Woodward-Clyde Consultants

PHASE III DRILLING PROGRAM AT DOUGLAS AIRCRAFT COMPANY'S TORRANCE (C6) FACILITY

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16 December 1987
Project No. 8741863C

[redacted]
DOCUMENTS
FILE: MDC v. Allstate
Box/File No.:
2-142/6107

(ABC/DAC-C6)

MDC v. ALLSTATE
(COVERAGE)

DOCUMENTS RE-PRODUCED TO DATE

10/13/94 - 1/27/95

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 OBJECTIVE AND SCOPE 2

3.0 FIELD PROGRAM 3

4.0 LABORATORY PROGRAM AND ANALYTICAL RESULTS 4

5.0 SUMMARY AND CONCLUSIONS 6

6.0 RECOMMENDATIONS 7

LIST OF TABLES

1 Summary of the Drilling Program at the C6 Facility ... 2
2 Summary of Hydrocarbon Chemical Compounds at C6 5
3 Summary of Volatile Organic Compounds at C6 5

LIST OF PLATES

1 Results and Locations of the C6 Phase III Drilling Program

APPENDICES

A Boring and Vadose Zone Well Location Figures

B Field Procedures

C Boring Logs

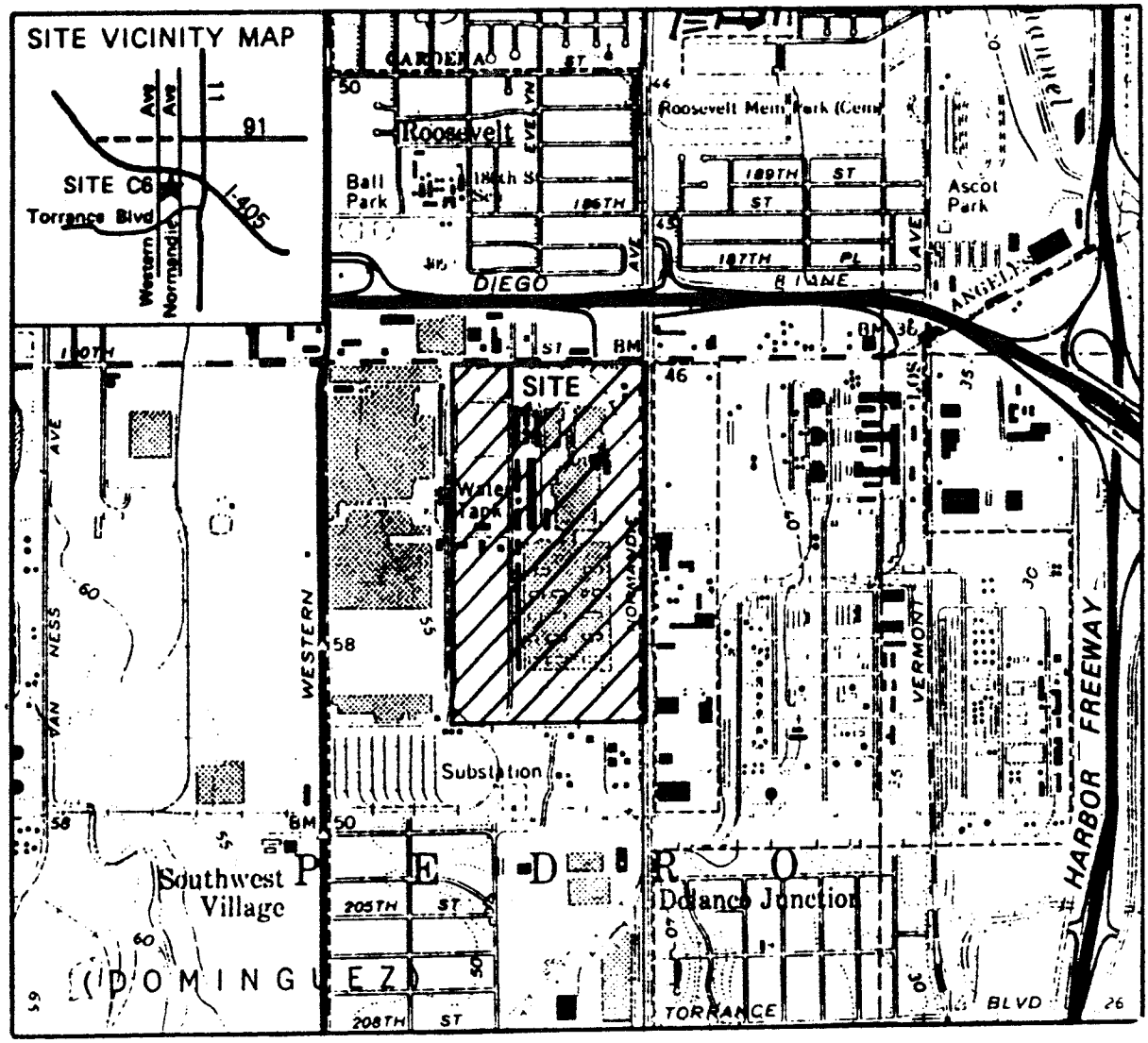
D Analytical Results and Chain-of-Custody Forms

PHASE III DRILLING PROGRAM AT
DOUGLAS AIRCRAFT COMPANY'S
TORRANCE (C6) FACILITY

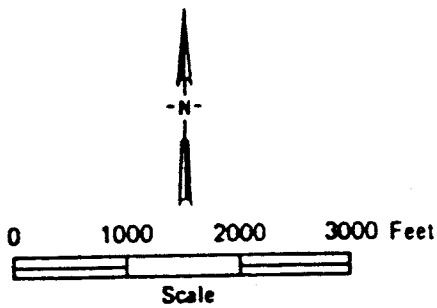
1.0 INTRODUCTION

The purpose of this report is to present the results of the Phase III drilling program performed at Douglas Aircraft Company's (DAC) C6 facility in Los Angeles. This facility is known as the Torrance facility, although it is located in the City of Los Angeles. The location of the C6 facility is shown in Figure 1. This drilling program was implemented as a part of the overall underground tank management program at this facility. Phase I of the program involved compiling a comprehensive list of the tanks and sumps at the facility from DAC's records. A program outlining the steps necessary for implementation of a monitoring program was developed, and the monitoring system(s) to be installed was identified. The report prepared in Phase I was called the Leak Detection Management Plan (LDMP), and was completed in 1985. The plan was reviewed by the Los Angeles Fire Department prior to implementation.

