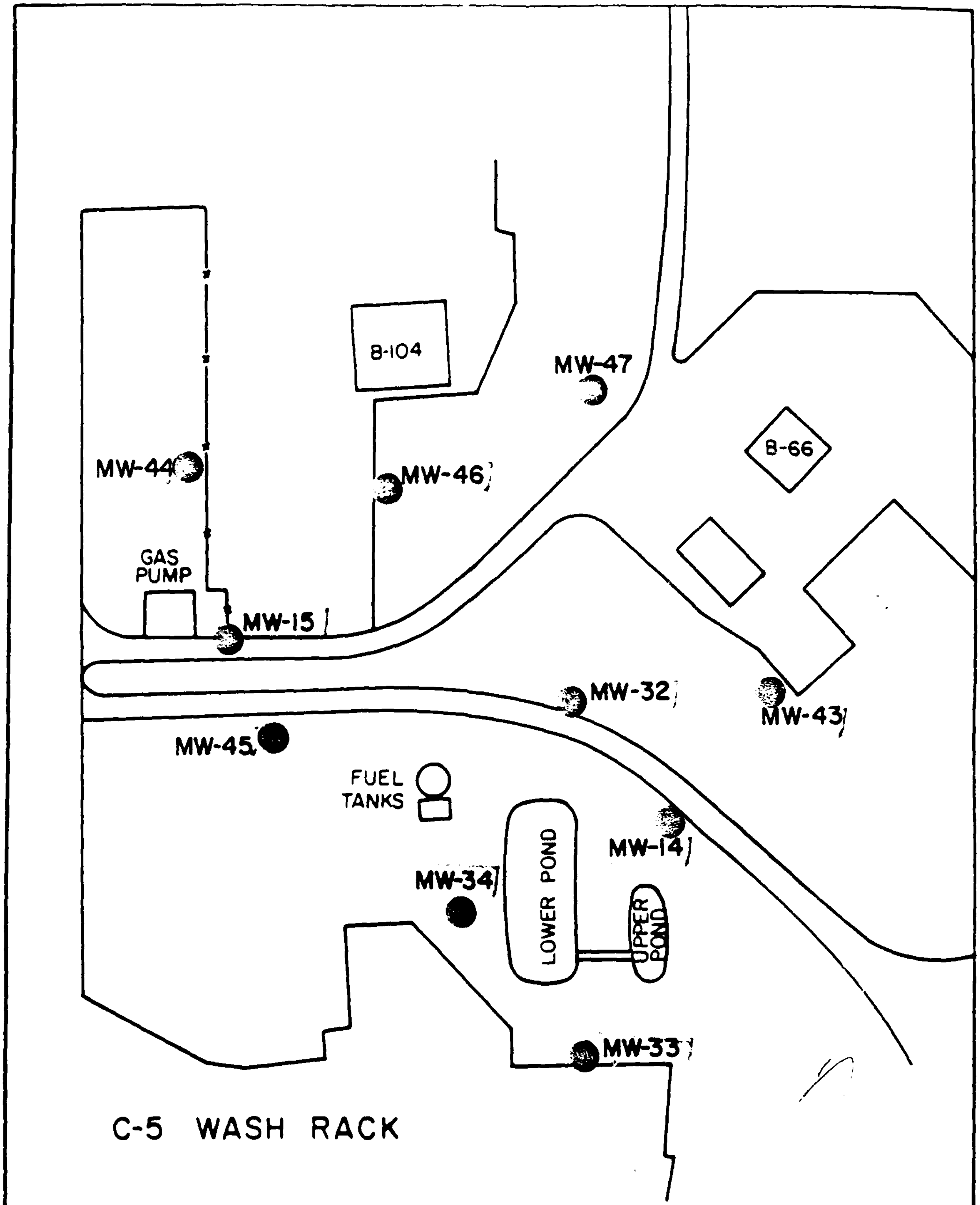
DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-9.0	Sand and silt, little clay, little rock fragments	Brown	Damp		7-11-13		S-1	5.0-6.5			
9.0-15.0	Sand and silt, little clay	White & Orange	Moist		8-9-12		S-2	10.0-11.5			
15.0-24.5	Sand, some silt, little clay, little rock fragments Auger refusal at 24.5'	Gray	Moist		11-65 100/.5		S-3 S-4	15.0-16.5 20.0-20.5			
	Bottom of Hole 24.5' Well Installation Machine slotted screen from 24.0' to 14.0', sand pack brought to 12.0', bentonite seal to 10.0', then grouted to the surface.										

*NOTE. Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

2.4 B-104 GAS PUMP STATION--SITE G16, ZONE 5

APPENDIX B

FLIGHT LINE AREA
B-104
GAS PUMP AREA



The Chester Engineers			SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6 B-104 GAS PUMP AREA MONITORING WELL LOCATIONS
DWN.BY:	SCALE:	DATE	DWG. NO.	
CHK'D.BY:	APPR.BY:		FIGURE IV-1	

Q-358

Chester Laboratories
A Division Of
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Pittsburgh
Pennsylvania 15225
Phone (412) 269-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 8/15/84
Report Date: 9/17/84

Source	Well 15	Well 32	Well 43	Well 44
Log No. 84-	5422	5423	5424	5425
Date Collected	8/13/84	8/13/84	8/13/84	8/13/84
Acrolein, ug/L	<10	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10	<10
Benzene, ug/L	151	857	<10	<10
Bromoform, ug/L	<10	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	33	<10
Chlorodibromomethane, ug/L	<10	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10	<10
Chloroform, ug/L	<10	<10	<10	<10
Dichlorobromomethane, ug/L	<10	<10	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	<10	<10
1,2-Dichloroethane, ug/L	66	<10	<10	<10
1,1-Dichloroethylene, ug/L	<10	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
Ethylbenzene, ug/L	<10	65	<10	<10
Methyl Bromide, ug/L	<10	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10	<10
Methylene Chloride, ug/L	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10	<10
Tetrachloroethylene, ug/L	<10	<10	<10	<10
Toluene, ug/L	<10	96	<10	<10
1,2-Trans-Dichloroethylene, ug/L	65	<10	<10	<10
1,1,1-Trichloroethane, ug/L	<10	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10	<10	<10
Trichloroethylene, ug/L	24	21	<10	11
Vinyl Chloride, ug/L	<10	<10	<10	<10
pH	6.0	5.9	5.9	5.7
Specific Conductance, umhos/cm	52	31	57	41
Freon Extractables, mg/L	<0.1	0.2	1.1	0.1
Lead, mg/L Pb	<0.005	<0.005	<0.005	<0.005

3276-98

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit.

B-359

Chester Laboratories

A Division Of
The Chester Engineers
P.O. Box 9356
Pittsburgh
Pennsylvania 15225
Phone (412) 268-3700

Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Samples Received: 8/15/84
Report Date: 9/17/84

Volatile Compounds

Source	Well 45	Well 46	Well 47
Log No. 84-	5426	5427	5428
Date Collected	8/13/84	8/13/84	8/13/84
Acrolein, ug/L	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10
Benzene, ug/L	<10	<10	<10
Bromoform, ug/L	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10
Chloroform, ug/L	<10	<10	<10
Dichlorobromomethane, ug/L	<10	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	<10
1,2-Dichloroethane, ug/L	<10	<10	<10
1,1-Dichloroethylene, ug/L	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10
Ethylbenzene, ug/L	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10
Methylene Chlorides, ug/L	<10	<10	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10
Tetrachloroethylene, ug/L	<10	<10	<10
Toluene, ug/L	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	<10	<10
1,1,1-Trichloroethane, ug/L	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10	<10
Trichloroethylene, ug/L	<10	31	<10
Vinyl Chloride, ug/L	<10	<10	<10
pH	6.1	6.1	5.9
Specific Conductance, umhos/cm	170	190	48
Freon Extractables, mg/L	0.5	0.1	0.1
Lead, mg/L Pb	0.03	<0.005	<0.005

3274-98

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit.

BORING NO. MW-43

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 995.77

FEATURE Monitoring Well Position 104 Top of Casing 997.79

DATE STARTED 8/2/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 8.0' 24 HRS 0.35'

DATE COMPLETED 8/3/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch

WEATHER Cloudy, Rain CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-4.0	Silt, some clay, little sand (fuel odor)	Reddish Brown	Moist	Firm							
4.0-16.5	Sand, some silt, some clay (fuel odor)	Reddish Brown	Moist Wet at 8.0'	Hard	8-14-19 17-21-35 10-21-17		S-1 S-2 S-3	5.0-6.5 10.0-11.5 15.0-16.5			
	Bottom of Hole 16.5' Well Installation Machine slotted screen from 16.0 to 6.0, sand pack brought to 5.0, bentonite seal to 3.0, then grouted to the surface.										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

BORING NO. MW-44

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 1009.51
Top of Casing 1012.16
FEATURE Monitoring Well Position 104
DATE STARTED 7/31/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 26.0 24 HRS 23.7'
DATE COMPLETED 8/1/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Cloudy, Rain CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HONESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-9.0	Silt, some clay, little sand and rock fragments	Reddish Brown	Moist	Very Stiff	9-8-13		S-1	4.0-5.5			
9.0-13.0	Clay and silt, some sand	Grayish Brown	Moist	Very Stiff	6-10-13		S-2	9.0-10.5			
13.0-29.0	Silt, some sand, some clay, little rock	Brown	Damp Wet at 26.0'	Very Stiff	8-11-12 8-10-13 9-9-11		S-3 S-4 S-5	14.0-15.5 19.0-20.5 24.0-25.5			
21.0-35.5	Sand and silt, little clay, trace rock (Weathered Granite)	Whitish Gray	Wet	Medium	4-8-12 4-4-7		S-6 S-7	29.0-30.5 34.0-35.5			
	Bottom of Hole 35.5' Well Installation Machine slotted screen from 34.0' to 24.0', sand pack brought to 21.0', bentonite seal to 19.0', then grouted to the surface.										

NOTE: * ... indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

BORING NO MW-45

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 1011.54
FEATURE Monitoring Well Position 104 Top of Casing 1013.97
DATE STARTED 7/31/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 23.8' 24 HRS 14.6'
DATE COMPLETED 7/31/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Cloudy, Rain CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-7.0	Silt, some clay, little sand and gravel	Red to Brown at 3.5'	Damp	Firm to Very Stiff	6-7-8		S-1	4.0-5.5			
7.0-9.0	Silt, some clay, little sand, little gravel	Gray	Damp	Very Stiff							
9.0-28.5	Coarse sand, little silt, little clay, little rock fragments (weathered granite)	White with Black	Damp Wet at 22.0'	Very Dense to Medium to Very Dense	28-21-22 10-15-13 79-100 42-28-21 24-42-118		S-2 S-3 S-4 S-5 S-6	9.0-10.5 14.0-15.5 19.0-20.0 24.0-25.5 27.0-28.5			
	Bottom of Hole 28.5' Well Installation Machine slotted screen from 27.0' to 17.0', sand pack brought to 16.0', bentonite seal to 12.0', then grouted to the surface.										

BORING NO. MW-46

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 1006.61
FEATURE Monitoring Well Position 104 Top of Casing 1008.85
DATE STARTED 8/1/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 22.5' 24 HRS 17.5'
DATE COMPLETED 8/1/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Cloudy, Rain CASING SIZE N/A WEIGHT OF HAMMER ______ FALL ______

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-4.0	Silt, some clay, little sand and rock gragments	Reddish Brown	Damp	Very Stiff							
4.0-14.0	Coarse to medium sand, little silt, little clay, trace rock fragments	Pink and White	Damp	Loose	4-8-9 4-4-5		S-1 S-2	4.0-5.5 9.0-10.5			
14.0-29.0	Silt, some sand, some clay	Brown	Moist Wet at 22.5'	Medium	5-7-8 4-5-6 4-8-10		S-3 S-4 S-5	14.0-15.5 19.0-20.5 24.0-25.5			
29.0-32.0	Coarse sand, little silt, little clay (weathered granite)	White	Wet	Dense to Very Dense	12-15-17 13-26-32		S-6 S-7	29.0-30.5 30.5-32.0			
	Bottom of Hole 32.0' Well Installation Machine slotted screen from 31.0' to 21.0', sand pack brought to 19.0', bentonite seal to 19.0', then grouted to the surface.										

BORING NO. MW-47

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 995.22

FEATURE Monitoring Well Position 104 Top of Casing 997.44

DATE STARTED 8/1/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 11.5' 24 HRS 11.0'

DATE COMPLETED 8/2/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch

WEATHER Cloudy, Rain CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-2.0	Silt, some clay, little sand, little rock fragments	Reddish Brown	Damp	Firm							
2.0-10.0	Medium sand, some silt, little clay	Brownish Gray	Damp	Medium	6-10-15		S-1	5.0-6.5			
10.0-20.0	Coarse sand, little silt, little clay (weathered granite)	Grayish White	Moist Wet at 11.5'	Very Dense to Medium	38-44-62 6-5-10 6-7-9		S-2 S-3 S-4	10.0-11.5 15.0-16.5 18.5-20.0			
	Bottom of Hole 20.0' Well Installation Machine slotted screen from 20.0' to 10.0', sand pack brought to 9.0', bentonite seal to 7.0', then grouted to the surface.										

2.5 <u>POSITION 58--FUEL/DEFUEL STATION--SITE G13, ZONE 5</u>

APPENDIX C

FLIGHT LINE AREA
POSITION 58
DEFUELING TANK

ESE
P. O. Box ESE
GAINESVILLE, FL 32602
(904) 332-3318

JOB

SHEET NO OF

CALCULATED BY DATE

CHECKED BY DATE

SCALE

Flight Position 58

Monitoring wells

mw 13
Top
Bottom

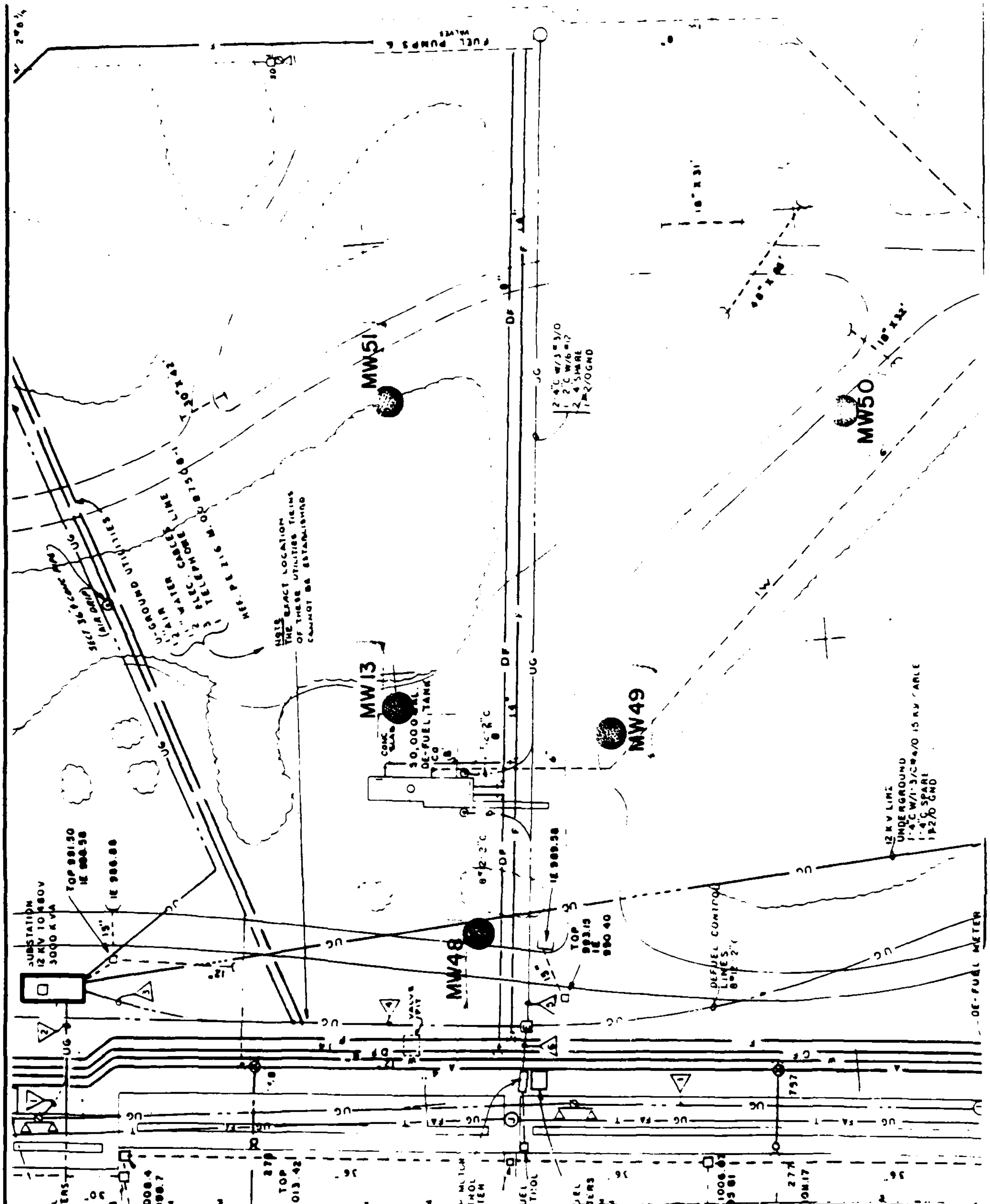
mw 48

mw 49

mw 50

mw 51

Stream Surface Water Sample



TheChesterEngineers			SHEET NO.	LOCKHEED-GEORGIA COMPANY
DWN.BY:	SCALE:	DATE	DWG. NO.	AIR FORCE PLANT 6
CHK'D.BY:	APPR.BY:		FIGURE V-1	POSITION 58 DEFUELING TANK MONITORING WELL LOCATIONS