During Phase II of the program, the tank systems at the facility selected for monitoring in Phase I were tested for tightness using the Hunter Precision tank testing system. The tank testing program was completed in June 1986, and the results obtained were documented in the Phase II report. This phase (Phase III) was designed to evaluate whether releases had occurred from the underground tanks and sumps at the facility prior to installation of monitoring systems. An evaluation was conducted by sampling the soil adjacent to, and underneath the tanks and sumps.



C6 FACILITY



Project: DOUGLAS AIRCRAFT CO. **Project No.** 41863A	C6 FACILITY LOCATION MAP	Fig. 1

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2.0 OBJECTIVE AND SCOPE

The objective of this drilling program was to evaluate soil adjacent to tanks or sumps for the presence of chemicals that may have been released into the soil as a result of past leakage.

The original scope of the LDMP Phase III drilling program required the drilling of 17 borings and the installation of 19 vadose zone monitoring wells adjacent to 19 tanks and sumps. The actual number of borings and vadose zone wells completed was 17 borings and 10 vadose zone wells. The intent at the start of the Phase III drilling program was to install two borings next to most of the tanks and sumps, and to convert one of the borings to a vadose zone well for installation of a monitoring probe. Table 1 presents a list of the borings and vadose zone wells that were initially planned, and those that were completed.

The reduction in the number of borings and vadose zone wells installed was the result of a number of factors. In the cases where the tanks and sumps were small, only one boring or vadose zone well was installed. For the small tanks and sumps, the borings were drilled at an angle so that they were advanced into the soil and backfill material beneath the tanks or sumps. Therefore, the whole area under the tank or sump could be sampled. During the field activities, some of the drilling locations originally selected could not be used because of space restrictions. In such cases, the borings were relocated to more accessible positions. At some of the other tank/sump locations, the proposed number of borings/wells was not installed, because the initial boring installed at the location indicated the presence of

TABLE 1

SUMMARY OF THE DRILLING PROGRAM AT THE C6 FACILITY

	Proposed		Actual		
Tank/Sump Number	Boring	Vadose Well	Boring	Vadose Well	Comment Code
1T	1	1	1	1	NC
2T	1	1	2	-	OC
3T	1	1	1	1	NC
4T	1	1	2	-	OC
9T	1	1	1	1	NC
10T	1	1	1	1	NC
11T	1	1	1	1	NC
12T	1	1	1	1	NC
13T	-	1	-	1	NC
14T	-	1	-	1	NC
15T	1	1	1	-	OC
16T	1	1	-	-	OC
17T	1	1	1	-	OC
18T	1	1	-	-	OC
19T	1	1	1	1	NC
20T	1	1	1	1	NC
23T	-	-	-	-	*
21S	1	1	1	-	NC
22S	1	1	1	-	OC
26S	1	1	1	-	S/C
TOTALS	17	19	17	10	
Combined Total		36		26	

Comment Codes:
OC -- Organic Compounds found in first boring, no vadose zone well installed.
NC -- No evidence of organic compound found in first boring, vadose zone well installed.
* -- 23T was removed before the start of the Phase III boring program.
- -- No boring planned/installed.
S/C Uncertainty as to whether this was a sump or clarifier

(ABC/DTAB1C6)

elevated concentrations of organic chemicals in the soil. The presence of these compounds would make installation of a vadose zone monitoring system pointless until the soil was cleaned up.

One tank (28T) originally scheduled for monitoring under the LDMP was removed prior to implementation of this boring program. The locations of borings and vadose zone wells installed in Phase III are shown on Figures C6-1 through C6-8 presented in Appendix A.

3.0 FIELD PROGRAM

Drilling was performed by A & R Drilling, Inc. of Carson, California. Drilling activities began on 14 August 1987 and were completed on 28 August 1987. Soil borings were drilled using a Central Mining Equipment (CME) 45 and CME 75 with a 7-inch outside diameter hollow stem auger.

Borings and wells were generally drilled approximately 30 to 40 feet in depth. The specific depth of each boring or vadose zone well is shown on the Boring Logs in Appendix C. Soil sampling was performed at the surface and at intervals of 5 feet. Soil samples were collected to observe the subsurface lithologic conditions and to be analyzed for the presence of hydrocarbons or other volatile organic compounds. Soil samples were also collected for field Organic Vapor Analyzer (OVA) headspace measurements. A description of the methodology used for soil sampling and for conducting OVA headspace measurements is presented in Appendix B.

Observations by Woodward-Clyde Consultants personnel during the drilling and sampling operations were recorded on Boring Logs, as presented in Appendix C. These observations included a visual soil description, sampling depth, OVA headspace readings, soil odor, and other pertinent information.

4.0 LABORATORY PROGRAM AND ANALYTICAL RESULTS

Soil samples were delivered to the laboratories of West Coast Analytical Service, Inc., in Santa Fe Springs. The sampling and quality assurance protocols used in this program are described in Appendix B, and copies of chain-of-custody forms are presented in Appendix D.

As described in Section 3.0, soil samples were collected at the surface and at intervals of 5 feet to the bottom of the boring. The sampling depths are shown on the Boring Logs presented in Appendix C. All of the soil samples collected were not analyzed at the laboratory. Individual soil samples were selected for analysis based on data from OVA headspace measurements, visible soil discoloration, odor, and sampling depth. If the presence of organic compounds was not indicated using the criteria just described, then the 10-, 15-, and 20-foot soil samples were generally analyzed. These sample depths were chosen because they were closest to the invert of the tank or sump, and were therefore in the soil zone most likely to show evidence of organic compounds if a leak had occurred. The specific laboratory analyses were selected based on the current or past known contents of the tank or sump. The following analyses were performed:

- Petroleum hydrocarbons, modified EPA Method 8015
- Volatile organic compounds, EPA Method 8240
- pH and electrical conductivity (EC)

The analytical results obtained from the soil samples are presented in Appendix D. Laboratory results obtained from the Phase III drilling activities indicate that six tanks and/or a total of 19 sumps had elevated concentrations of organic compounds in the soil next to them. One location had concentrations in the micrograms-per-kilogram (ug/kg or ppb) range, while five locations had concentrations in the miligrams-per-kilogram (mg/kg or ppm) range. Brief descriptions of the six tanks and sumps, and a summary of where subsurface leakage was found are presented in this section. Table 2 presents the petroleum hydrocarbon concentrations found, and the corresponding depths where the soil samples were collected. Table 3 lists the soil volatile organic chemical concentrations measured, and the corresponding depths at which the soil samples were analyzed.

- Tank 2T is a 37+ year old, 4,000 gallon gasoline tank located near the southeast corner of Building 20 (see Figure C6-2 in Appendix A). Organic compounds were found at depths of 10 and 15 feet with concentrations ranging from 170 to 24,000 mg/kg (ppm). Organic compounds were not detected above 10 feet or below 15 feet.

- Tank 4T is a 37+ year old, 500 gallon auto waste oil tank located near the southeast corner of Building 20 (see Figure C6-2 in Appendix A). Organic compounds were found in Boring 4TW at 5 feet with a concentration of 42 mg/kg (ppm). An obstruction at 7 feet prevented further drilling at 4TW. Evidence of organic compounds was not found at Boring 4TB.

- Tank 10T is a 35+ year old, 10,000 gallon steam cleaning wastewater tank located between the bottle storage house and the steam cleaning area (see Figure C6-3 in Appendix A). Organic compounds were found at 10 and 20 feet with concentrations ranging from 13 to 15 ug/kg (ppb). Field data does not indicate the presence of organic compounds below 20 feet.

- Tank 15T is an 8-year old, 2,000 gallon tank located between Buildings 1 and 36 (see Figure C6-5 in Appendix A). The tank was originally designed for spill containment, but is currently being used to hold alkaline soaps. Organic compounds were found at 10, 15, and 20 feet with concentrations ranging from 11 ug/kg (ppb) to 6,300 mg/kg (ppm). Field data indicated that organic compounds may extend below 40 feet.

- Tank 17T is an 8-year old, 5,000 gallon 1,1,1-trichloroethane tank located between Buildings 1 and 36 (see Figure C6-5 in Appendix A). Organic compounds were found at 10, 20, and 30 feet with concentrations ranging from 7 ug/kg (ppb) to 840 mg/kg (ppm). Field data indicate organic compounds may extend below 30 feet.

- Sump 22S is a 24-year old, 500 gallon waste oil concrete sump. Sump 22S is situated east of the washdown booth at Building 36 (see Figure C6-7 in Appendix A). Petroleum hydrocarbons were found at 5 feet with a concentration of 1,400 mg/kg (ppm). Soil samples and field data at 10 and 15 feet do not indicate the presence of organic compounds below 5 feet.

5.0 SUMMARY AND CONCLUSIONS

Seventeen borings and 19 vadose zone monitoring wells were initially scheduled as part of the Phase III drilling program. The completed program included 16 borings and 10 vadose zone wells. The smaller number of borings and vadose zone wells completed is due to the fact that organic

compounds were encountered in the soil around some of the tanks and sumps during drilling, and that some small tanks and sumps only required one boring or vadose zone well.

Laboratory analyses indicated the presence of organic compounds in the soil at five of the tanks (2T, 4T, 10T, 15T, and 17T) and at one sump (22S). The soil around 10T contained trace concentrations of toluene (<0.1 ppm) that pose no environmental threat. At Sump 22S petroleum hydrocarbons were found only at five feet, while petroleum hydrocarbons were found above 15 feet at Tank 2T, and in the boring at Tank 4T at a depth of five feet.

A wider range of organic compounds (see Table 3) were found in the soil at Tank 15T and the compounds seem to be present through the entire boring, a depth of 40 feet. There is also evidence of volatile organics at Tank 17T, extending to 40 feet.

6.0 RECOMMENDATIONS

The tanks and sumps that did not have organic compounds detected can now have monitoring systems installed next to them. The extent of organic compounds in the soil around tank cluster 15T to 17T needs to be identified and remediated, before the proposed monitoring system can be installed. A problem does not exist at Tank 10T, and a monitoring system can be installed at that tank. The extent of the problem at tanks 2T and 4T and Sump 22S needs to be evaluated further.

TABLE 2- SUMMARY OF HYDROCARBON COMPOUNDS FOUND AT THE C6 FACILITY

Tank/Sump Number	Boring I.D.	Analyzed Soil Depth (ft)	Gasoline mg/kg (ppm)	Kerosene mg/kg (ppm)	Diesel Fuel mg/kg (ppm)	Mineral Spirits mg/kg (ppm)	C9-C30 Hydrocarbons mg/kg (ppm)
2 T	2TW	5	ND	ND	ND	ND	ND
		10	170	ND	ND	ND	ND
		15	24000	ND	ND	ND	ND
		20	ND	ND	ND	ND	ND
4 T	4TW	0	ND	ND	ND	ND	ND
		5	42	ND	ND	ND	ND
22 S	22SB	5	ND	ND	ND	ND	1400
		10	ND	ND	ND	ND	ND
		15	ND	ND	ND	ND	ND
Detection Limit (ppm)-			10	10	10	10	100

NOTE: D.L.- Detection Limit
ND - Not Detected

TABLE 3- SUMMARY OF VOLATILE ORGANIC COMPOUNDS AT THE C6 FACILITY.

Tank/Sump Number	Boring I.D.	Analyzed Soil Depth (ft)	(MEK) 2-Butanone mg/kg (ppm)	1,1,1-TCA mg/kg (ppm)	TCE mg/kg (ppm)	Toluene mg/kg (ppm)	Ethylbenzene mg/kg (ppm)	Total Xylenes mg/kg (ppm)	(MIBK) 4-Methyl-2-Pentanone mg/kg (ppm)	1,4-Dioxane mg/kg (ppm)
10 T	10TW	10	ND	ND	ND	(15)	ND	ND	ND	ND
		15	ND	ND	ND	ND	ND	ND	ND	ND
		20	ND	ND	ND	(13)	ND	ND	ND	ND
15 T	15TB	10	(570)	ND	ND	(56)	(11)	(110)	ND	ND
		15	160	27	10	870	41	460	ND	ND
		20	1800	38	94	6300	180	1300	ND	ND
17 T	17TB	5	ND	ND	ND	ND	ND	ND	ND	ND
		10	ND	(36)	ND	(8)	ND	ND	ND	ND
		20	ND	(13)	ND	(7)	ND	ND	ND	(14)
		30	810	ND	ND	ND	ND	ND	840	ND
Detection Limit- (ppm)			50	5	5	5	5	5	30	D.L.-5
- (ppb)			(50)	(5)	(5)	(5)	(5)	(5)	(30)	(5)

NOTE: D.L.- Detection Limit
ND - Not Detected
( ) - Concentration in ug/kg (ppb)