Q-369

Site G13

TABLE V-1

SUMMARY OF VOLATILE ORGANICS AT POSITION 58

Log 84-	Top Layer Well 13 5646A	Bottom Layer Well 13 5646B	MW-48 5647	MW-49 5648	MW-50 5649	MW-51 5650	Up Stream 5651	Down Stream 5652
Benzene, ug/L	<10	178	<10	25	<10	<10	<10	<10
Chlorobenzene, ug/L	<10	1450	<10	181	<10	<10	<10	<10
Ethylbenzene, ug/L	36,800	6230	7920	263	21	<10	<10	<10
Tetrachloroethylene, ug/L	<10	130	<10	51	16	<10	<10	<10
Toluene, ug/L	6500	688	3650	76	30	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	1220	<10	<10	<10	<10	<10	<10
Trichloroethylene, ug/L	<10	<10	<10	23	25	34	28	29

Chester Laboratories
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Phone (412) 268-5700

Laboratory Analysis Report
For
Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 8/24/84
Report Date: 9/17/84

Source	*Well 13 Top Layer	*Well 13 Bottom Layer	Well 48	Well 49
Log No. 84-	5646A	5646B	5647	5648
Date Collected	8/20/84	8/20/84	8/20/84	8/20/84
Acrolein, µg/L	<10	<10	<10	<10
Acrylonitrile, µg/L	<10	<10	<10	<10
Benzene, µg/L	<10	178	<10	25
Bromoform, µg/L	<10	<10	<10	<10
Carbon Tetrachloride, µg/L	<10	<10	<10	<10
Chlorobenzene, µg/L	<10	1,450	<10	181
Chlorodibromomethane, µg/L	<10	<10	<10	<10
Chloroethane, µg/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10	<10	<10
Chloroform, µg/L	<10	<10	<10	19
Dichlorobromomethane, µg/L	<10	<10	<10	<10
1,1-Dichloroethane, µg/L	<10	<10	<10	<10
1,2-Dichloroethane, µg/L	<10	<10	<10	<10
1,1-Dichloroethylene, µg/L	<10	<10	<10	<10
1,2-Dichloropropane, µg/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
Ethylbenzene, µg/L	36,800	6,230	7,920	263
Methyl Bromide, µg/L	<10	<10	<10	<10
Methyl Chloride, µg/L	<10	<10	<10	<10
Methylene Chloride, µg/L	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane, µg/L	<10	<10	<10	26
Tetrachloroethylene, µg/L	<10	130	<10	51
Toluene, µg/L	6,500	688	3,650	76
1,2-Trans-Dichloroethylene, µg/L	<10	<10	<10	<10
1,1,1-Trichloroethane, µg/L	<10	<10	<10	<10
1,1,2-Trichloroethane, µg/L	<10	1,220	<10	<10
Trichloroethylene, µg/L	<10	<10	<10	23
Vinyl Chloride, µg/L	<10	<10	<10	<10
pH	6.9		7.1	6.9
Specific Conductance, umhos/cm	74		112	92
Freon Extractables, mg/L	226,000		2.1	1.9

*Sample had two layers; approximately 50:50; one was yellow colored, the other water white.

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- "Less-than" (<) values are indicative of the detection limit

Chester Laboratories
A Division Of
The Chester Engineers
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Pittsburgh
Pennsylvania 15225
Phone (412) 268-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Samples Received: 8/24/84
Report Date: 9/17/84

Volatile Compounds

Source	Well 50	Well 51	Position 58 Upstream	Position 58 Downstream
Log No. 84-	5649	5650	5651	5652
Date Collected	8/20/84	8/20/84	8/22/84	8/22/84
Acrolein, ug/L	<10	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10	<10
Benzene, ug/L	<10	<10	<10	<10
Bromoform, ug/L	<10	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10	<10
Chloroform, ug/L	<10	<10	<10	<10
Dichlorobromomethane, ug/L	<10	<10	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	<10	<10
1,2-Dichloroethane, ug/L	<10	<10	30	15
1,1-Dichloroethylene, ug/L	<10	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
Ethylbenzene, ug/L	21	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10	<10
Methylene Chloride, ug/L	<10	17	<10	13
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10	<10
Tetrachloroethylene, ug/L	16	<10	<10	<10
Toluene, ug/L	30	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	<10	24	11
1,1,1-Trichloroethane, ug/L	<10	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10	<10	<10
Trichloroethylene, ug/L	25	34	28	29
Vinyl Chloride, ug/L	<10	<10	<10	<10
pH	6.8	7.8	7.0	7.1
Specific Conductance, umhos/cm	81	82	70	72

3276-98

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit

BORING NO. MW-48

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of ___

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 991.99
FEATURE Monitoring Well Position 58 Top of Casing 994.89
DATE STARTED 8/15/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 19.1 24 HRS 13.1'
DATE COMPLETED 8/15/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Sunny, Hot CASING SIZE N/A WEIGHT OF HAMMER ___ FALL ___

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HARDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-4.0	Silt, some clay, some sand, trace rock fragments	Reddish Brown	Damp	Firm							
4.0-16.0	Silt, some clay, some sand, trace rock fragments	Light Brown	Moist Wet at 16.0'	Stiff to Soft	3-4-5 3-4-4 1-2-2		S-1 S-2 S-3	5.0-6.5 10.0-11.5 15.0-16.5			
16.0-26.0	Medium to coarse sand, some silt, little clay (weathered granite)	Whitish Gray	Wet	Dense to Medium	10-18-14 6-10-12		S-4 S-5	19.0-20.5 24.0-25.5			
	Bottom of Hole 26.0' Well Installation Machine slotted screen from 26.0' to 16.0', sand pack brought to 14.0', bentonite seal to 11.0', then grouted to the surface.										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Dixie Well Drilling DRILLER Don Watson INSPECTOR Frank A. Jones

BORING NO. MW-49

THE CHESTER E...EERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 986.91

FEATURE Monitoring Well Position 58 Top of Casing 989.07

DATE STARTED 8/3/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 19.0' 24 HRS 13.4'

DATE COMPLETED 8/3/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch

WEATHER Ptly Cloudy, Wrm CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HONESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-10.5	Silt, some clay, some sand, trace rock fragments	Light Brown	Moist	Hard	9-14-17		S-1	5.0-6.5			
10.5-26.5	Sand and silt, little clay, trace rock fragments	Brownish Gray	Moist Wet at 19.0'	Medium to Loose to Medium	4-7-11 1-2-3 6-11-12 5-8-11		S-2 S-3 S-4 S-5	10.0-11.5 15.0-16.5 20.0-21.5 25.0-26.5			
	Bottom of Hole 26.5' Well Installation Machine slotted screen from 26.0' to 16.0', sand pack brought to 16.0', bentonite seal to 13.0', then grouted to the surface.										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Dixie Well Drilling DRILLER Don Watson INSPECTOR Frank A. Jones

BORING MW-50

THE CHESTE. GINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 979.61
Top of Casing 981.86
FEATURE Monitoring Well Position 58
DATE STARTED 8/10/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 9.0' 24 HRS 9.3'
DATE COMPLETED 8/10/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch
WEATHER Sunny, Hot CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CON-SISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-4.0	Silt, some clay, some sand, little rock fragments	Light	Damp	Firm							
4.0-20.0	Coarse to medium sand and silt, little clay, trace rock fragments	Brownish Gray	Moist	Stiff to Hard	4-5-8 3-4-6 32-36-32 8-10-7		S-1 S-2 S-3 S-4	5.0-6.5 10.0-11.5 15.0-16.5 18.5-20.0			
	Bottom of Hole 20.0' Well Installation Machine slotted screen from 20.0' to 10.0', sand pack brought to 8.0', bentonite seal to 7.0', then grouted to the surface.										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Dixie Well Drilling DRILLER Don Watson INSPECTOR Frank A. Jones

BORING NO. MW-51

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

PROJECT LOCKHEED-GEORGIA COMPANY LOCATION Marietta, Georgia GROUND ELEVATION 978.25

FEATURE Monitoring Well Position 58 Top of Casing 981.09

DATE STARTED 8/15/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch O.D. GROUND WATER 0 HRS 8.0' 24 HRS 7.5'

DATE COMPLETED 8/16/84 SAMP. SIZE 1.5" O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch

WEATHER Sunny, Hot CASING SIZE N/A WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CON-SISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-3.0	Silt, some sand, some clay, little gravel	Light Brown	Damp	Firm							
3.0-9.0	Medium to fine sand and silt, little clay, trace rock fragments (weathered granite)	Whitish Gray	Moist Wet at 8.0'	Loose	2-2-3		S-1				
[illegible]-18.0	Coarse to fine sand, some silt, little clay	Whitish Gray	Wet	Loose to Medium	2-3-5 4-8-11		S-2 S-3				
	Bottom of Hole 18.0' Well Installation Machine slotted screen from [illegible] to 8.0', sand pack [illegible] to 6.0', bentonite [illegible] 4.[illegible]', then grouted [illegible] surface.										

* [illegible] sampler 6 inches using 140 pound hammer falling 30 inches.

[illegible] Don Watson INSPECTOR Frank A. Jones

AD-A190 453 INSTALLATION RESTORATION PROGRAM PHASE 2 CONFIRMATION/QUANTIFICATION STAG..(U) ENVIRONMENTAL SCIENCE AND ENGINEERING INC GAINESVILLE FL 5/5

UNCLASSIFIED C R NEFF ET AL. 09 AUG 86 F/G 24/3 NL

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DATE
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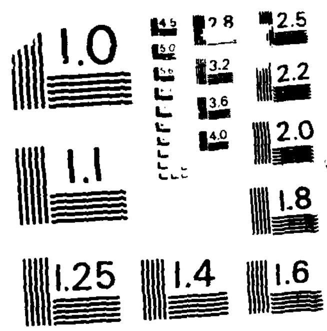


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

2.6 <u>SANITARY WWTP SLUDGE DISPOSAL AREA--SITE G4, ZONE 1</u>

PDP (K. Warren, 424-5480) 19 November 1985

IRP Phase IIa Report

Environmental Science & Engineering, Inc.
P.O. Box ESE
Gainesville FL 32602-3053
ATTN: D. E. Bruderly, Associate Vice President

1. Part "B" application has been made for the Surface Impoundment, B-10 Aeration Basis and three drum storage areas. On 8 Nov 85 we notified the Georgia EPD of our intent to close the C-5 Washrack Ponds, the TCE Spill Site and the B-58 Site. Therefore, those three sites were not part of the part "B".

2. The sludge analysis and draft B-10 Aeration Basin Ground Water Quality Assessment Plan Implementation Report are forwarded as you requested.

CHARLIE L. KORNEGAY, Major, USAF
Manufacturing Operations Division

2 Atch
1. Sludge Analysis
2. IT Draft Report

cc: ASD/PMDA (Lt. Reynolds)
w/o atch

Engineers
Architects
Planners

2501 Hillsboro Road
Nashville
Tennessee 37212
615 383 5376

The Chester Engineers

Ref. No. 3276-99

3 September 1984

Mr. James H. Lucas
Assistant Manager
Facilities Engineering, Bldgs. Dept.
LOCKHEED-GEORGIA COMPANY
86 South Cobb Drive
Marietta, Georgia 30063

Dear Mr. Lucas:

Re: Analytical Data
Sanitary Treatment Plant Sludge

Please find enclosed three copies of our Analytical Report regarding testing of your sanitary treatment plant sludge. I have also enclosed one copy of the concentration maximum levels for EP Toxicity.

In comparing the EP Toxic levels to Log Nos. 4925 and 4927, all materials fall below the set limits. Although chromium is high in the sludge samples themselves, it is not leachable, and therefore, should not be considered as a hazardous threat. With regards to the volatile organic compounds, 47 ppb Methylene Chloride shows up in area No. 1. This is considered insignificant to any possibility of groundwater contamination.

I should point out that the Georgia EPD may require a more rigorous sampling program in accordance with delisting procedures. If this should be the case Chester could prepare and implement such a plan immediately upon notice. The plan would adhere to all Federal and State delisting requirements as we had previously prepared for the Aeration Basin at B-10 Facilities.

Please let me know should you need any additional assistance.

Very truly yours,

David M. Henderson
Director, Southeast Region

DMH/dm

Enclosure

cc: File (2)

hester Labor...ories
. Division Of
The Chester Engineers
P O Box 9356
Pittsburgh
Pennsylvania 15225
Phone (412) 269-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Analyses

Samples Received: 7/23/84
Report Date: 8/27/84

Source	Sanitary Sludge Area I	Sanitary Sludge Area 2
Log No. 84-	4924	4926
Date Collected	7/20/84	7/20/84
pH	6.9	7.2
Arsenic, ppm As	3	2
Barium, ppm Ba	412	312
Cadmium, ppm Cd	75	128
Chromium, ppm Cr	4,150	4,880
Lead, ppm Pb	228	212
Mercury, ppm Hg	<1	<1
Nickel, ppm Ni	45	55
Selenium, ppm Se	<1	<1
Silver, ppm Ag	146	72
EP Toxicity Test:		
Log No. 84-	4925	4927
pH	5.1	5.1
Arsenic, mg/L As	<0.001	<0.001
Barium, mg/L Ba	0.2	0.3
Cadmium, mg/L Cd	0.04	0.06
Chromium, mg/L Cr	0.05	0.32
Lead, mg/L Pb	<0.01	0.01
Mercury, mg/L Hg	<0.001	<0.001
Nickel, mg/L Ni	0.18	0.23
Selenium, mg/L Se	<0.001	<0.001
Silver, mg/L Ag	0.05	0.06

3276-93

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit

nester Labor. .ories
Division Of
The Chester Engineers
P O Box 9356
Pittsburgh
Pennsylvania 15225
Phone (412) 269-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 7/23/84
Report Date: 8/27/84

Source	Sanitary Sludge Area 1	Sanitary Sludge Area 2
Log No. 84-	4924	4926
Date Collected	7/20/84	7/20/84
Acrolein, ppb	<10	<10
Acrylonitrile, ppb	<10	<10
Benzene, ppb	<10	<10
Bromoform, ppb	<10	<10
Carbon Tetrachloride, ppb	<10	<10
Chlorobenzene, ppb	<10	<10
Chlorodibromomethane, ppb	<10	<10
Chloroethane, ppb	<10	<10
2-Chloroethylvinyl Ether, ppb	<10	<10
Chloroform, ppb	<10	<10
Dichlorobromomethane, ppb	<10	<10
1,1-Dichloroethane, ppb	<10	<10
1,2-Dichloroethane, ppb	<10	<10
1,1-Dichloroethylene, ppb	<10	<10
1,2-Dichloropropane, ppb	<10	<10
cis-1,3-Dichloropropene, ppb	<10	<10
trans-1,3-Dichloropropene, ppb	<10	<10
Ethylbenzene, ppb	<10	10
Methyl Bromide, ppb	<10	<10
Methyl Chloride, ppb	<10	<10
Methylene Chloride, ppb	47	<10
1,1,2,2-Tetrachloroethane, ppb	<10	<10
Tetrachloroethylene, ppb	<10	<10
Toluene, ppb	<10	<10
1,2-Trans-Dichloroethylene, ppb	<10	<10
1,1,1-Trichloroethane, ppb	<10	<10
1,1,2-Trichloroethane, ppb	<10	<10
Trichloroethylene, ppb	<10	<10
Vinyl Chloride, ppb	<10	<10

3276-93

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit.