BOE-C6-0220529

APPENDIX A

BORING AND VADOSE ZONE WELL LOCATION FIGURES

	Tank or sump location
2T	Tank (T) or sump (S) number
	All utilities
	Zone of multiple utilities
	Box, outlet, etc.
	Catch basin
	Hydrant
	Manhole
	Valve
	No drilling area
	Pipe >6 inch diameter, cover >12 inch diameter
	Pipe <6 inch diameter, cover <12 inch diameter
	Square or rectangular cover >12 inch diameter
	Square or rectangular cover <12 inch diameter
	Vent
	Light
	Pump
	Meter
	Leak detection boring and vadose zone monitoring system location
	Leak detection boring location
	Non-volatile liquid monitoring well
R.P.	Reference point

Project: DOUGLAS AIRCRAFT CO. Project No. 41863C - 1000	EXPLANATION OF FIGURES C6-1 THROUGH C6-8	Fig. C6-1

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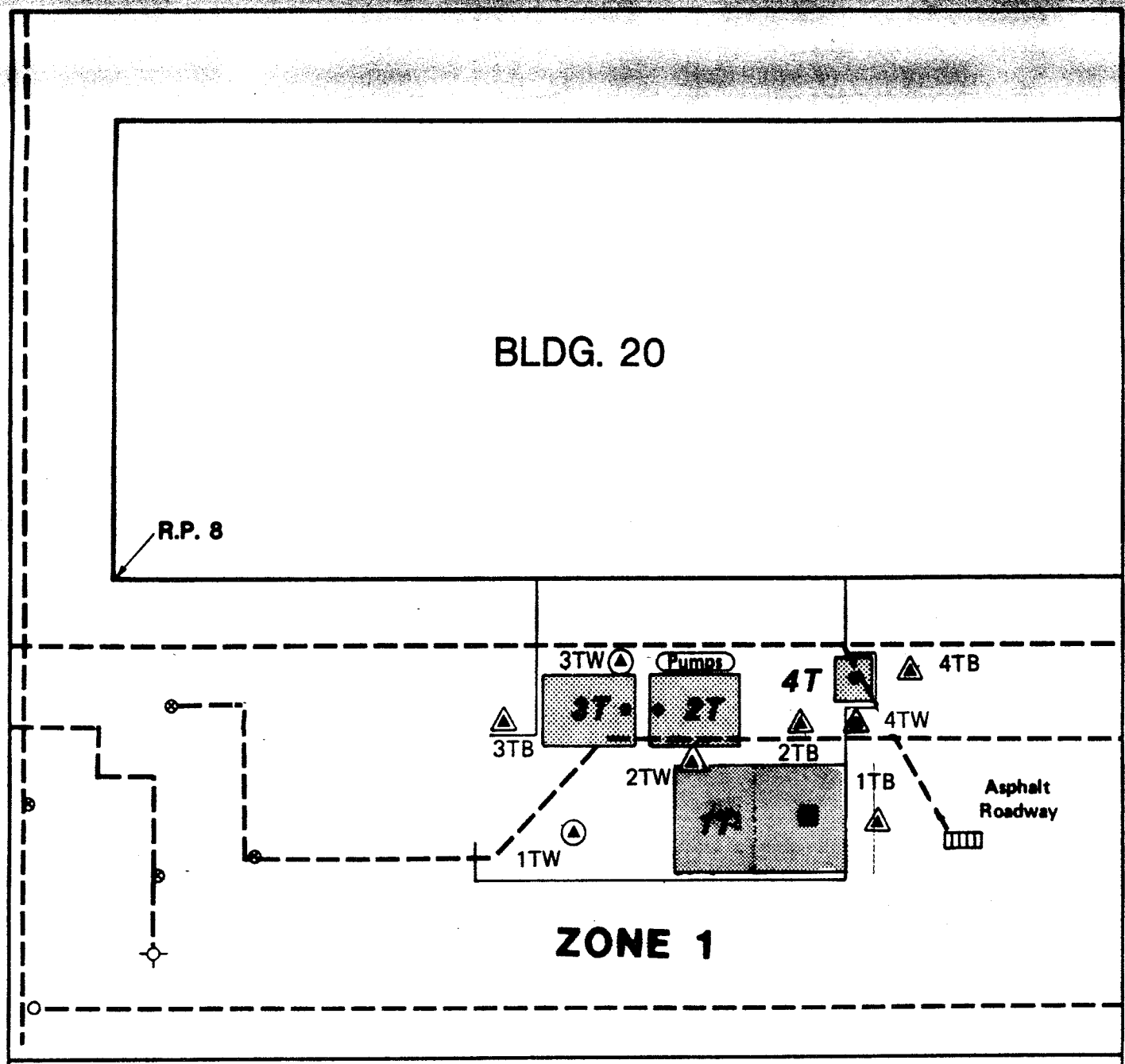


BLDG. 29

0 10 20

SCALE, feet

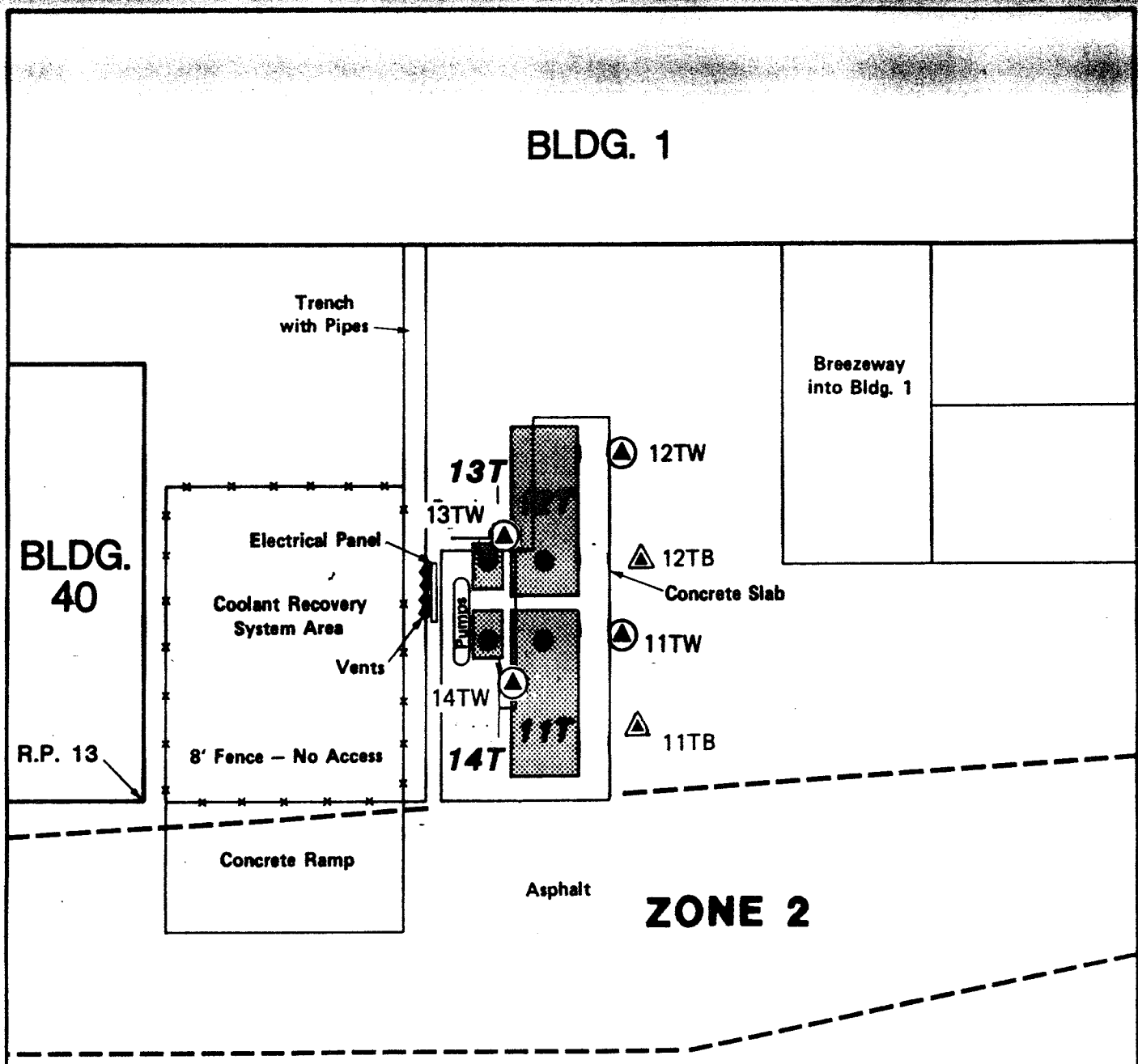
NOTES:

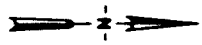
1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material is a concrete pad surrounded by asphalt.
3. No restrictions other than those shown.

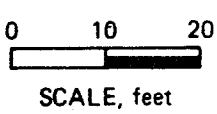
October 1987

Project: DOUGLAS AIRCRAFT CO. Project No. 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 1T TO 4T	Fig. C6-2

WOODWARD–CLYDE CONSULTANTS







NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material over tanks 11, 13, and 14 is concrete with tank 12 covered by concrete and asphalt. Asphalt roadway surrounds.
3. No restrictions other than those shown.

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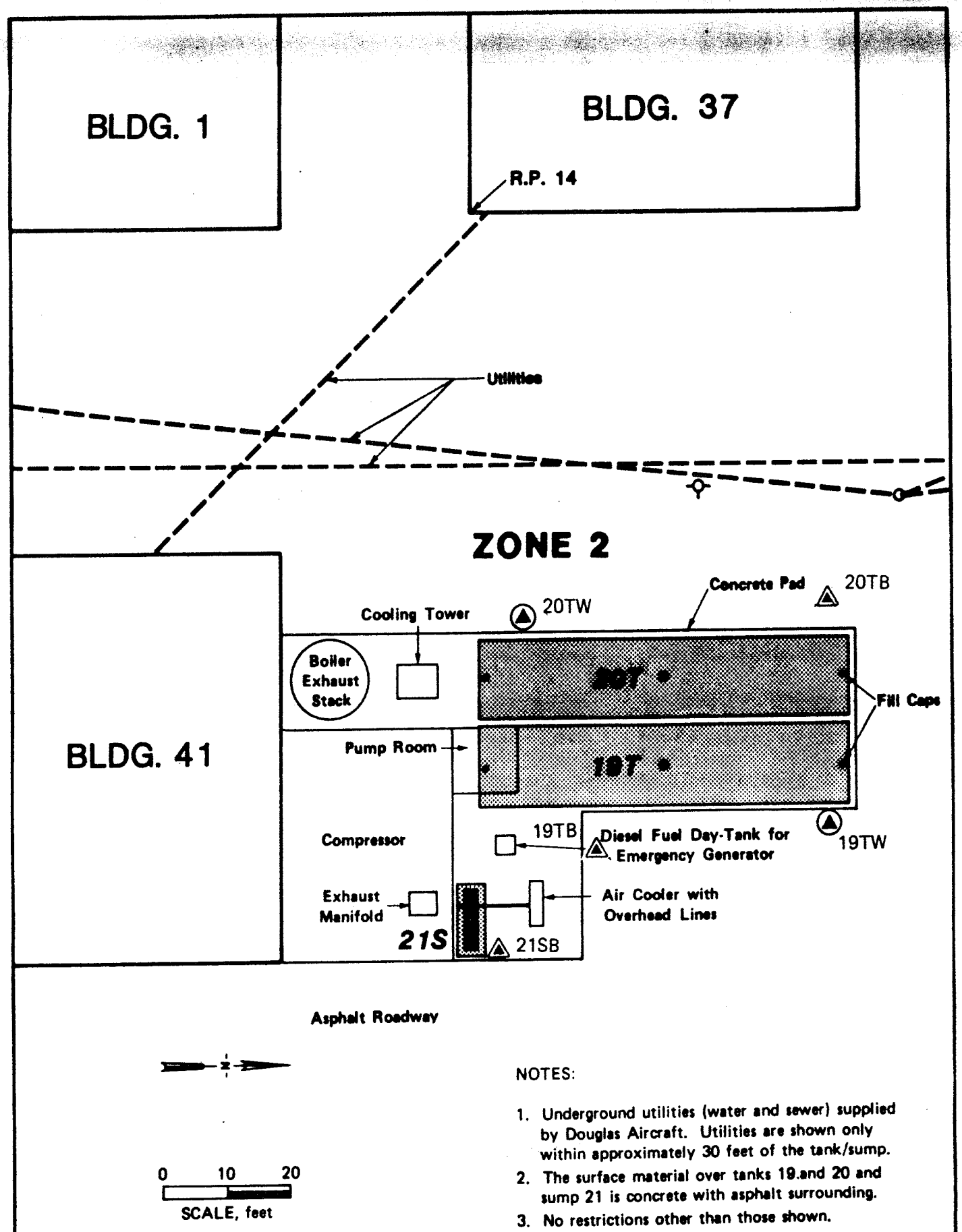
Project: DOUGLAS AIRCRAFT CO. Project No. 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 11T TO 14T	Fig. C6-4

WOODWARD–CLYDE CONSULTANTS



NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material over tanks 19.and 20 and sump 21 is concrete with asphalt surrounding.
3. No restrictions other than those shown.