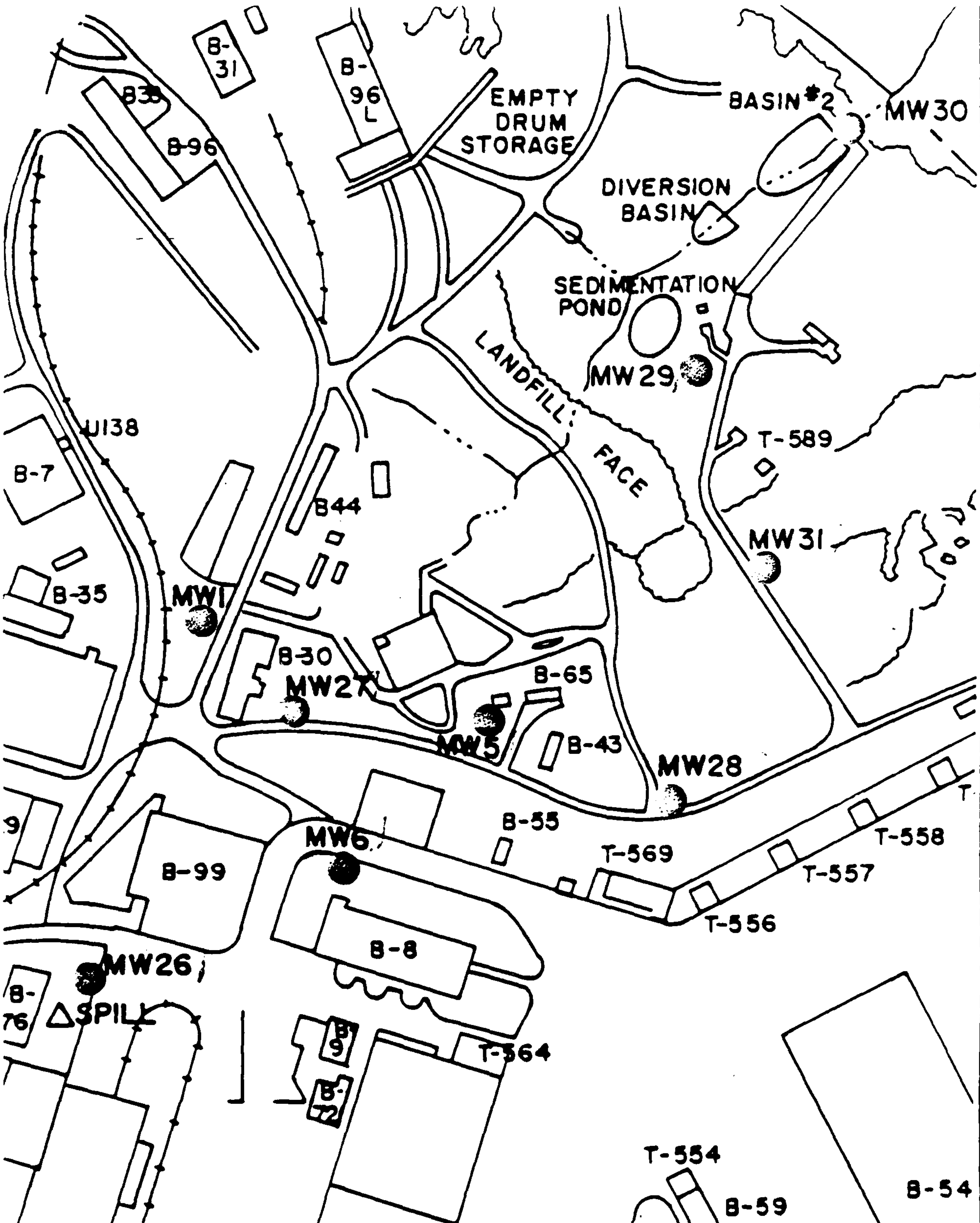
2.7 TCE SPILL AT B-56--SITE G9, ZONE 2

TABLE IV-4

TCE AREA
GROUNDWATER ELEVATIONS
Site G9

Proximity	LOCATION	3/1/84	5/29/84	9/27/84
B-30	1	1055	1055.80	--
South B-3 upgradient	2	1084	1084.10	--
B-65	5	1046	1047.80	--
B-8	6	1057	1057.15	--
B-76 - TCE Storage Tank	26	--	1079.74	1079.64
B-30	27	--	1053.18	1051.93
T-569	28	--	1057.50	1057.30
Sedimentation Pond	29	--	1028.01	1026.51
Basin #2	30	--	1018.02	1017.27
Existing Landfill	31	--	1048.20	1042.20
Drinking water Well	U138			
B-96 Landfill	G5-5		1064.32	
Stormwater Basin #2	G5-6		1041.04	

Lockheed-GA
3276-08/10-84



The Chester Engineers

DWN.BY:	SCALE:	DATE	SHEET NO.	LOCKHEED-GEORGIA COMPANY
CK'D.BY:	APPR.BY:		DWG. NO.	AIR FORCE PLANT 6
			FIGURE IV-2	TCE SPILL AREA MONITORING WELL LOCATIONS

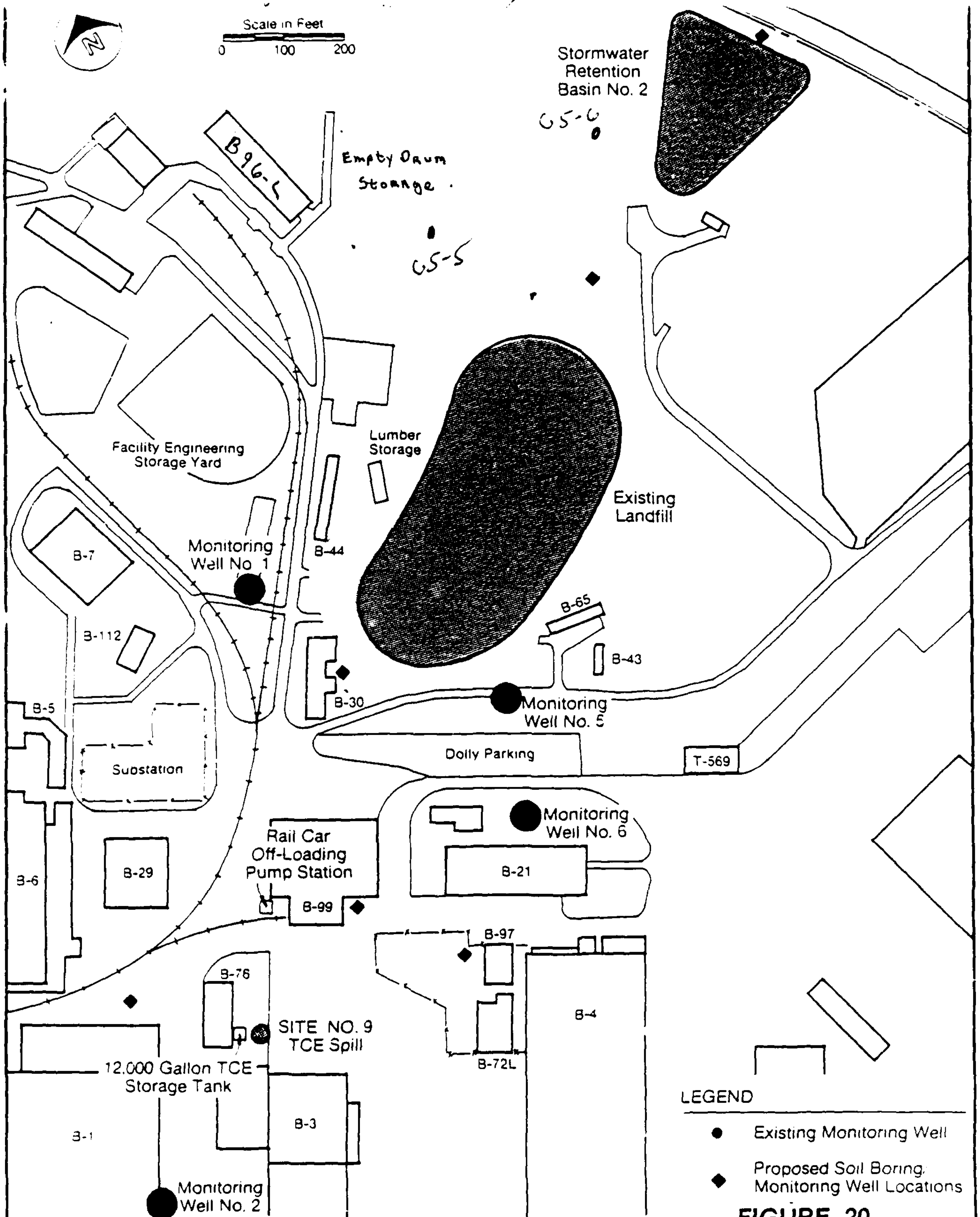


FIGURE 20.
Recommended Monitoring Well and Preliminary Sampling Locations for Site No. 2—the Existing Landfill; Site No. 5—Stormwater Retention Basin No. 2; and, Site No. 9—the TEC Spill.

CH2M HILL

TABLE IV-2

TIME HISTORY OF TRICHLOROETHYLENE CONTAMINATION
TCE SPILL AREA Site G 9

DATE	TRICHLOROETHYLENE, ug/L				
			BASIN #2		
	Well #5	Well #6	Influent	Effluent	
3/22/83	(Spill occurred on this date)				
4/20/83			792	509	
4/22/83			581	17.6	
4/28/83	1,140		430	16.2	
5/03/83		26.5			
5/09/83	771	10,000	203	<1.9	
5/17/83	1,035	2,100		4.5	
5/20/83	622	6,960			
5/25/83	3,190	156,000	1,040	<1.9	
6/01/83		10,300	226	1.9	
6/14/83	2,045	5,195	109	1.9	
7/15/83	705	7,720	215	11.1	
8/05/83	606	4,120	245	16.3	
9/12/83	132	5,810	876	20.6	
10/11/83	95	6,230	181	22.8	
11/07/83	81.6	6,910	480	43.9	
11/14/83			366	24	
1/27/84	1,020	3,980	634	27.2	
2/24/84			27,000	3,580	(Spill)
2/28/84			520	35.3	
3/02/84	1,450	2,770	558	39	
5/15/84	441	1,100	217		

Lockheed-GA
3276-08/10-84

Site G5

TABLE IV-1

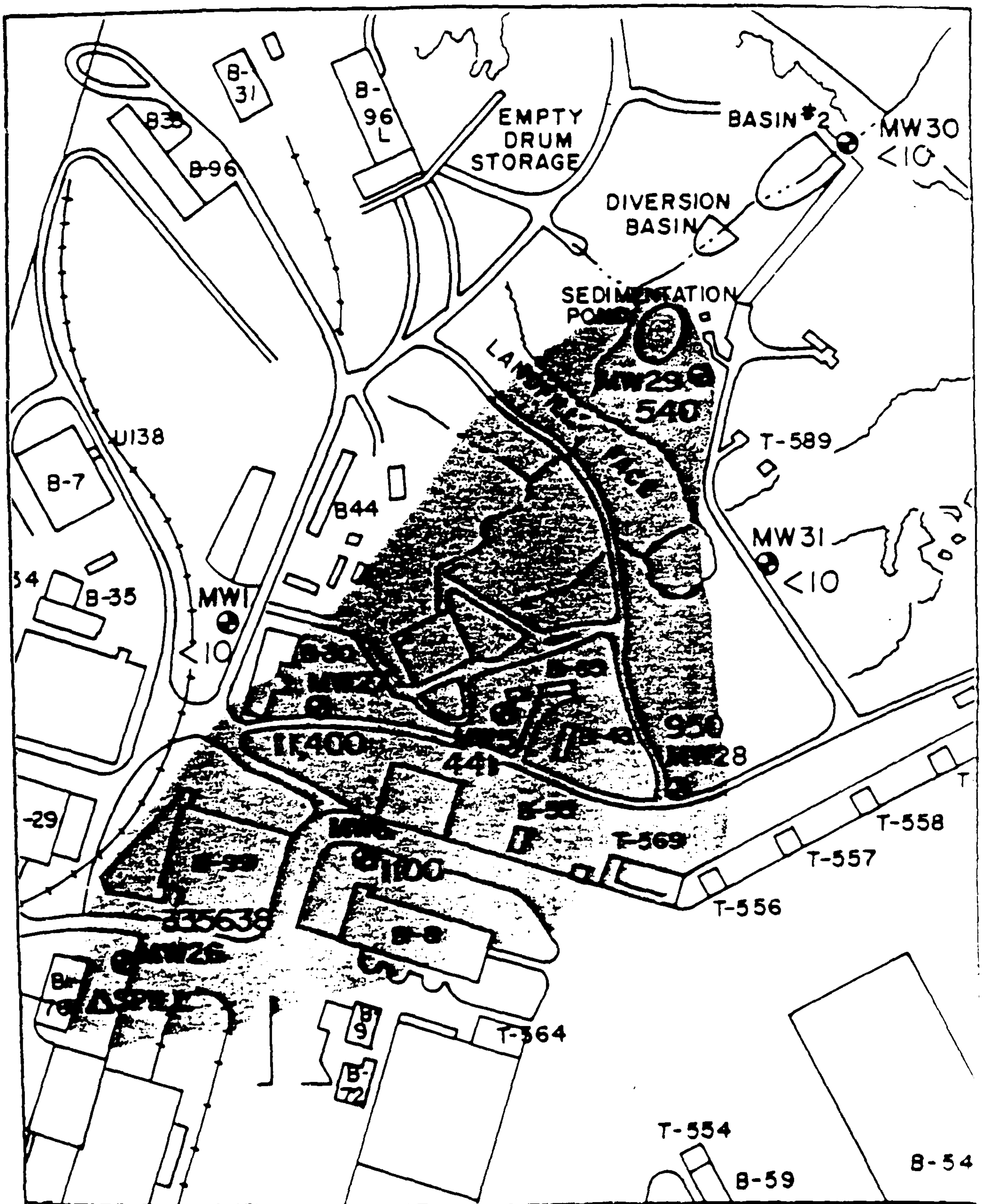
Stormwater BASIN NO. 2 SAMPLING RESULTS
MARCH 1984

Source	INFLUENT	BOTTOM WATER	SEDIMENTS	EFFLUENT
Log No. 84-	1417	1550	1589	1416
Benzene, ug/L	14	<10	<10	<10
Chloroform, ug/L	<10	97	<10	<10
1,2-Dichloroethane, ug/L	109	23	<10	<10
Ethylbenzene, ug/L	<10	46	<10	35
Toluene, ug/L	<10	<10	35	18
1,2-Trans-Dichloroethylene, ug/L	109	22	<10	<10
Trichloroethylene, ug/L	558	140	<10	39

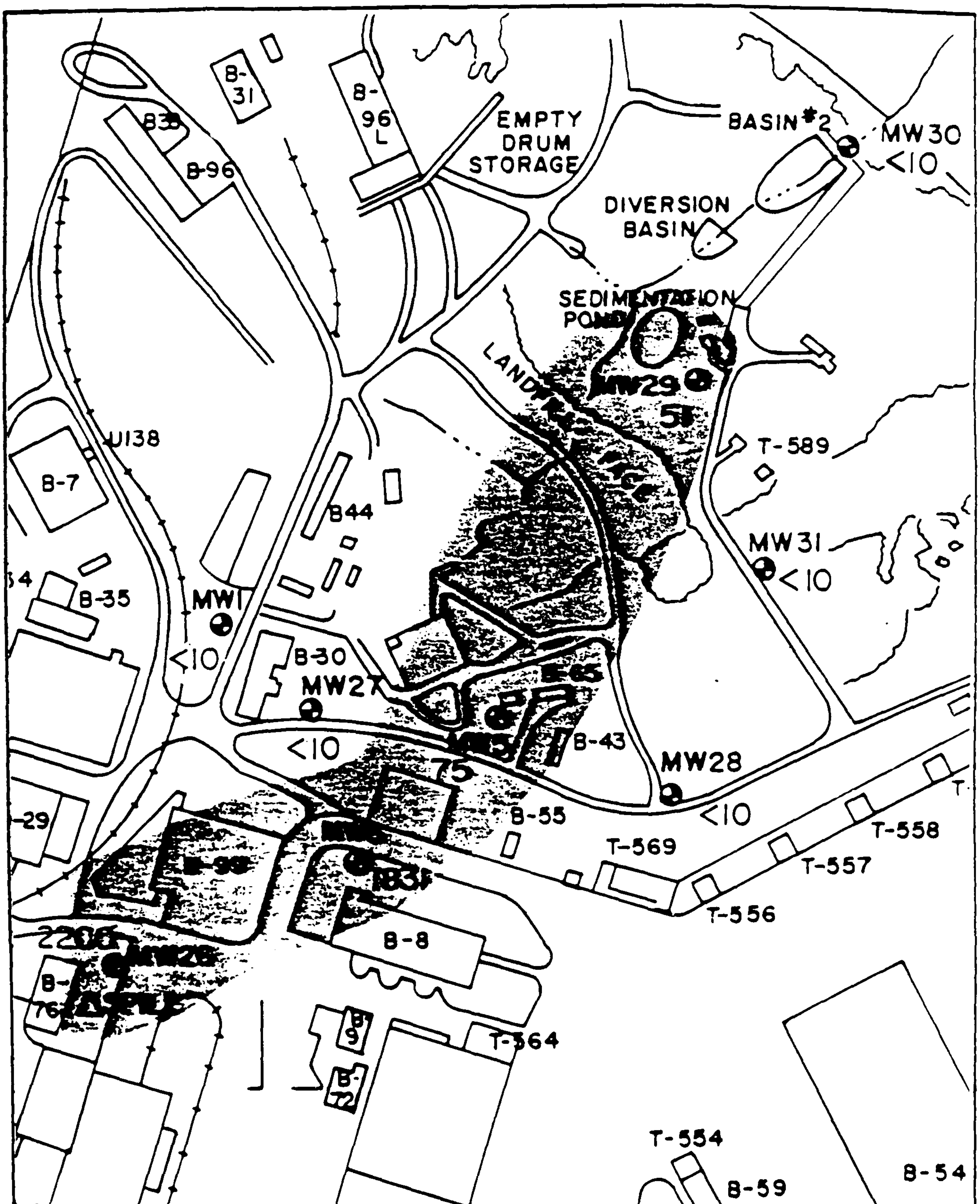
TABLE IV-5

COMPARATIVE SAMPLING OF MW-27

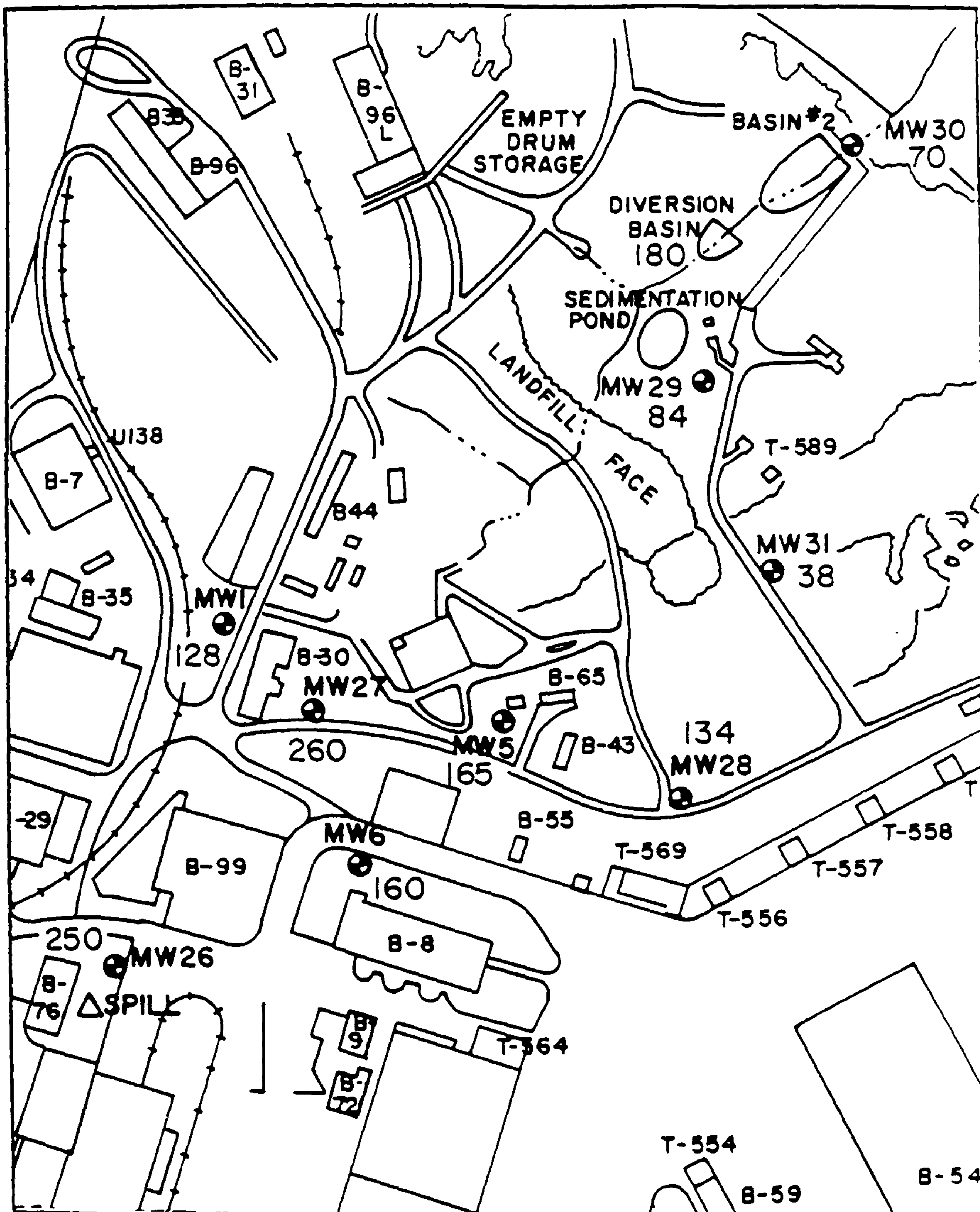
	5/11/84 BEFORE BAILING	5/14/84 AFTER BAILING
Log 84-	3152	3430
Benzene, ug/L	3260	5650
Ethylbenzene, ug/L	400	<10
Toluene, ug/L	2240	1200
Trichloroethylene, ug/L	64	11,400



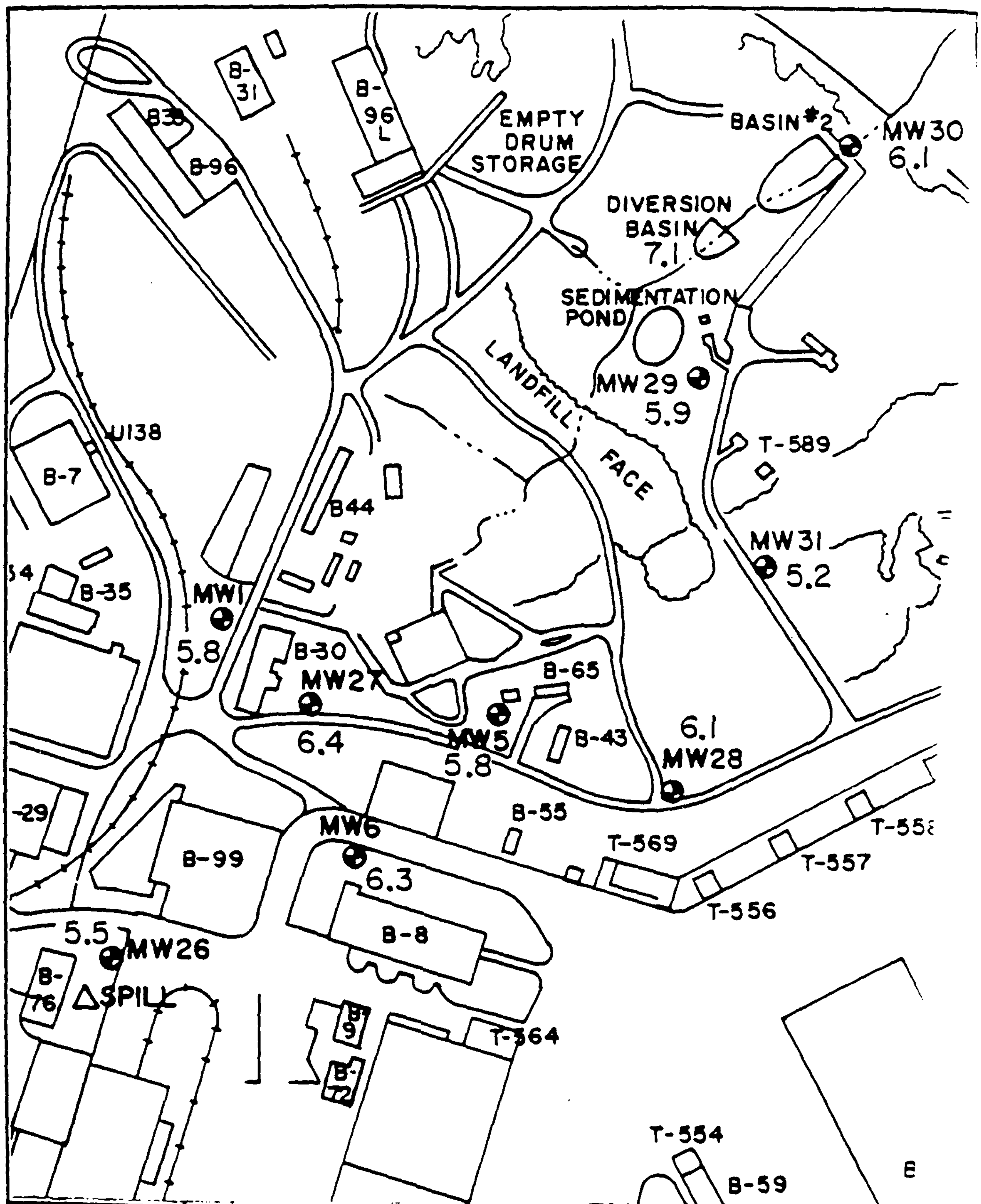
The Chester Engineers			SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6
DWN. BY:	SCALE:	DATE	DWG. NO.	TCE SPILL AREA TRICHLOROETHYLENE ug/L
CHK'D. BY:	APPR. BY		FIGURE IV-9	



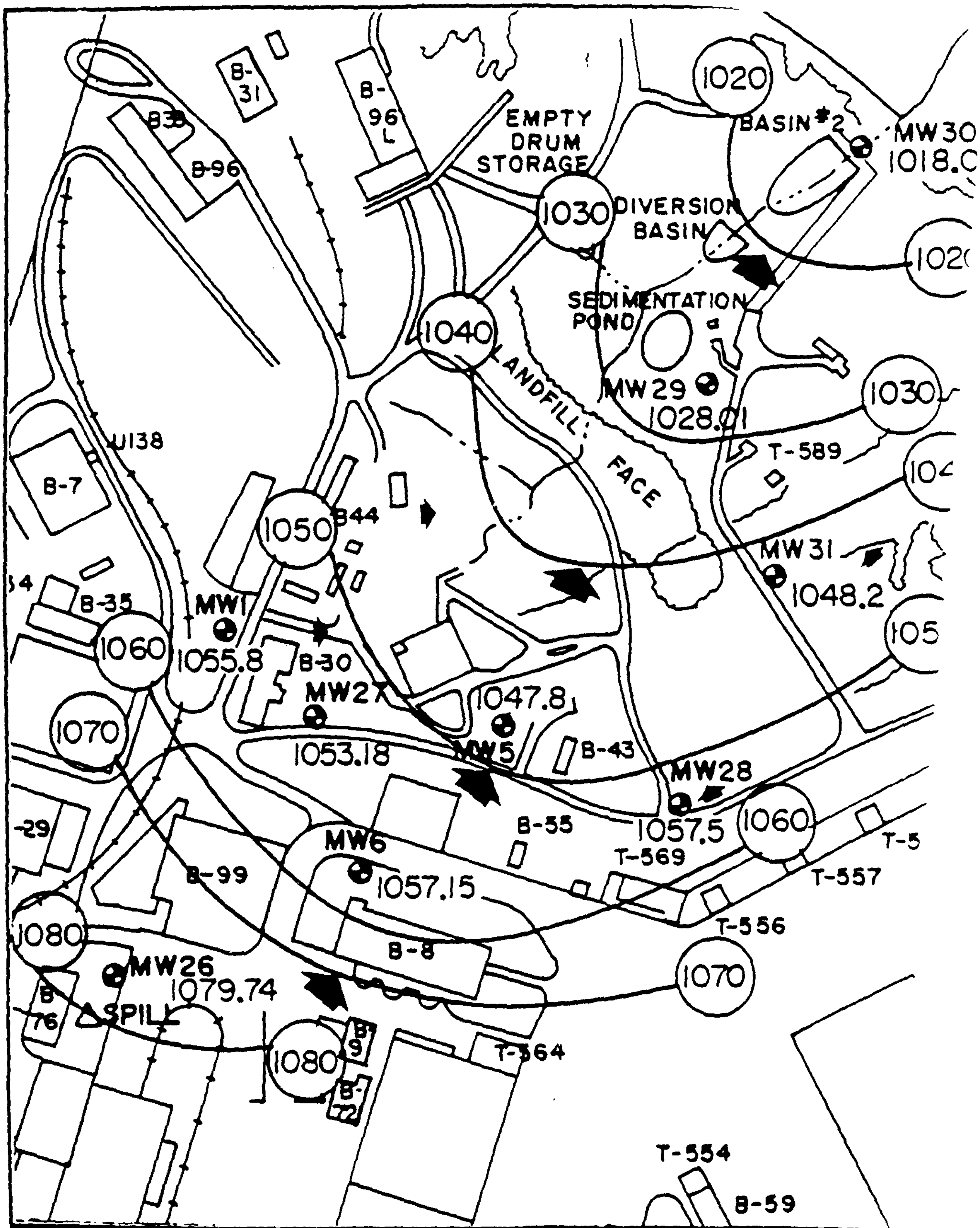
The Chester Engineers	SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6
DWN.BY: / SCALE: / DATE	DWG. NO. Q-390	TCE SPILL AREA
CHK'D BY: / APPR.BY:	FIGURE IV-10	1,2-DICHLOROETHANE ug/L



The Chester Engineers	SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6
DWN.BY: / SCALE: / DATE	DWG. NO.	TCE SPILL AREA
CHK'D.BY: / APPR.BY:	FIGURE IV-8	SPECIFIC CONDUCTANCE MARCH 1984



The Chester Engineers	SHEET NO.	LOCKHEED-GEORGIA COMPANY
DWN.BY: / SCALE: / DATE	DWG. NO.	AIR FORCE PLANT 6
CHK'D.BY: / APPR.BY:	FIGURE IV-7	TCE SPILL AREA DISTRIBUTION OF pH MARCH 198



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SHEET NO.	LOCKHEED-GEORGIA COMPA
DWG. NO.	AIR FORCE PLANT 6
	TCE SPILL AREA
FIGURE IV-6	GROUNDWATER ELEVATIONS 5

DWN.BY: | SCALE: | DATE
CHK'D.BY: | APPR.BY:

site G9

Table 22
SUMMARY OF TRICHLOROETHYLENE CONCENTRATIONS (μg/l) IN GROUND-WATER AND STORMWATER RETENTION BASIN NO. 2 AFTER SPILL

Sample Source	Date of Sampling/Concentration 4/01/83	4/04/83	4/11/83	4/14/83	4/18/83	4/20/83	4/22/83	4/29/83	5/03/83	5/09/83	5/17/83	5/20/83	5/24/83	6/01/83	6/10/83	6/14/83	8/15/83	9/12/83	10/11/83	11/14/83
Well No. 1	--	--	--	--	--	--	--	<1.9	--	--	--	2.4	--	--	--	--	--	--	--	--
Well No. 5	--	--	--	--	--	--	--	1,140	--	771	1,035	622	3,190	--	705	2,045	609	132	95	--
Well No. 6	--	--	--	--	--	--	--	--	26.5	10,000	7,100	6,960	156,000	10,300	7,720	5,186	4,120	5,010	6,230	--
Stormwater Retention Basin No. 2 Influent	14	33	550	313	207	792	501	430	--	203	--	--	1,040	226	215	109	245	876	181	366
Stormwater Retention Basin No. 2 Discharge	<1.9	<1.9	--	--	--	509	260	16.2	--	<1.9	--	--	1.9	1.9	11.1	1.9	16.3	20.6	22.8	24.0

ChesterLaboratories
A Division Of
The Chester Engineers
845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone (412) 262-1035

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds*

Samples Received: 3/6/84
Report Date: 3/20/84

Source	Oily Soil From Slosh Bldg. Area Above Basin #2	Slosh Bldg. Drum Storage Area Soils 0-3" from First Four Rows	Slosh Bldg. Drum Storage Area Soils 0-3" from Second Four Rows	Soil From Drainage at Well #1
Log No. 84-	1425	1426	1427	1415
Date Collected	3/2/84	3/2/84	3/2/84	3/2/84
Acrolein, ppb	<100	<100	<100	<100
Acrylonitrile, ppb	<100	<100	<100	<100
Benzene, ppb	<10	<10	<10	<10
Bromoform, ppb	<10	<10	<10	<10
Carbon Tetrachloride, ppb	<10	<10	<10	<10
Chlorobenzene, ppb	<10	<10	<10	<10
Chlorodibromomethane, ppb	<10	<10	<10	<10
Chloroethane, ppb	<10	<10	<10	<10
2-Chloroethylvinyl Ether, ppb	<10	<10	<10	<10
Dichlorobromomethane, ppb	<10	<10	<10	<10
1,1-Dichloroethane, ppb	<10	<10	<10	<10
1,2-Dichloroethane, ppb	<10	<10	<10	<10
1,1-Dichloroethylene, ppb	<10	<10	<10	<10
1,2-Dichloropropane, ppb	<10	<10	<10	<10
cis-1,3-Dichloropropene, ppb	<10	<10	<10	<10
trans-1,3-Dichloropropene, ppb	<10	<10	<10	<10
Ethylbenzene, ppb	<10	<10	<10	<10
Methyl Bromide, ppb	<10	<10	<10	<10
Methyl Chloride, ppb	<10	<10	<10	<10

* Unless otherwise noted analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
* Less than (<) values are indicative of the detection limit