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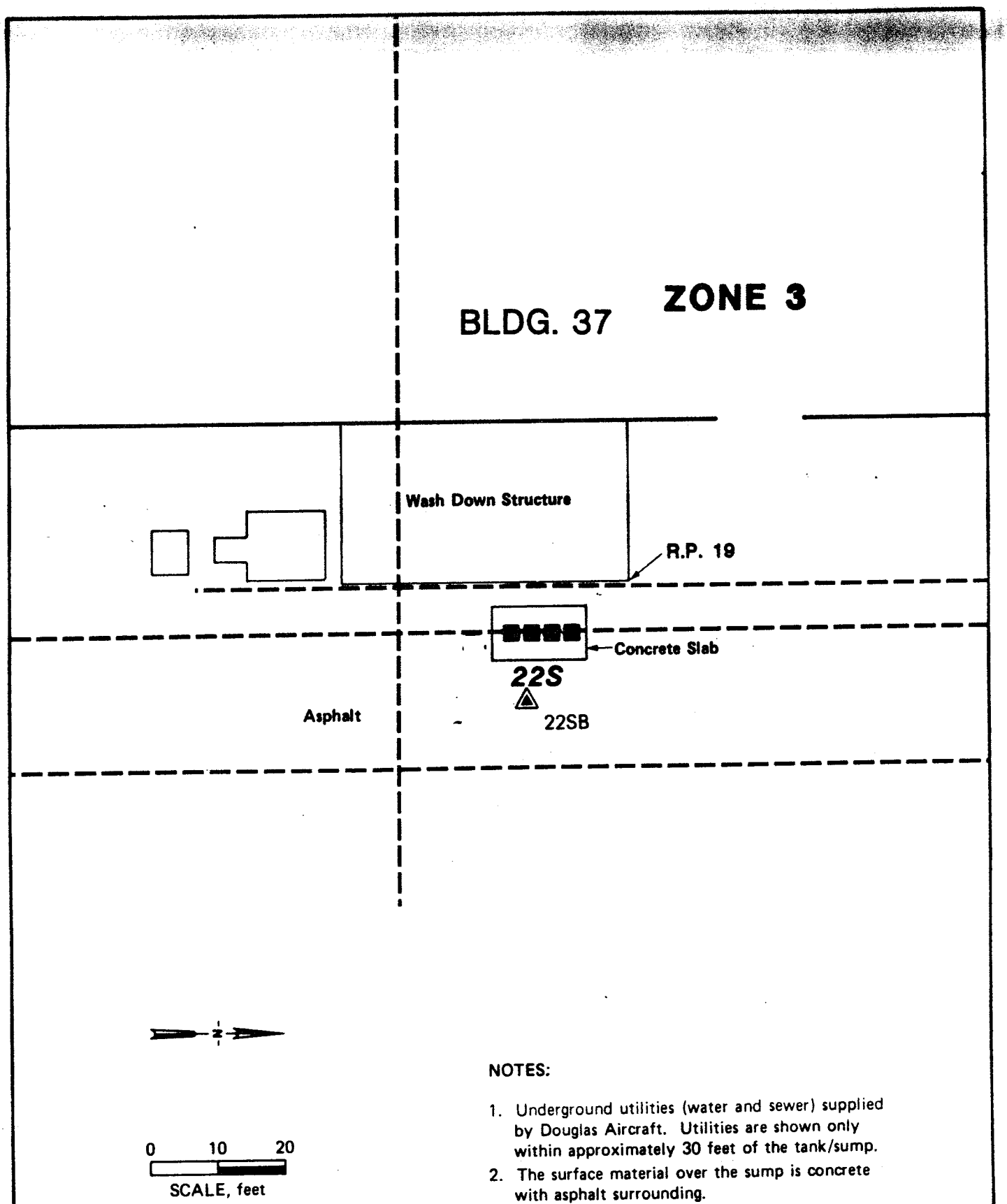
Project: DOUGLAS AIRCRAFT CO. **Project No.** 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 19T AND 20T AND SUMP 21S	**Fig.** C6-6

WOODWARD–CLYDE CONSULTANTS



NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material over the sump is concrete with asphalt surrounding.
3. No restrictions other than those shown.

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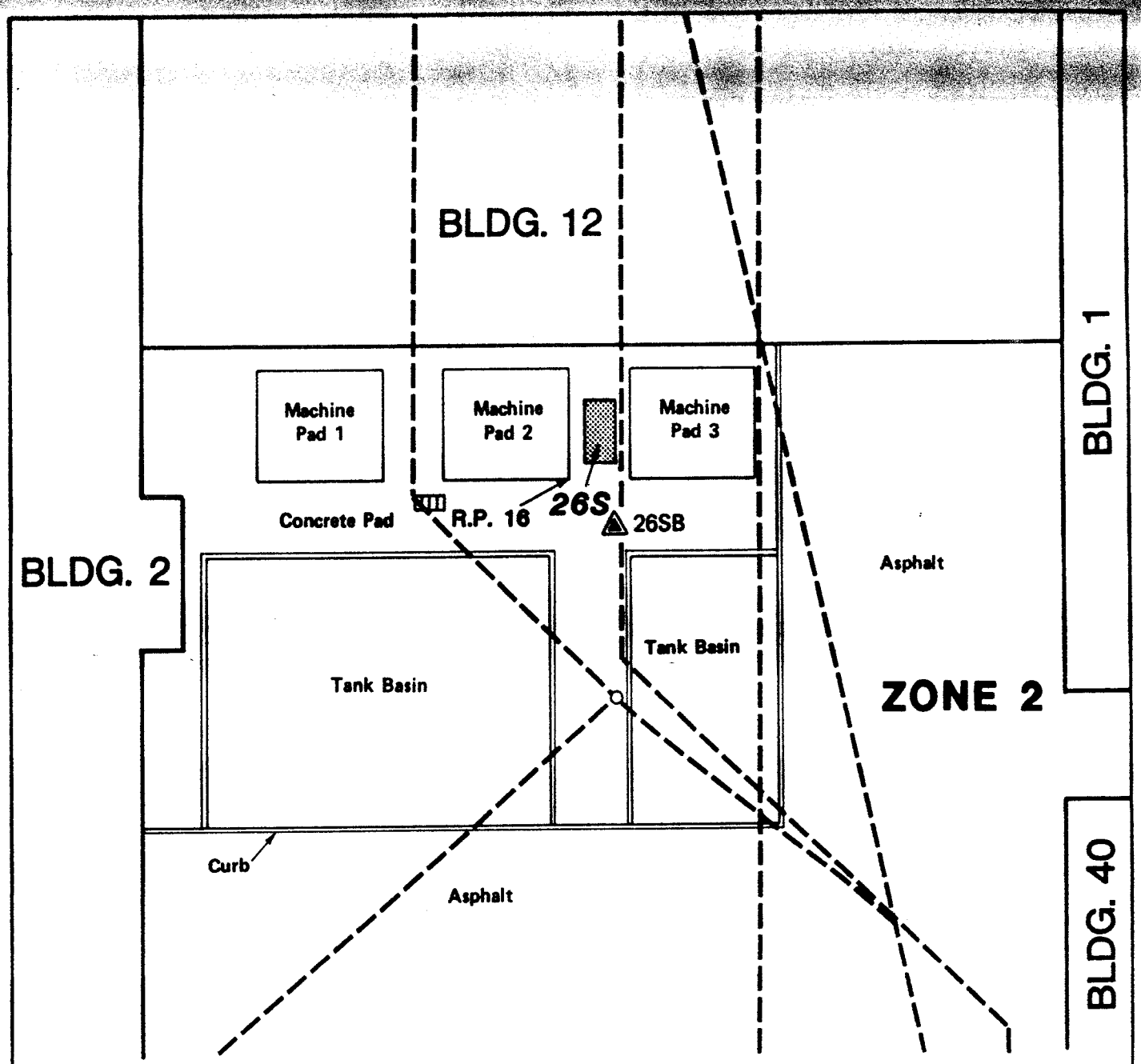
Project: DOUGLAS AIRCRAFT CO. **Project No.** 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR SUMP 22S	Fig. C6-7