Q-395

LABORATORY ANALYSIS REPORT
FOR

Lockheed Corporation
Marietta, Georgia

Volatile Compounds
(Continued)

Source	Oily Soil From Slosh Bldg. Area Above Basin #2	Slosh Bldg. Drum Storage Area Soils 0-3" from First Four Rows	Slosh Bldg. Drum Storage Area Soils 0-3" from Second Four Rows	Soil From Drainage at Well #1
Log No. 84-	1425	1426	1427	1415
Date Collected	3/2/84	3/2/84	3/2/84	3/2/84
Methylene Chloride, ppb	<10	41	62	<10
1,1,2,2-Tetrachloroethane, ppb	<10	<10	<10	<10
Tetrachloroethylene, ppb	<10	<10	<10	<10
Toluene, ppb	<10	<10	<10	<10
1,2-Trans-Dichloroethylene, ppb	<10	<10	<10	<10
1,1,1-Trichloroethane, ppb	<10	<10	14	<10
1,1,2-Trichloroethane, ppb	<10	<10	<10	<10
Trichloroethylene, ppb	<10	<10	<10	<10
Vinyl Chloride, ppb	<10	<10	<10	<10

3276-93

ChesterLaboratories

A Division Of

The**Chester**Engineers

845 Fourth Avenue
[illegible]
Pennsylvania 15108
Phone (412) 262 1035

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 3/6/84
Report Date: 3/20/84

Source	Well #1	Well #2	Well #5	Well #6
Log No. 84-	1408	1409	1410	1411
Date Collected	3/2/84	3/2/84	3/2/84	3/2/84
Acrolein, ug/L	<100	<100	<100	<100
Acrylonitrile, ug/L	<100	<100	<100	<100
Benzene, ug/L	<10	<10	100	<10
Bromoform, ug/L	<10	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10	<10
Chloroform, ug/L	<10	<10	<10	<10
Dichlorobromomethane, ug/L	<10	<10	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	<10	<10
1,2-Dichloroethane, ug/L	<10	<10	265	2,480
1,1-Dichloroethylene, ug/L	<10	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
Ethylbenzene, ug/L	<10	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10	<10
Methylene Chloride, ug/L	<10	<10	<10	<1[illegible]
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10	<1[illegible]
Tetrachloroethylene, ug/L	<10	<10	321	40[illegible]
Toluene, ug/L	<10	<10	<10	<1[illegible]
1,2-Trans-Dichloroethylene, ug/L	<10	<10	255	2,50[illegible]
1,1,1-Trichloroethane, ug/L	<10	<10	<10	<1[illegible]
1,1,2-Trichloroethane, ug/L	<10	<10	<10	<1[illegible]
Trichloroethylene, ug/L	<10	16	1,450	2,77[illegible]
Vinyl Chloride, ug/L	<10	<10	<10	<1[illegible]

3374-93

- Unless otherwise noted, analyses are in accordance with methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- Less than (<) values are indicative of the detection limit.

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/

ChesterLaboratories

A Division Of

The**Chester**Engineers

845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone (412) 262 1035

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 3/6/84
Report Date: 3/20/84

Source	Basin #2 Effluent	Basin #2 Influent From Main Storm Sewer At Diversion Chamber	Influent to Sedimentation Basin At Toe of Landfill	Surface Drainage Into Middle Of Basin #2
Log No. 84-	1416	1417	1418	1419
Date Collected	3/2/84	3/2/84	3/2/84	3/2/84
Acrolein, ug/L	<100	<100	<100	<100
Acrylonitrile, ug/L	<100	<100	<100	<100
Benzene, ug/L	<10	14	<10	<10
Bromoform, ug/L	<10	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10	<10
Chloroform, ug/L	<10	<10	<10	<10
Dichlorobromomethane, ug/L	<10	<10	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	<10	<10
1,2-Dichloroethane, ug/L	<10	109	<10	<10
1,1-Dichloroethylene, ug/L	<10	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
Ethylbenzene, ug/L	35	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10	<10
Methylene Chloride, ug/L	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10	<10
Tetrachloroethylene, ug/L	<10	<10	<10	<10
Toluene, ug/L	18	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	109	<10	<10
1,1,1-Trichloroethane, ug/L	<10	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10	<10	<10
Trichloroethylene, ug/L	39	558	17	<10
Vinyl Chloride, ug/L	<10	<10	<10	<10

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- "Less than" (<) values are indicative of the detection limit

ChesterLaboratories

A Division Of

TheChesterEngineers

845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone: (412) 262-1035

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Volatile Compounds

Samples Received: 3/12/84
Report Date: 4/18/84

Source	Basin #2 Water	Basin #2 Sediment
Log No. 84-	1550	1589
Date Collected	3/8/84	3/8/84
Acrolein, ug/L	<100	<100
Acrylonitrile, ug/L	<100	<100
Benzene, ug/L	<10	<10
Bromoform, ug/L	<10	<10
Carbon Tetrachloride, ug/L	<10	<10
Chlorobenzene, ug/L	<10	<10
Chlorodibromomethane, ug/L	<10	<10
Chloroethane, ug/L	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10
Chloroform, ug/L	97	<10
Dichlorobromomethane, ug/L	<10	<10
1,1-Dichloroethane, ug/L	<10	<10
1,2-Dichloroethane, ug/L	23	<10
1,1-Dichloroethylene, ug/L	<10	<10
1,2-Dichloropropane, ug/L	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10
Ethylbenzene, ug/L	46	<10
Methyl Bromide, ug/L	<10	<10
Methyl Chloride, ug/L	<10	<10
Methylene Chloride, ug/L	<10	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10
Tetrachloroethylene, ug/L	<10	<10
Toluene, ug/L	<10	35
1,2-Trans-Dichloroethylene, ug/L	22	<10
1,1,1-Trichloroethane, ug/L	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10
Trichloroethylene, ug/L	140	<10
Vinyl Chloride, ug/L	<10	<10

3274-93

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Pennsylvania 15225
Phone (412) 269-5700

Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Samples Received: 5/22/84
Report Date: 7/2/84

Monitoring Well Analyses

Source	Storm Sewer Grab	Well 1	Well 5	Well 6
Log No. 84-	3425	3426	3427	3428
Date Collected	5/14/84	5/15/84	5/15/84	5/15/84
pH	7.1	5.8	5.8	6.3
Specific Conductance, umhos/cm	180	128	165	160

Source	Well 26	Well 27	Well 28	Well 31
Log No. 84-	3429	3430	3431	3432
Date Collected	5/14/84	5/14/84	5/14/84	5/14/84
pH	5.5	6.4	6.1	5.2
Specific Conductance, umhos/cm	250	260	134	38

3276-93

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Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 5/22/84
Report Date: 7/2/84

Source	Storm Sewer Grab	Well 1	Well 5	Well 6
Log No. 84-	3425	3426	3427	3428
Date Collected	5/14/84	5/15/84	5/15/84	5/15/84
Acrolein, ug/L	<10	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10	<10
Benzene, ug/L	<10	<10	295	<10
Bromoform, ug/L	<10	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10	<10
Chloroform, ug/L	<10	<10	<10	<10
Dichlorobromomethane, ug/L	<10	< .0	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	<10	<10
1,2-Dichloroethane, ug/L	80	<10	75	1,830
1,1-Dichloroethylene, ug/L	<10	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
Ethylbenzene, ug/L	<10	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10	<10
Methylene Chloride, ug/L	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	82	240
Tetrachloroethylene, ug/L	<10	<10	91	270
Toluene, ug/L	<10	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/L	74	<10	68	1,660
1,1,1-Trichloroethane, ug/L	<10	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10	<10	<10
Trichloroethylene, ug/L	217	<10	441	1,100
Vinyl Chloride, ug/L	<10	<10	<10	<10

3276-93

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Laboratory Analysis Report For

Lockheed-Georgia Company
Marietta, Georgia

Volatile Compounds

Samples Received: 5/14/84
Report Date: 6/18/84

Source	Well #27 Before Bailing	Well #29	Well #30
Log No. 84-	3152	3153	3154
Date Collected	5/11/84	5/11/84	5/11/84
Acrolein, ug/L	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10
Benzene, ug/L	3,260	<10	<10
Bromoform, ug/L	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10
Chloroform, ug/L	12	14	<10
Dichlorobromomethane, ug/L	<10	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	<10
1,2-Dichloroethane, ug/L	<10	51	<10
1,1-Dichloroethylene, ug/L	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10
Ethylbenzene, ug/L	400	<10	21
Methyl Bromide, ug/L	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10
Methylene Chloride, ug/L	71	120	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10
Tetrachloroethylene, ug/L	<10	36	<10
Toluene, ug/L	2,240	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	33	12
1,1,1-Trichloroethane, ug/L	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10	<10
Trichloroethylene, ug/L	64	540	<10
Vinyl Chloride, ug/L	<10	<10	<10
pH	6.4	5.9	6.1
Specific Conductance, umhos/cm	220	84	70

3274-93

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Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 5/22/84
Report Date: 7/2/84

Source	Well 26	Well 27	Well 28	Well 31
Log No. 84-	3429	3430	3431	3432
Date Collected	5/14/84	5/14/84	5/14/84	5/14/84
Acrolein, ug/L	<10	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10	<10
Benzene, ug/L	<10	5,650	<10	<10
Bromoform, ug/L	<10	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10	<10
Chloroform, ug/L	45	<10	<10	<10
Dichlorobromomethane, ug/L	<10	<10	<10	<10
1,1-Dichloroethane, ug/L	52	<10	<10	<10
1,2-Dichloroethane, ug/L	2,800	<10	<10	<10
1,1-Dichloroethylene, ug/L	15	<10	<10	<10
1,2-Dichloropropane, ug/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10	<10
Ethylbenzene, ug/L	15	<10	<10	<10
Methyl Bromide, ug/L	<10	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10	<10
Methylene Chloride, ug/L	52	<10	650	53
1,1,2,2-Tetrachloroethane, ug/L	28	<10	<10	<10
Tetrachloroethylene, ug/L	35	<10	<10	<10
Toluene, ug/L	70	1,200	<10	<10
1,2-Trans-Dichloroethylene, ug/L	2,710	<10	<10	<10
1,1,1-Trichloroethane, ug/L	<10	<10	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10	<10	<10
Trichloroethylene, ug/L	336,000	11,400	950	<10
Vinyl Chloride, ug/L	<10	<10	<10	

3276-93

Q-403

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Chester Laboratories

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Pennsylvania 15225
Phone (412) 259-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 8/24/84
Report Date: 9/17/84

Source	Well 26
Log No. 84-	5636
Date Collected	8/21/84
Acrolein, ug/L	<10
Acrylonitrile, ug/L	<10
Benzene, ug/L	<10
Bromoform, ug/L	<10
Carbon Tetrachloride, ug/L	<10
Chlorobenzene, ug/L	<10
Chlorodibromomethane, ug/L	<10
Chloroethane, ug/L	<10
2-Chloroethylvinyl Ether, ug/L	<10
Chloroform, ug/L	38
Dichlorobromomethane, ug/L	<10
1,1-Dichloroethane, ug/L	27
1,2-Dichloroethane, ug/L	2,270
1,1-Dichloroethylene, ug/L	<10
1,2-Dichloropropane, ug/L	<10
cis-1,3-Dichloropropene, ug/L	<10
trans-1,3-Dichloropropene, ug/L	<10
Ethylbenzene, ug/L	12
Methyl Bromide, ug/L	<10
Methyl Chloride, ug/L	<10
Methylene Chloride, ug/L	<10
1,1,2,2-Tetrachloroethane, ug/L	26
Tetrachloroethylene, ug/L	22
Toluene, ug/L	25
1,2-Trans-Dichloroethylene, ug/L	2,490
1,1,1-Trichloroethane, ug/L	<10
1,1,2-Trichloroethane, ug/L	<10
Trichloroethylene, ug/L	511,900
Vinyl Chloride, ug/L	<10

1276-98

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2.8 POSITION 65--C-5 WASH RACK PONDS--SITE G7, ZONE 5

APPENDIX D

C-5 WASH RACK

ESE
P. O. Box ESE
GAINESVILLE, FL 32602
(904) 332-3318

JOB ______
SHEET NO ______ OF ______
CALCULATED BY ______ DATE ______
CHECKED BY ______ DATE ______
SCALE ______

C-5 Wash Rack

Monitoring Wells

mw 14

mw 15

~~mw 16~~

Upper Basin water Sample

Lower Basin water Sample
mw 47
mw 46
mw 45
mw 44

mw 43

mw 32

mw 33

mw 34

JOB

SHEET NO OF

ESE
P. O. Box ESE
GAINESVILLE, FL 32602
(904) 332-3318

CALCULATED BY DATE

CHECKED BY DATE

SCALE

Site 67 C-5 Wash Rack Ponds

Scope of Work (Chesten Engineers)
Site Reconnaissance Survey

1) Comprehensive Sampling of the ponds and nearby wells
   a) RCRA Groundwater Indicators
   b) Standard Water Quality / Drinking Parameters
   - MW 14, 15
   - Wash Rack Effluent
   - Main Storm Sewer Stream Drainage
   - Lower + upper Basin Sediment Samples
     a) EP Toxicity
     b) Volatile Organics
     c) Standard RCRA Parameters
   - Soil Sample from Bank of Lower Pond

2) Installation of additional monitoring wells
   - MW-32
   - MW-33
   - MW-34

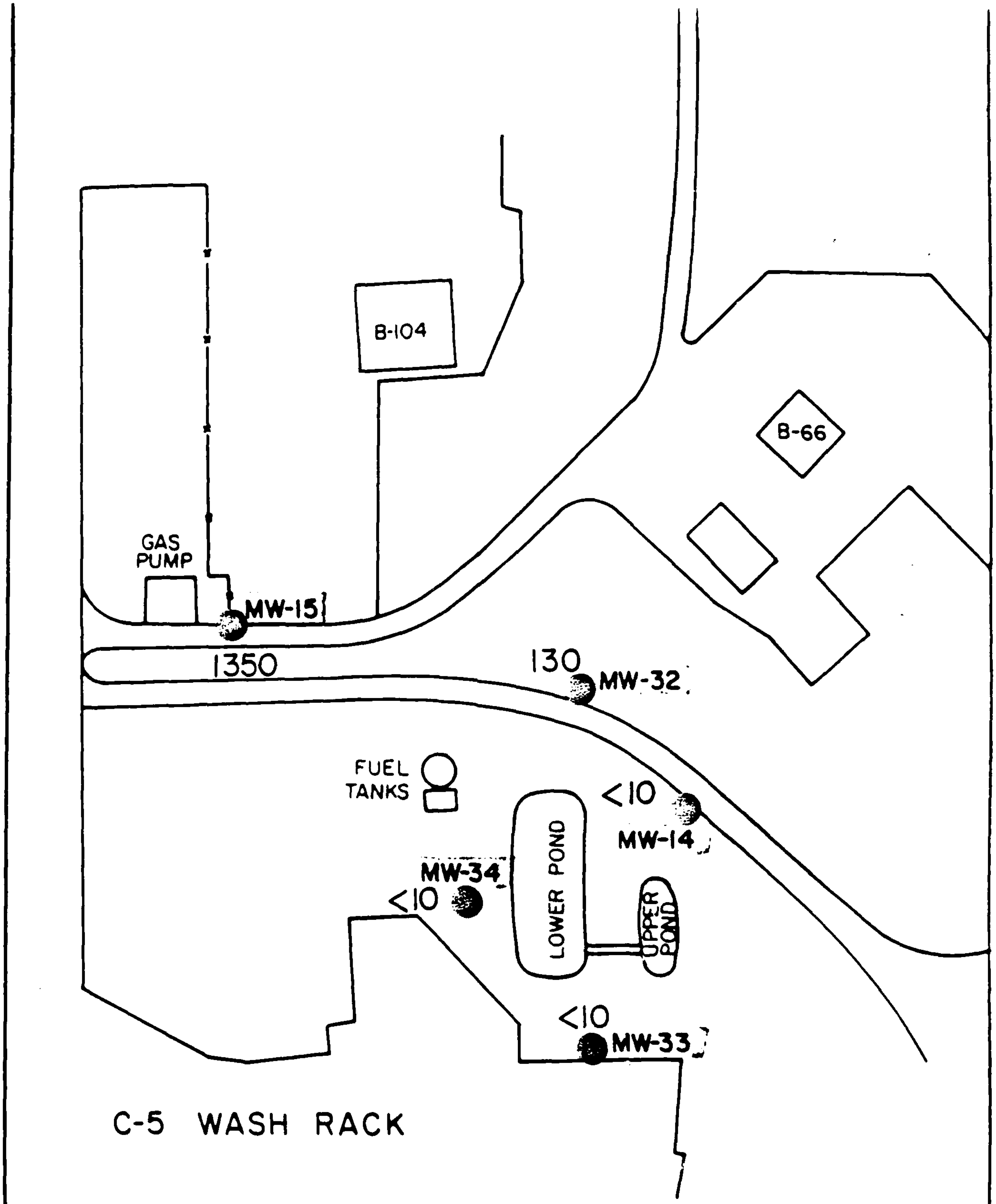
3) Permeability Testing

4) Groundwater Flow Pattern

5) Contaminant Migration Rate and Extent

6) Regulatory Status

7) Recommended Groundwater Monitoring Program.