WOODWARD–CLYDE CONSULTANTS



N

0 10 20

SCALE, feet

NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material around the sump is concrete with asphalt to the north.
3. No restrictions other than those shown.

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Project: DOUGLAS AIRCRAFT CO. Project No. 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR SUMP 26S	Fig. C6-8

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APPENDIX B

FIELD PROCEDURES

APPENDIX B
FIELD PROCEDURES
AT THE TORRANCE C6 FACILITY

B.1 GENERAL INFORMATION

Drilling was performed by A & R Drilling, Inc. of Carson, California. Drilling began on 14 August 1987 and was completed on 28 August 1987. Borings were drilled using a CME 45 and CME 75 with 7-inch hollow stem augers.

B.1.1 Soil Borings

Soil borings were generally drilled from 30 to 40 feet in depth. Some of the borings were transformed into monitoring wells. Borings that were not converted into vadose zone monitoring wells were backfilled with a dry mixture of 75 percent No. 60 Silica sand and 25 percent of bentonite powder. The top 1 to 2 feet of the borings were backfilled with concrete or asphalt.

B.1.2 Vadose Zone Wells

Borings that were converted to vadose zone monitoring wells were generally backfilled to 20 feet with the sand/bentonite mixture described above. A vadose zone well, 20 feet in length, was generally installed and backfilled with Monterey No. 3 sand. The top 2 to 3 feet of the well were sealed with concrete. Vadose zone well construction details are shown on the Boring Logs presented in Appendix C.

Vadose zone wells were temporarily sealed to prevent fluids from entering the wells until they are installed with vapor or liquid monitoring systems. The wells were sealed by covering the well heads with bentonite powder, and then sealed to grade with an asphalt patch or a 1/4-inch thick steel plate.

B.1.3 Drill Cuttings

Drill cuttings from each boring were placed in 55-gallon drums, and the contents of the drums were labeled using an identification label and permanent ink marker. The drums were sealed and left adjacent to the boring locations. Douglas Aircraft was advised of the locations and contents of the drums, and the need for proper management of the drill cuttings.

B.2 SOIL SAMPLING

Subsurface soil samples were collected at the surface and at 5-foot intervals. Soil samples were taken for Organic Vapor Analyzer (OVA) headspace measurements and laboratory analyses. Soil samples were collected using a California modified sampler for borings drilled by the CME 45 and the CME 75. The California modified sampler holds four brass tubes, and is 18 inches in length.

Surface soil samples were collected by driving a California modified sampler into the soil 1 to 1.5 feet in depth. In areas covered with asphalt or concrete, surface samples were collected from below the asphalt or concrete cover.

B.2.1 OVA Headspace Measurements

Field OVA headspace measurements were taken from each soil sample. This procedure was conducted by extruding approximately one brass or stainless steel tube from each soil sample into a one pint glass jar. The jar's lid had a 1/4-inch diameter hole, which was sealed with duct tape. Approximately 10 minutes was allowed for organic vapors from the soil to reach equilibrium inside the jar. An OVA probe was then inserted through the hole in the jar, and the vapor concentration was measured (in ppm).

B.2.2 Soil Sample Preparation

One to two tubes from the soil sampler were prepared for laboratory analysis. The ends of the tubes were covered with aluminum foil, plastic end caps, and sealed with electrical tape. Soil samples were labeled with the following information:

- Project number
- Project name
- Boring number
- Sample number
- Soil depth
- Sampler's signature
- Date

The soil samples were then sealed in Ziploc plastic bags and placed on ice in an ice chest. All of the soil samples were delivered to West Coast Analytical Service, Inc. in Santa Fe Springs for laboratory analysis. Chain-of-custody procedures, including the use of sample identification labels and

chain-of-custody forms, were used for tracking the collection and shipment of soil samples. Chain-of-custody forms are presented in Appendix D.

B.2.3 Field Observations

Observations by Woodward-Clyde Consultants personnel during the drilling and sampling operations were recorded on Boring Logs, as presented in Appendix C. These observations related to visual soil classifications, geologic and stratigraphic comments, vadose zone well construction details, sampling efforts, OVA measurements, and other pertinent information.

APPENDIX C

BORING LOGS

BORING LOCATION				ELEVATION AND DATUM	
DRILLING AGENCY		DRILLER		DATE STARTED	DATE FINISHED
DRILLING EQUIPEMENT				COMPLETION DEPTH (ft)	ROCK DEPTH (ft)
TYPE OF WELL CASING		SCREEN PERFORATION		DIAMETER OF BORING (in.)	DIAMETER OF WELL (in.)
No OF SAMPLES	DIST.	UNDIST.	CORE	LOGGED BY	CHECKED BY
WATER DEPTH (ft)	FIRST	COMPL.	24 HRS.		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS

Medium dense, moist, light brown, SILTY fine grained SAND (SM).

Unified Soil Classification System (USCS).

Sample Identification Number.

5 Sample Location and Type.

Concrete

75% Sand/25% Bentonite Powder

10 Native Soil

No. 3 Sand Filter Pack

15 Screen

Modified California Sampler.