The Chester Engineers	SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6
DWN.BY: SCALE: DATE	DWG. NO.	TOLUENE ug/L
CHK'D.BY: APPR.BY:	FIGURE V-5	MAY 10, 1984

OF TRICHLOROETHYLENE CONTAMINATION (ug/l)

TE	MW-5	MW-6	BASIN-2 INFLUENT	BASIN-2 EFFLUENT
-83			792.0	509.0
-83			581.0	17.6
-83	1,140.0		430.0	16.2
-83		26.5		
-83	771.0	10,000.0	263.0	<1.9
-83	1,035.0	2,100.0		4.5
-83	7,622.0	6,960.0		
-83	3,190.0	156,000.0	1,040.0	<1.9
-83		10,300.0	226.0	1.9
-83	2,045.0	5,195.0	109.0	1.9
-83	705.0	7,720.0	215.0	11.1
-83	606.0	4,120.0	245.0	16.3
-83	132.0	5,810.0	876.0	20.6
-83	95.0	6,230.0	181.0	22.8
-83	81.6	6,910.0	480.0	43.9
-83			366.0	24.0
-84	1,020.0	3,980.0	634.0	27.2
-84			27,000.0	3,580.0
-84			520.0	35.3
-84	1,450.0	2,770.0	558.0	39.0
-84	441.0	1,100.0	217.0	

LL AREA MONITOR WELLS DATA (INCLUDES UNDATED DATA)

OR L	DATE	TRICHLORO ETHYLENE (ug/l)	BENZENE (ug/l)	ETHYL BENZENE (ug/l)	TOLUENE (ug/l)	pH	SPECIFIC CONDUCTANCE (uMHO/cm)	1,2-DICHLORO ETHANE (ug/l)	METHYLENE CHLORIDE (ug/l)
1	19-May-83	---	---	---	---	5.8	128	---	---
	?	<10	<10	---	<10	---	---	<10	<10
5	19-May-83	---	---	---	---	5.8	165	---	---
	?	441.0	295.0	---	400.0	---	---	75	<10
6	03-May-83	26.5	10.7	---	13.1	---	---	---	---
	19-May-83	---	---	---	---	6.3	160	---	---
	14-Jun-83	5,195.0	8.5	42.5	12.6	---	---	---	---
	?	1,100.0	<10	---	<10	---	---	183	<10
6	19-May-83	---	---	---	---	5.5	250	---	---
	?	335,638.0	<10	---	70.0	---	---	2200	52
7	19-May-83	---	---	---	---	6.4	260	---	---
	?	11,400.0	5,650.0	---	1,200.0	---	---	<10	<10
8	19-May-83	---	---	---	---	6.1	134	---	---
	?	950.0	<10	---	<10	---	---	<10	650
9	19-May-83	---	---	---	---	5.9	84	---	---
	?	540.0	<10	---	<10	---	---	51	120
0	19-May-83	---	---	---	---	6.1	70	---	---
	?	<10	<10	---	<10	---	---	<10	<10
1	19-May-83	---	---	---	---	5.2	38	---	---
	?	<10	<10	---	<10	---	---	<10	53

ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.
P. O. Box ESE
GAINESVILLE, FLORIDA 32602-3053
(904) 332-3318 TWX 810-825-6310

SHEET NO. ____ OF ____
CALCULATED BY ____ DATE ____
CHECKED BY ____ DATE ____
SCALE ____

Table 4.3.6-3

TCE Spill Area

Monitoring Well Identification Summary

Monitoring Well	Location
MW-1	B-30
MW-2	South B-3 (upgradient)
MW-5	B-65
MW 6	B-8
MW 26	B-76 (TCE storage tank)
MW 27	B-30
MW 28	T-56
MW 29	Basin No 2
MW 30	Basin No. 2
MW 31	Existing Landfill
GS-5	Existing Landfill
[illegible]	Basin No. 2

ESE
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GAINESVILLE, FL 32602
(904) 332-3318

Summary Table 4.3.6-1

TCE Spill Area

		Well Identification	
Groundwater Parameters	Units	Existing Landfill GS-5	Stormwater Basin No. 2 GS-6
Oil and grease	mg/l	2	<0.7
TOC	mg/l	3.0	3.2
TOX	ug/l	5800	530
pH	units	4.3	4.9
Specific Conductivity	umhos/cm	33.0	4.9

Source ESE, 1985

ChesterLaboratories

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The Chester Engineers

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 3/12/84
Report Date: 4/18/84

Source	Well #14 Flight Line	Well #15 Flight Line	Well #16 Flight Line	C-5 Wash Rack Upper Basin Water	L B W
Log No. 84-	1564	1565	1566	1585	
Date Collected	3/9/84	3/9/84	3/9/84	3/8/84	3/
pH	6.0	5.8	5.6	6.5	
Specific Conductance, umhos/cm	26	53	39	110	
Total Organic Halogens, ug/L Cl	25	33	38	75	
Total Organic Carbon, mg/L C	<1	1	8	16	
Chlorides, mg/L Cl	1	2	7	3	
Sulfate, mg/L SO_4	4	<2	5	6	
Fluoride, mg/L F	0.29	0.09	0.48	0.62	
Nitrates, mg/L N	0.32	0.70	0.75	0.03	
Phenols, mg/L PhOH	0.007	0.025	0.019	0.007	C
Iron, mg/L Fe	0.55	1.2	12	0.71	
Manganese, mg/L Mn	0.25	0.42	0.98	0.06	
Sodium, mg/L Na	1.2	4.2	3.5	5	
Arsenic, mg/L As	0.002	0.001	0.002	0.001	<C
Barium, mg/L Ba	<0.1	0.1	<0.1	<0.1	
Cadmium, mg/L Cd	<0.01	0.01	0.01	0.01	
Chromium, mg/L Cr	<0.005	<0.005	0.01	0.04	
Lead, mg/L Pb	<0.01	0.01	0.09	0.03	
Mercury, mg/L Hg	<0.001	<0.001	<0.002	<0.001	<C
Selenium, mg/L Se	<0.001	<0.001	<0.001	<0.001	
Silver, mg/L Ag	<0.01	<0.01	<0.01	<0.01	

3276-93

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- "Less-than" (<) values are indicative of the detection limit.

ChesterLaboratories

A Division Of

The Chester Engineers
845 Fourth Avenue
Coraopolis
Pennsylvania 15108
Phone (412) 262 1035

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 3/6/84
Report Date: 3/20/84

Source	Well #14	Well #15
Log No. 84-	1413	1414
Date Collected	3/2/84	3/2/84
Acrolein, µg/L	<100	<100
Acrylonitrile, µg/L	<100	<100
Benzene, µg/L	<10	1,500
Bromoform, µg/L	<10	<10
Carbon Tetrachloride, µg/L	<10	<10
Chlorobenzene, µg/L	<10	<10
Chlorodibromomethane, µg/L	<10	<10
Chloroethane, µg/L	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10
Chloroform, µg/L	<10	<10
Dichlorobromomethane, µg/L	<10	<10
1,1-Dichloroethane, µg/L	<10	<10
1,2-Dichloroethane, µg/L	<10	84
1,1-Dichloroethylene, µg/L	<10	<10
1,2-Dichloropropane, µg/L	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10
Ethylbenzene, µg/L	<10	11
Methyl Bromide, µg/L	<10	<10
Methyl Chloride, µg/L	<10	<10
Methylene Chloride, µg/L	<10	<10
1,1,2,2-Tetrachloroethane, µg/L	<10	<10
Tetrachloroethylene, µg/L	<10	<10
Toluene, µg/L	<10	1,350
1,2-Trans-Dichloroethylene, µg/L	<10	81
1,1,1-Trichloroethane, µg/L	<10	<10
1,1,2-Trichloroethane, µg/L	<10	<10
Trichloroethylene, µg/L	<10	37
Vinyl Chloride, µg/L	<10	<10

5276-95

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845 Fourth Avenue
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Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Samples Received: 3/12/84
Report Date: 4/18/84

Analyses

Source	C-5 Wash Rack Upper Basin Sediment	C-5 Wash Rack Lower Basin Sediment
Log No. 84-	1586	1588
Date Collected	3/8/84	3/8/84
pH	7.2	6.6
Freon Extractables, wt %	2.88	6.98
EP Toxicity Test:		
pH	5.0	4.9
Arsenic, mg/L As	0.032	0.017
Barium, mg/L Ba	<0.1	0.2
Cadmium, mg/L Cd	0.02	0.01
Chromium, mg/L Cr	0.77	0.25
Lead, mg/L Pb	0.06	0.04
Mercury, mg/L Hg	<0.002	<0.002
Silver, mg/L Ag	<0.01	<0.01
Selenium, mg/L Se	0.019	0.022
Water Extract (ASTM Method A)		
pH	7.2	6.7
Specific Conductance, umhos/cm	640	375
Total Organic Halogens, ug/L Cl	1,384	651
Total Organic Carbon, mg/L C		
Chlorides, mg/L Cl	4	5
Sulfates, mg/L SO_4	8	9
Fluorides, mg/L F	1.5	0.66
Nitrates, mg/L N	0.03	0.03
Phenols, mg/L PhOH	0.36	0.059
Iron, mg/L Fe	6.1	1.3
Manganese, mg/L Mn	0.10	0.04
Sodium, mg/L Na	4.5	1.8
Arsenic, mg/L As	0.009	0.007
Barium, mg/L Ba	0.2	0.1

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LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Water Extract (ASTM Method A) Analyses
(Continued)

Source	C-5 Wash Rack Upper Basin Sediment	C-5 Wash Rack Lower Basin Sediment
Log No. 84-	1586	1588
Date Collected	3/8/84	3/8/84
Cadmium, mg/L Cd	0.10	0.01
Chromium, mg/L Cr	2.4	0.20
Lead, mg/L Pb	0.28	0.04
Mercury, mg/L Hg	<0.002	<0.002
Selenium, mg/L Se	0.002	<0.001
Silver, mg/L Ag	<0.01	<0.01
Acrolein, µg/L	<10	<10
Acrylonitrile, µg/L	<10	<10
Benzene, µg/L	<10	15
Bromoform, µg/L	<10	<10
Carbon Tetrachloride, µg/L	<10	<10
Chlorobenzene, µg/L	<10	<10
Chlorodibromomethane, µg/L	<10	<10
Chloroethane, µg/L	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10
Chloroform, µg/L	<10	16
Dichlorobromomethane, µg/L	<10	<10
1,1-Dichloroethane, µg/L	<10	<10
1,2-Dichloroethane, µg/L	<10	<10
1,1-Dichloroethylene, µg/L	<10	<10
1,2-Dichloropropane, µg/L	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10
Ethylbenzene, µg/L	<10	17
Methyl Bromide, µg/L	<10	<10
Methyl Chloride, µg/L	<10	<10
Methylene Chloride, µg/L	474	595
1,1,2,2-Tetrachloroethane, µg/L	<10	<10
Tetrachloroethylene, µg/L	<10	<10
Toluene, µg/L	31	<10
1,2-Trans-Dichloroethylene, µg/L	<10	<10
1,1,1-Trichloroethane, µg/L	<10	16
1,1,2-Trichloroethane, µg/L	<10	<10
Trichloroethylene, µg/L	<10	<10
Vinyl Chloride, µg/L	<10	<10

[illegible]

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845 Fourth Avenue
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Phone (412) 262 1035

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 3/6/84
Report Date: 3/20/84

Source	C-5 Wash Rack-Influent to Upper Pond	C-5 Wash Rack Upper Pond	C-5 Wash Rack Lower Pond	Stream Behind C-6 Wash Rack At Dobbins Fence
Log No. 84-	1420	1421	1422	1423
Date Collected	3/6/84	3/6/84	3/6/84	3/6/84
Acrolein, µg/L	<100	<100	<100	<100
Acrylonitrile, µg/L	<100	<100	<100	<100
Benzene, µg/L	<10	<10	<10	<10
Bromoform, µg/L	<10	<10	<10	<10
Carbon Tetrachloride, µg/L	38	<10	79	<10
Chlorobenzene, µg/L	<10	<10	<10	<10
Chlorodibromomethane, µg/L	<10	<10	<10	<10
Chloroethane, µg/L	<10	<10	<10	<10
2-Chloroethylvinyl Ether, µg/L	73	<10	<10	<10
Chloroform, µg/L	<10	<10	<10	<10
Dichlorobromomethane, µg/L	<10	<10	<10	<10
1,1-Dichloroethane, µg/L	28	<10	25	<10
1,2-Dichloroethane, µg/L	<10	<10	<10	<10
1,1-Dichloroethylene, µg/L	<10	<10	<10	<10
1,2-Dichloropropane, µg/L	<10	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10	<10	<10
Ethylbenzene, µg/L	<10	10	19	<10
Methyl Bromide, µg/L	<10	<10	<10	<10
Methyl Chloride, µg/L	<10	<10	<10	<10
Methylene Chloride, µg/L	142	91	75,000	<10
1,1,2,2-Tetrachloroethane, µg/L	92	15	274	<10
Tetrachloroethylene, µg/L	<10	<10	<10	<10
Toluene, µg/L	<10	<10	53	<10
1,2-Trans-Dichloroethylene, µg/L	<10	11	<10	<10
1,1,1-Trichloroethane, µg/L	310	55	636	<10
1,1,2-Trichloroethane, µg/L	<10	<10	<10	<10
Trichloroethylene, µg/L	28	96	95	<10
Vinyl Chloride, µg/L	<10	<10	<10	<10

3274-93

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845 Fourth Avenue
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Phone (412) 262 1035

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds*

Samples Received: 3/6/84
Report Date: 3/20/84

Source	C-5 Wash Rack Lower Pond Soil 0-6" deep between Static and High Water Mark
Log No. 84-	1424
Date Collected	3/2/84
Acrolein, ppb	<100
Acrylonitrile, ppb	<100
Benzene, ppb	<10
Bromoform, ppb	<10
Carbon Tetrachloride, ppb	<10
Chlorobenzene, ppb	<10
Chlorodibromomethane, ppb	<10
Chloroethane, ppb	<10
2-Chloroethylvinyl Ether, ppb	<10
Dichlorobromomethane, ppb	<10
1,1-Dichloroethane, ppb	64
1,2-Dichloroethane, ppb	<10
1,1-Dichloroethylene, ppb	<10
1,2-Dichloropropane, ppb	<10
cis-1,3-Dichloropropene, ppb	<10
trans-1,3-Dichloropropene, ppb	<10
Ethylbenzene, ppb	<10
Methyl Bromide, ppb	<10
Methyl Chloride, ppb	<10

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LABORATORY ANALYSIS REPORT
FOR

Lockheed Corporation
Marietta, Georgia

Volatile Compounds
(Continued)

Source	C-5 Wash Rack Lower Pond Soil 0-6" deep between Static and High Water Mark
Log No. 84-	1424
Date Collected	3/2/84
Methylene Chloride, ppb	7,240
1,1,2,2-Tetrachloroethane, ppb	<10
Tetrachloroethylene, ppb	<10
Toluene, ppb	394
1,2-Trans-Dichloroethylene, ppb	<10
1,1,1-Trichloroethane, ppb	104
1,1,2-Trichloroethane, ppb	<10
Trichloroethylene, ppb	<10
Vinyl Chloride, ppb	<10

3276-93

BORING NO. MW-33

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

Top of Casing 1018.33

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia GROUND ELEVATION 1015.21

FEATURE C-5 wash rack area

DATE STARTED 4/26/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 19.9 24 HRS 7.7

DATE COMPLETED 4/26/84 SAMP. SIZE 2 Inch O.D. WEIGHT OF HAMMER 140 Lb FALL 30 Inch

WEATHER Sunny, Warm CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-4.0	Silt, some sand, some clay, little gravel	Reddish Brown	Moist	Stiff							
4.0-24.0	Silt, some clay, some sand, trace gravel	Grayish Brown	Moist Wet at 19.0'	Stiff	3-4-6 4-3-7 3-3-6 3-5-7		S-1 S-2 S-3 S-4	4.0-5.5 9.0-10.5 14.0-15.5 19.0-20.5			
24.0-35.0	Silt, some clay, some sand, (weathered granite)	Grayish Brown	Wet	Stiff	2-4-6 2-3-4		S-5 S-6	24.0-25.5 29.0-30.5			
	Bottom of Hole 35.0' *Well screen set from 35.0' to 30.0'										

Q-420

BORING NO. MW-34

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

Top of Casing 1017.04

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia GROUND ELEVATION 1014.26

FEATURE C-5 wash rack area

DATE STARTED 4/26/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 16.3 24 HRS 12.5

DATE COMPLETED 4/26/84 SAMP. SIZE 2 Inch O.D. WEIGHT OF HAMMER 140 Lb FALL 30 Inch

WEATHER Sunny, Warm CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CON-SISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-14.5	Silt, some sand, little clay	Pinkish Brown	Moist	Medium	3-5-7 3-3-5		S-1 S-2	4.0-5.5 9.0-10.5			
14.5-30.5	Silt, some sand, some clay, little gravel (weathered granite)	Whitish Brown	Moist Wet at 20.0'	Very Stiff	3-7-13 3-9-7 3-7-8 8-7-8		S-3 S-4 S-5 S-6	14.0-15.5 19.0-20.5 24.0-25.5 29.0-30.5			
Q-421	Bottom of Hole 30.5' *Well screen set from 30.5' to 25.5'										

[illegible] number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches

2.9 POSITION 19--FUEL/DEFUEL STATION--SITE G16, ZONE 5

APPENDIX E

POSITION 19

ESE
P. O. Box ESE
GAINESVILLE, FL 32602
(904) 332-3318

JOB
SHEET NO OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Site No G 14 Flight Line Position 19

Previous Scope of Work (Chester Engineers)

Site Reconnaissance Survey

1) Initial Site Inspection

2) Preliminary Well Sampling (MW-18, 17, 16)
   a) Oil and Grease
   b) pH
   c) Conductivity

3) Groundwater Quality Sampling Survey MW18, 37, 38, 16,
   a) TOX
   b) Phenol
   c) Priority Pollutant Volatile Fraction
   d) Oil + Grease

4) Contaminant Migration Rate and Extent

5) Compiled Recommended Groundwater Monitoring Plan

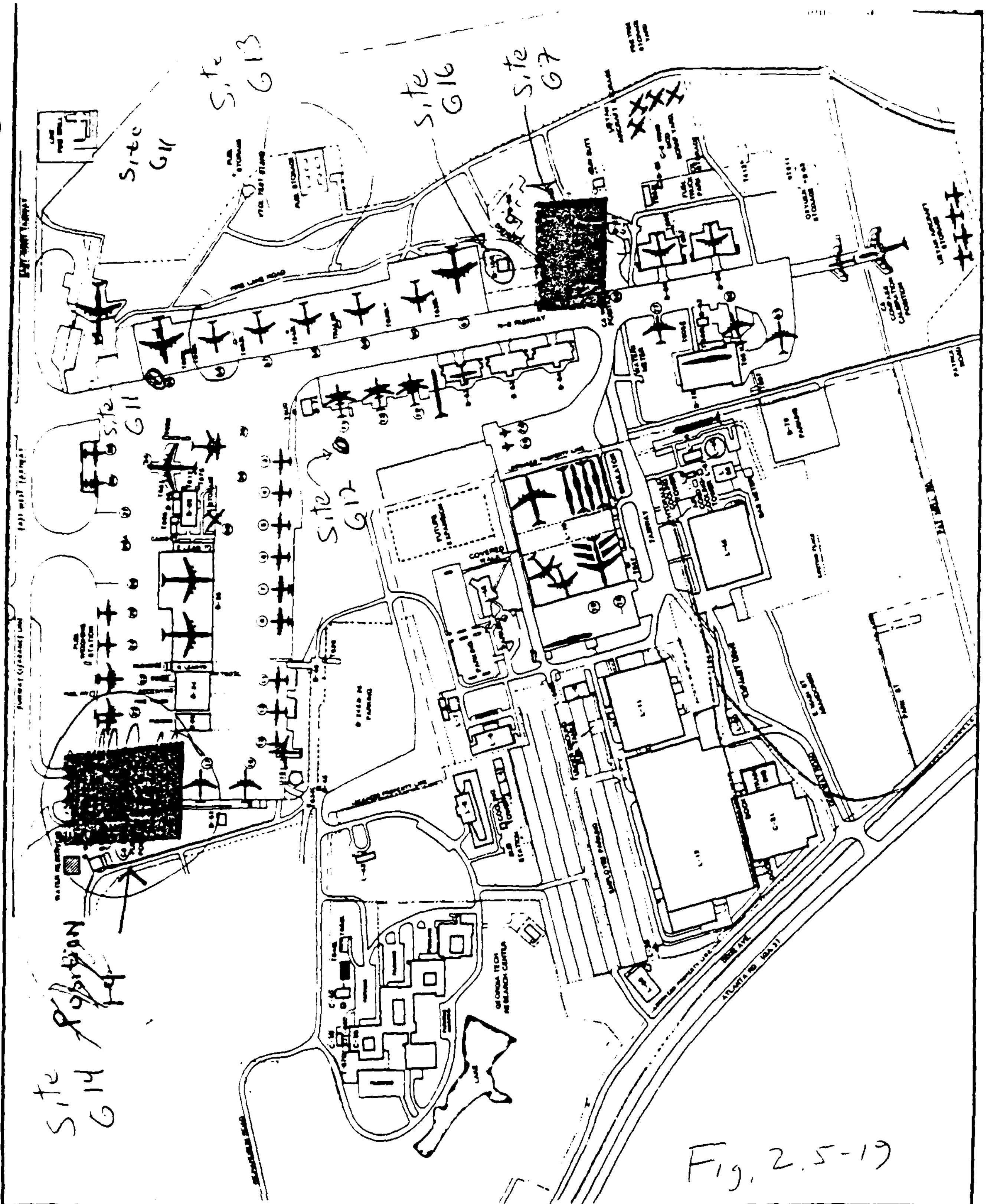
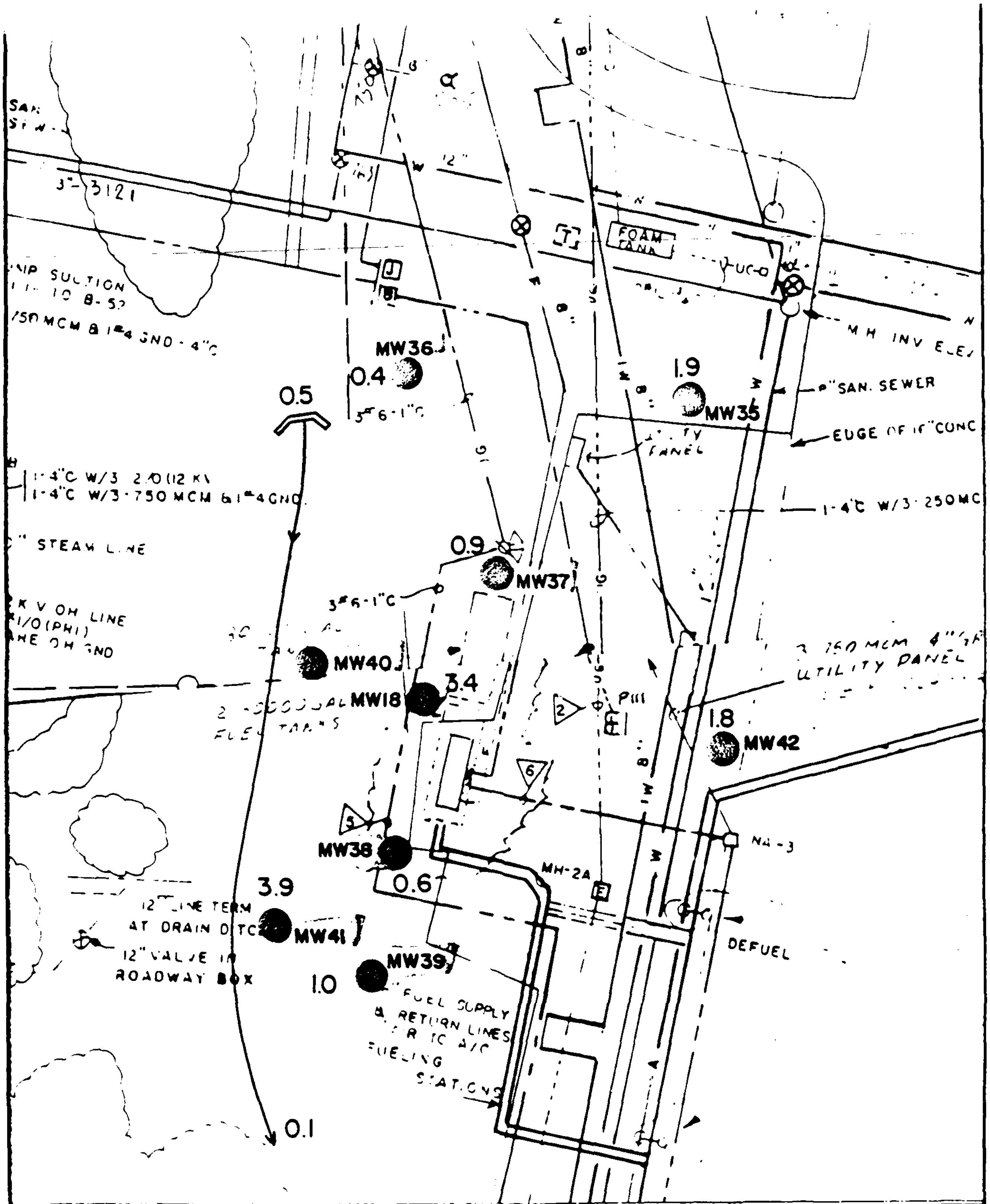


Fig. 2.5-19

TheChesterEngineers			SHEET NO.	LOCKHEED-GEORGIA COMPANY
			DWG. NO.	AIR FORCE PLANT 6
DWN.BY:	SCALE:	DATE		Site G14
CHK'D.BY:	APPR.BY:		FIGURE II-4	Q-425 ~~PROJECT LOCATIONS IN THE FLIGHT LINE AREA~~



TheChesterEngineers		SHEET NO.	LOCKHEED-GEORGIA COMPANY AIR FORCE PLANT 6
		DWG. NO.	
DWN.BY:	SCALE:	DATE	Q-426 POSITION 19
CHK'D.BY:	APPR.BY:	FIGURE VI-3	OIL AND GREASE mg/L

Site G-14

TABLE VI-1

SUMMARY OF POSITION 19 VOLATILE ORGANICS

SOURCE	WELL 16	WELL 18	WELL 37	WELL 38		DRAINAGEWAY WELL 39	WELL 42	DOWNSTREAM
	5/16/84	5/16/84	5/19/84	5/21/84	8/21/84	8/21/84	8/21/84	5/16/84
LOG 84-	3433	3423	3439	3424	5637	5638	5639	3436
1,1-Dichloroethane, ug/L	<10	<10	<10	26	<10	<10	165	<10
1,2-Dichloroethane, ug/L	<10	<10	<10	31	<10	75	148	16
1,1-Dichloroethylene, ug/L	<10	<10	<10	<10	61	26	<10	<10
Ethylbenzene, ug/L	<10	<10	<10	20	75	37	33	<10
Methylene Chloride, ug/L	21	<10	<10	37	<10	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	<10	<10	15	<10	62	<10	10
1,1,1-Trichloroethane, ug/L	<10	<10	<10	167	271	866	553	<10
Trichloroethylene, ug/L	<10	<10	<10	<10	360	500	196	26

Q-427

Chester Laboratories
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Phone (412) 268-5700

Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Samples Received: 5/22/84
Report Date: 7/2/84

Monitoring Well Analyses

Source	Well 18	Well 38
Log No. 84-	3423	3424
Date Collected	5/16/84	5/21/84
pH	6.2	6.8
Specific Conductance, umhos/cm	114	146
Total Organic Halogens, ug/L Cl	63	100
Total Organic Carbon, mg/L C	76	9
Freon Extractables, mg/L	3.4	0.6
Arsenic, mg/L As	<0.001	<0.001
Barium, mg/L Ba	<0.05	0.17
Cadmium, mg/L Cd	<0.005	<0.005
Chromium, mg/L Cr	<0.005	0.007
Lead, mg/L Pb	<0.005	0.013
Mercury, mg/L Hg	<0.001	<0.001
Selenium, mg/L Se	<0.001	<0.001
Silver, mg/L Ag	<0.01	<0.01
Iron, mg/L Fe	16	6.0
Manganese, mg/L Mn	9.8	0.44
Sodium, mg/L Na	1	8
Chlorides, mg/L Cl	6	28
Sulfates, mg/L SO_4	8	11
Fluorides, mg/L F	0.33	1.2
Phenols, mg/L PhOH	0.023	0.020
Nitrates, mg/L N	0.14	0.58
Radium 226, pCi/L	0.2	2.3
Gross Alpha, pCi/L	1.6	5.0
Gross Beta, pCi/L	32	28
Turbidity, NTU	60	56
Total Coliform, No./100 mL	<1	<1
Endrin, ug/L	<0.01	<0.01
Lindane, ug/L	<0.01	<0.01
Methoxychlor, ug/L	<0.1	<0.1
Toxaphene, ug/L	<0.5	<0.5
2,4-D, ug/L	<1	<1
2,4,5-TP Silvex, ug/L	<1	<1

3276-93

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Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Volatile Compounds

Samples Received: 5/22/84
Report Date: 7/2/84

Source	Well 18	Well 38
Log No. 84-	3423	3424
Date Collected	5/16/84	5/21/84
Acrolein, ug/L	<10	<10
Acrylonitrile, ug/L	<10	<10
Benzene, ug/L	<10	<10
Bromoform, ug/L	<10	<10
Carbon Tetrachloride, ug/L	<10	<10
Chlorobenzene, ug/L	<10	<10
Chlorodibromomethane, ug/L	<10	<10
Chloroethane, ug/L	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10
Chloroform, ug/L	<10	<10
Dichlorobromomethane, ug/L	<10	<10
1,1-Dichloroethane, ug/L	<10	<10
1,2-Dichloroethane, ug/L	<10	26
1,1-Dichloroethylene, ug/L	<10	31
1,2-Dichloropropane, ug/L	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10
Ethylbenzene, ug/L	<10	20
Methyl Bromide, ug/L	<10	<10
Methyl Chloride, ug/L	<10	<10
Methylene Chloride, ug/L	<10	37
1,1,2,2-Tetrachloroethane, ug/L	<10	<10
Tetrachloroethylene, ug/L	<10	<10
Toluene, ug/L	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	15
1,1,1-Trichloroethane, ug/L	<10	167
1,1,2-Trichloroethane, ug/L	<10	<10
Trichloroethylene, ug/L	<10	<10
Vinyl Chloride, ug/L	<10	<10

3276-95

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Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Samples Received: 5/22/84
Report Date: 7/2/84

Volatile Compounds

Source	Well 16	Position 19 Downstream
Log No. 84-	3433	3436
Date Collected	5/16/84	5/16/84
Acrolein, ug/L	<10	<10
Acrylonitrile, ug/L	<10	<10
Benzene, ug/L	<10	<10
Bromoform, ug/L	<10	<10
Carbon Tetrachloride, ug/L	<10	<10
Chlorobenzene, ug/L	<10	<10
Chlorodibromomethane, ug/L	<10	<10
Chloroethane, ug/L	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10
Chloroform, ug/L	<10	<10
Dichlorobromomethane, ug/L	<10	<10
1,1-Dichloroethane, ug/L	<10	<10
1,2-Dichloroethane, ug/L	<10	16
1,1-Dichloroethylene, ug/L	<10	<10
1,2-Dichloropropane, ug/L	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10
Ethylbenzene, ug/L	<10	<10
Methyl Bromide, ug/L	<10	<10
Methyl Chloride, ug/L	<10	<10
Methylene Chloride, ug/L	21	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10
Tetrachloroethylene, ug/L	<10	<10
Toluene, ug/L	<10	<10
1,2-Trans-Dichloroethylene, ug/L	<10	10
1,1,1-Trichloroethane, ug/L	<10	<10
1,1,2-Trichloroethane, ug/L	<10	<10
Trichloroethylene, ug/L	<10	26
Vinyl Chloride, ug/L	<10	<10

3276-93

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- [illegible]

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Phone (412) 269-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Samples Received: 5/22/84
Report Date: 7/2/84

Volatile Compounds

Source	Well 37
Log No. 84-	3439
Date Collected	5/19/84
Acrolein, µg/L	<10
Acrylonitrile, µg/L	<10
Benzene, µg/L	<10
Bromoform, µg/L	<10
Carbon Tetrachloride, µg/L	<10
Chlorobenzene, µg/L	<10
Chlorodibromomethane, µg/L	<10
Chloroethane, µg/L	<10
2-Chloroethylvinyl Ether, µg/L	<10
Chloroform, µg/L	16
Dichlorobromomethane, µg/L	<10
1,1-Dichloroethane, µg/L	<10
1,2-Dichloroethane, µg/L	<10
1,1-Dichloroethylene, µg/L	<10
1,2-Dichloropropane, µg/L	<10
cis-1,3-Dichloropropene, µg/L	<10
trans-1,3-Dichloropropene, µg/L	<10
Ethylbenzene, µg/L	<10
Methyl Bromide, µg/L	<10
Methyl Chloride, µg/L	<10
Methylene Chloride, µg/L	<10
1,1,2,2-Tetrachloroethane, µg/L	<10
Tetrachloroethylene, µg/L	<10
Toluene, µg/L	<10
1,2-Trans-Dichloroethylene, µg/L	<10
1,1,1-Trichloroethane, µg/L	<10
1,1,2-Trichloroethane, µg/L	<10
Trichloroethylene, µg/L	<10
Vinyl Chloride, µg/L	<10

3274-93

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less-than" (<) values are indicative of the detection limit.

Q-431

Chester Laboratories
A Division Of
The Chester Engineers
P.O. Box 9356
Pittsburgh
Pennsylvania 15225
Phone (412) 269-5700

Laboratory Analysis Report
For

Lockheed Corporation
Marietta, Georgia

Samples Received: 8/24/84
Report Date: 9/17/84

Volatile Compounds

Source	Well 38	Well 39	Well 42
Log No. 84-	5637	5638	5639
Date Collected	8/21/84	8/21/84	8/21/84
Acrolein, ug/L	<10	<10	<10
Acrylonitrile, ug/L	<10	<10	<10
Benzene, ug/L	<10	<10	<10
Bromoform, ug/L	<10	<10	<10
Carbon Tetrachloride, ug/L	<10	<10	<10
Chlorobenzene, ug/L	<10	<10	<10
Chlorodibromomethane, ug/L	<10	<10	<10
Chloroethane, ug/L	<10	<10	<10
2-Chloroethylvinyl Ether, ug/L	<10	<10	<10
Chloroform, ug/L	<10	<10	<10
Dichlorobromomethane, ug/L	<10	<10	<10
1,1-Dichloroethane, ug/L	<10	<10	165
1,2-Dichloroethane, ug/L	<10	75	148
1,1-Dichloroethylene, ug/L	61	26	<10
1,2-Dichloropropane, ug/L	<10	<10	<10
cis-1,3-Dichloropropene, ug/L	<10	<10	<10
trans-1,3-Dichloropropene, ug/L	<10	<10	<10
Ethylbenzene, ug/L	75	37	33
Methyl Bromide, ug/L	<10	<10	<10
Methyl Chloride, ug/L	<10	<10	<10
Methylene Chloride, ug/L	<10	<10	<10
1,1,2,2-Tetrachloroethane, ug/L	<10	<10	<10
Tetrachloroethylene, ug/L	<10	<10	<10
Toluene, ug/L	<10	<10	<10
1,2-Trans-Dichloroethylene, ug/l	<10	62	<10
1,1,1-Trichloroethane, ug/L	271	866	553
1,1,2-Trichloroethane, ug/L	<10	<10	<10
Trichloroethylene, ug/L	360	500	196
Vinyl Chloride, ug/L	<10	<10	<10

3276-98

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol
- "Less than" (<) values are indicative of the detection limit

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Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 5/14/84
Report Date: 6/18/84

Source	Well #32	Well #33	Well #34
Log No. 84-	3149	3150	3151
Date Collected	5/10/84	5/10/84	5/10/84
Arsenic, mg/L As	<0.001	<0.001	<0.001
Barium, mg/L Ba	0.02	0.02	0.05
Cadmium, mg/L Cd	<0.003	<0.003	<0.003
Chromium, mg/L Cr	<0.003	<0.003	<0.003
Lead, mg/L Pb	0.005	<0.003	0.008
Mercury, mg/L Hg	<0.001	<0.001	<0.001
Selenium, mg/L Se	<0.001	<0.001	<0.001
Silver, mg/L Ag	<0.003	<0.003	<0.003
Iron, mg/L Fe	0.67	0.35	0.88
Manganese, mg/L Mn	0.46	0.08	0.33
Sodium, mg/L Na	0.82	0.86	0.99
Chlorides, mg/L Cl	5	4	3
Sulfates, mg/L SO_4	9	6	7
Fluorides, mg/L F	<0.02	<0.02	0.04
Phenols, mg/L PhOH	0.01	0.007	0.01
Nitrates, mg/L N	0.25	1.7	0.36
Radium 226, pCi/L	0.04	0.15	0.04
Gross Alpha, pCi/L	0.8	0.7	0.6
Gross Beta, pCi/L	0	0	0
Turbidity, NTU	14	5	17
Total Coliforms, No./100 mL	<1	<1	<1
Endrin, ug/L	<0.01	<0.01	<0.01
Lindane, ug/L	<0.01	<0.01	<0.01
Methoxychlor, ug/L	<0.1	<0.1	<0.1
Toxaphene, ug/L	<0.5	<0.5	<0.5
2,4-D, ug/L	<1	<1	<1
2,4,5-TP Silvex, ug/L	<1	<1	<1

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- "Less-than" (<) values are indicative of the detection limit

LABORATORY ANALYSIS REPORT
FOR

Lockheed-Georgia Company
Marietta, Georgia

Monitoring Well Analyses
(Continued)

Source	Well #32	Well #33	Well #34
Log No. 84-	3149	3150	3151
Date Collected	5/10/84	5/10/84	5/10/84
pH	5.8	4.2	6.0
Specific Conductance, umhos/cm	32	44	32
Total Organic Halogens, ug/L Cl	93	65	43
Total Organic Carbon, mg/L C	11	<1	5

3276-93

Chester Laboratories
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Phone (412) 299-5700

Laboratory Analysis Report
For

Lockheed-Georgia Company
Marietta, Georgia

Volatile Compounds

Samples Received: 5/14/84
Report Date: 6/18/84

Source	Well #32	Well #33	Well #34
Log No. 84-	3149	3150	3151
Date Collected	5/10/84	5/10/84	5/10/84
Acrolein, µg/L	<10	<10	<10
Acrylonitrile, µg/L	<10	<10	<10
Benzene, µg/L	1,130	<10	<10
Bromoform, µg/L	<10	<10	<10
Carbon Tetrachloride, µg/L	<10	<10	<10
Chlorobenzene, µg/L	<10	<10	<10
Chlorodibromomethane, µg/L	<10	<10	<10
Chloroethane, µg/L	<10	<10	<10
2-Chloroethylvinyl Ether, µg/L	<10	<10	<10
Chloroform, µg/L	<10	<10	<10
Dichlorobromomethane, µg/L	<10	<10	<10
1,1-Dichloroethane, µg/L	<10	<10	<10
1,2-Dichloroethane, µg/L	20	<10	<10
1,1-Dichloroethylene, µg/L	<10	<10	<10
1,2-Dichloropropane, µg/L	<10	<10	<10
cis-1,3-Dichloropropene, µg/L	<10	<10	<10
trans-1,3-Dichloropropene, µg/L	<10	<10	<10
Ethylbenzene, µg/L	140	<10	<10
Methyl Bromide, µg/L	<10	<10	<10
Methyl Chloride, µg/L	<10	<10	<10
Methylene Chloride, µg/L	<10	75	71
1,1,2,2-Tetrachloroethane, µg/L	<10	<10	<10
Tetrachloroethylene, µg/L	<10	<10	<10
Toluene, µg/L	130	<10	<10
1,2-Trans-Dichloroethylene, µg/L	<10	<10	<10
1,1,1-Trichloroethane, µg/L	<10	<10	<10
1,1,2-Trichloroethane, µg/L	<10	<10	<10
Trichloroethylene, µg/L	45	<10	<10
Vinyl Chloride, µg/L	<10	<10	<10

3274-93

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit

BORING NO. MW-35

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

Top of Casing 1033.61
GROUND ELEVATION 1030.78

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia
FEATURE Position 19 defueling area
DATE STARTED 4/24/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 21.5 24 HRS 13.3
DATE COMPLETED 4/24/84 SAMP. SIZE 2 Inch O.D. WEIGHT OF HAMMER 140 Lb FALL 30 Inch
WEATHER Sunny, Warm CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	ROD LENGTH	% ROD	CAS. BLOWS
0.0-9.0	Sand, some silt, little gravel, little clay	Reddish Brown	Moist	Loose	2-1-2		S-1	4.0-5.5			
9.0-30.5	Sand and silt, little clay	Brown with Black Streaks	Moist Wet at 24.0'	Loose to Medium	2-2-2 1-2-3 1-1-2 3-5-5 3-7-18		S-2 S-3 S-4 S-5 S-6	9.0-10.5 14.0-15.5 19.0-20.5 24.0-25.5 29.0-30.5			
	Bottom of Hole 30.5' *Well screen set from 25.0' to 15.0' with 5' solid riser pipe at the bottom of the hole										

*NOTE Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

Mike Taylor Frank Jones

BORING NO. MW-36

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

Top of Casing 1032.84
GROUND ELEVATION 1029.91

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia
FEATURE Position 19 defueling area
DATE STARTED 4/20/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 16.4 24 HRS 12.3
DATE COMPLETED 4/20/84 SAMP. SIZE 2 Inch O.D. WEIGHT OF HAMMER 140 Lb FALL 30 Inch
WEATHER Sunny, Warm CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CON-SISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-15.5	Silt, some sand, little clay, little gravel	Reddish Brown	Moist	Medium to Loose	2-3-12 4-5-5 2-3-4		S-1 S-2 S-3	4.0-5.5 9.0-10.5 14.0-15.5			
15.5-30.5	Sand, some silt, little clay, little gravel	Grayish Brown	Moist becoming Wet at 17.0'	Medium	3-4-9 3-4-7 11-14-14		S-4 S-5 S-6	19.0-20.5 24.0-25.5 29.0-30.5			
	Bottom of Hole 30.5' *Well screen set from 30.0' to 20.0'										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.
DRILLING COMPANY Geologic Associates DRILLER Mike Taylor INSPECTOR Rich Morris (Log by Frank Jones)

BORING NO. MW-37

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

Top of Casing 1033.47
GROUND ELEVATION 1030.76

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia
FEATURE Position 19 defueling area
DATE STARTED 4/23/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 15.6 24 HRS 13.5
DATE COMPLETED 4/23/84 SAMP. SIZE 2 Inch O.D. WEIGHT OF HAMMER 140 Lb FALL 30 Inch
WEATHER Pt. Sunny, Cool CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HONESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-6.0	Silt, some sand, little clay, little gravel	Reddish Brown	Moist		NOTE:	No Samples Taken					
6.0-30.0	Silt, some sand, some clay	Brown	Moist becoming Wet at 21.0'		NOTE:	No Samples Taken					
	Bottom of Hole 30.0' *Well screen set from 30.0' to 20.0'										

*NOTE Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Geologic Associates DRILLER Mike Taylor INSPECTOR Frank Jones

BORING NO. MW-38

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

Top of Casing 1033.34

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia GROUND ELEVATION 1030.51

FEATURE Position 19 defueling area

DATE STARTED 4/24/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 16.1 24 HRS 15.1

DATE COMPLETED 4/24/84 SAMP. SIZE 2 Inch O.D. WEIGHT OF HAMMER 140 lb FALL 30 Inch

WEATHER Sunny, Warm CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HONESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-9.0	Sand, some silt, some gravel, little clay	Reddish Brown	Moist	Medium	5-8-10		S-1	4.0-5.5			
9.0-24.0	Coarse sand, little silt, trace clay (weathered granite)	Grayish White	Moist becoming Wet at 21.0'	Very Dense	10-4-8 8-11-55 couldn't drive		S-2 S-3 S-4 S-5	9.0-10.5 14.0-15.5 19.0-19.0 24.0-24.0			
	Bottom of Hole 24.0' *Well screen set from 22.0' to 12.0'										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Geologic Associates DRILLER Mike Taylor INSPECTOR Frank Jones

BORING MW-39

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

Top of Casing 1033.52
GROUND ELEVATION 1030.82

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia
FEATURE Position 19 defueling area
DATE STARTED 4/19/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 15.0 24 HRS 14.4
DATE COMPLETED 4/19/84 SAMP. SIZE WEIGHT OF HAMMER 140 lb FALL 30 inch
WEATHER Sunny, Warm CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HDNESS	BLOW CNT OR REC.Y*	REC.	SMPL OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	RQD	CAS. BLOWS
0.0-26.0	Sand, some gravel, little silt, little clay NOTE: Auger refusal at 26.0'	Reddish Purple becoming Grayish Brown at 10.5'	Moist becoming Wet at 18.0'		2-4-5 3-3-4 2-3-5 3-11-24 50/.4		S-1 S-2 S-3 S-4 S-5	4.0-5.5 9.0-10.5 14.0-15.5 19.0-20.5 24.0-24.4			
	Bottom of Hole 26.0' *Well screen set from 26.0' to 16.0'										

*NOTE Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches

DRILLING COMPANY Geologic Associates DRILLER Mike Taylor INSPECTOR Frank Jones

BORING NO. MW-41

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

Top of Casing 1019.70
GROUND ELEVATION 1015.13

PROJECT LOCKHEED-GEORGIA
LOCATION Marietta, Georgia
FEATURE Position 19 defueling area
DATE STARTED 4/19/84
DATE COMPLETED 4/19/84
WEATHER Rain, Cool
Splitspoon
2 Inch O.D.
DIAMETER OF AUGER 6 Inch
WEIGHT OF HAMMER 140 Lb
WEIGHT OF HAMMER
GROUND WATER 0 HRS 1.4 24 HRS 1.4
FALL 30 Inch
FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CONSISTENCY, HARDNESS	BLOW CNT OR RECVY*	% REC.	SMPL OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	RQD %	[illegible]
0.0-1.5	Sand and silt, some clay	Reddish Brown	Moist								
1.5-2.5	Silt, some sand, some clay	Grayish Brown	Wet		NOTE:	No Samples Taken					
2.5-7.1	Sand, some silt	Brown	Wet								
	Bottom of Hole 7.1'										
	*Well screen set from 7.1' to 2.1'										

*NOTE: Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.
(Test by Frank Jones)

BORING NO MW-42

THE CHESTER ENGINEERS
CORAOPOLIS, PENNSYLVANIA
TEST BORING RECORD

SHEET 1 of 1

Top of Casing 1031.05
GROUND ELEVATION 1031.05

PROJECT LOCKHEED-GEORGIA LOCATION Marietta, Georgia

FEATURE Position 19 defueling area

DATE STARTED 4/25/84 TYPE OF SAMPLER Splitspoon DIAMETER OF AUGER 6 Inch GROUND WATER 0 HRS 19.9 24 HRS 18.5

DATE COMPLETED 4/25/84 SAMP. SIZE 2 Inch O.D. WEIGHT OF HAMMER 140 Lb FALL 30 Inch

WEATHER Pt. Sunny, Warm CASING SIZE WEIGHT OF HAMMER FALL

DEPTH OF STRATUM	DESCRIPTION OF STRATUM	COLOR	MOISTURE CONDITION	DENSITY CON-SISTENCY, HDNESS	BLOW CNT OR RECVY*	% REC.	SMPL. OR RUN NO.	SMPL. OR RUN INTVL	RQD LENGTH	% RQD	CAS. BLOWS
0.0-2.0	Concrete	Gray		Hard							
2.0-5.0	Sand and gravel	Gray	Moist		NOTE:	No samples because of	taken short time				
5.0-18.0	Sand, some silt, some gravel, little clay	Grayish Brown	Wet								
18.0-30.5	Silt, some sand, some clay, little gravel (weathered schist)	Grayish Brown	Wet	Stiff	2-4-6		S-1	29.0-30.5			
	Bottom of Hole 30.5' *Well screen set from 30.0' to 20.0'										

Q-442

*NOTE Blow Count indicates number of blows required to drive sampler 6 inches using 140 pound hammer falling 30 inches.

DRILLING COMPANY Geologic Associates DRILLER Mike Taylor INSPECTOR Frank Jones

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Laboratory Analysis Report For

Lockheed Corporation
Marietta, Georgia

Monitoring Well Analyses

Samples Received: 5/22/84
Report Date: 7/2/84

Source	Well 35	Well 36	Well 37
Log No. 84-	3437	3438	3439
Date Collected	5/19/84	5/19/84	5/19/84
pH	6.6	6.3	3.6
Specific Conductance, umhos/cm	102	98	600
Freon Extractables, mg/L	1.9	0.4	0.9
Total Organic Carbon, mg/L C	6	9	6

Source	Well 39	Well 41	Well 42
Log No. 84-	3440	3441	3442
Date Collected	5/21/84	5/21/84	5/19/84
pH	6.5	6.4	6.1
Specific Conductance, umhos/cm	590	108	650
Freon Extractables, mg/L	1.0	3.9	1.8
Total Organic Carbon, mg/L C	5	8	14

Source	Well 16	Well 17	Position 19 Upstream	Position 19 Downstream
Log No. 84-	3433	3434	3435	3436
Date Collected	5/16/84	5/16/84	5/16/84	5/16/84
pH	5.6	6.0	6.7	6.6
Specific Conductance, umhos/cm	44	136	142	106
Freon Extractables, mg/L	1.3	0.9	0.5	<0.1
Total Organic Carbon, mg/L C	64	8	9	10

3276-99

Q-443

- Unless otherwise noted, analyses are in accordance with the methods and procedures outlined and approved by the Environmental Protection Agency and conform to quality assurance protocol.
- "Less-than" (<) values are indicative of the detection limit

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