20 Split Spoon Sampler

25 Number of Blows Required to Advance Sampler One Foot using a 140 Pound Downhole Hammer with a 30-inch Drop.

Organic Vapor Analyzer (OVA) Readings (field headspace).

30 Rate at which Drilling Progresses. Time at depths noted.

Remarks or Comments by Driller or Drilling Supervisor.

35

Project: DOUGLAS AIRCRAFT COMPANY Project No.: 8741863C	KEY TO BORING LOG	Fig. C-0

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BORING LOCATION	See Location Map C6-2	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-27-87 / DATE FINISHED 8-27-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 6 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Medium dense, damp, yellowish brown, CLAYEY fine to coarse grained SAND (SC) with some gravel. (FILL) Possible 2nd asphalt layer.		1	X	–	–	1305 / 1325	No recovery. Obstruction possibly asphalt
5	Stiff, moist, dark gray, SANDY CLAY (CL).		2	X	11	0.1	1335	
10	Becomes olive brown, SILTY CLAY (CL).		3	X	26	0.1	1345	
15	Medium dense, moist, olive brown, fine grained SANDY CLAYEY SILT (ML).		4	X	19	0	1350	
20	Becomes more SANDY (SM-ML).		5	X	20	20	1405	
25	Very stiff, moist, olive brown, SILTY CLAY (CH) with white cemented pieces.		6	X	26	160	1410	
30	Becomes SANDY. Dense, moist, yellowish brown, SILTY fine grained SAND (SM) with white layered deposits (1/16" thick).		7	X	38	3.2	1420	
35	Bottom of Boring at 31 feet. Actual Vertical Depth at 29.5 feet.							Note: Angle drilled 17° due south. Actual vertical depth 29.5'.

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 1TB

Fig. C-1

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-2	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-28-87 / DATE FINISHED 8-28-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION 0.02 inch	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Concrete covering (9").		1	X	24	0	0820	
	Medium dense, damp, brown SILTY fine grained SAND (SM). (FILL)							
5	Becoming very loose.		2	X	3	0.5	0830	
	Stiff to very stiff, moist, olive brown, SILTY CLAY (CL) to CLAYEY SILT (ML).							
10			3	X	12	0	0845	
15			4	X	24	0	0850	
20			5	X	18	0	0900	
	Medium dense, moist, brown SILTY fine grained SAND (SM) with small holes in soil (look like root holes).							
25			6	X	22	0	0910	
	Becomes less SILTY (SM).							
30			7	X	25	0	0920	
	Bottom of Boring at 31 feet.							Note: Vertical boring.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 1TW

Fig. C-2

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-2	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-28-87 / DATE FINISHED 8-28-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 36	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 8 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Concrete covering (9").		1	X	6	20	1020	
	Medium stiff, damp brown, SANDY CLAY (CL) with pieces of asphalt, sand. (FILL)							
	Mottled with black clay.							
5			2	X	6	200	1025	
	Curttings: Black clay.							
	Medium stiff, moist, olive brown SILTY CLAY (CL).							
10			3	X	6	>1000	1035	Strong odor.
	Stiff to very stiff, moist, olive brown, SANDY SILT (ML) with CLAY (CL).							
15			4	X	12	61	1045	Little odor.
20			5	X	17	–	1055	No odor.
	Very stiff, moist, olive brown, SILTY CLAY (CH).							
25			6	X	27	17	1105	
	Medium dense, moist yellowish brown, SILTY fine grained SAND (SM).							
30			7	X	22	11	1115	
35	Slightly cemented.		8	X	20	0.8	1130	Actual vertical depth 34.5'.
	Bottom of Boring at 36 feet.							Note: Angle drilled at 17° due south.

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 2TB

Fig. C-3

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-2 -	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-27-87 / DATE FINISHED 8-27-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Concrete covering (9").		1	X	9	0.3	1230	
	Stiff, damp, brown with black areas, SILTY CLAY (CL). (FILL)							
5	**Stiff to very stiff, moist, olive brown, SANDY CLAY (CL).**		2	X	17	1.8	1240	OVA reading = 240 ppm **out of boring**
10			3	X	16	>1000	1245	Strong odor.
15	Some silt.		4	X	18	>1000	1250	Strong odor.
	Medium dense, moist, dark brown, SILTY fine grained SAND (SM-ML), micaceous.							
20			5	X	16	220	1300	
25	Becomes brown, less SILT (SM), some cementation.		6	X	19	20	1305	
30	SILT content decreases (SP-SM?).		7	X	23	3.0	1315	
	Bottom of Boring at 31 feet.							Note: Vertical boring No well installed.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 2TW

Fig. C- 4

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-2	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-27-87 / DATE FINISHED 8-27-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Stiff, damp, olive brown, SILTY CLAY (CL) with sand. (FILL)		1	X	11	0.6	0900	
5	Very loose, moist, olive brown, SILTY medium grained SAND (SM), micaceous. (FILL)		2	X	2	0	0940	
	Stiff, moist, olive brown, CLAYEY SILT (ML) micaceous.							
10			3	X	8	0	0947	
15			4	X	11	0.6	0955	
	Becomes very stiff, some fine grained SAND (ML).							
20			5	X	16	0.3	1000	
	Medium dense, moist, brown, SILTY fine grained SAND (SM).							
25			6	X	18	0.3	1010	
30	Less SILTY, 1/8" areas of gray fine grained SAND (SM).		7	X	24	0	1020	
	Bottom of Boring at 31 feet.							Note: Vertical boring. No well installed.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 3TB

Fig. C-5

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-2	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 9-1-87 / DATE FINISHED 9-1-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Concrete covering (10"). Loose, damp, yellowish brown, SILTY fine to medium grained SAND (SM), with little gravel. (FILL)		1	X	7	0.5	0750	
	Very stiff, moist, yellowish brown, CLAYEY SILT (ML), micaceous, with little fine sand.							
5			2	X	21	0.5	0800	
	Very stiff, moist (with 1/2" dry areas) brown. SANDY SILT (ML), micaceous, 1/4" irregular fragment of rock (?).							Headspace reading on cuttings > 1000 ppm
10			3	X	17	20	0805	Definite odor in cuttings.
15	Becomes olive brown, CLAYEY SILT (ML). 1/2" irregular fragment, rock(?).		4	X	17	1.6	0815	
20	Becomes less Clayey (ML).		5	X	18	0.2	0825	
	Very stiff, moist, yellowish brown, SANDY SILT (ML), micaceous.							
25			6	X	21	0.2	0835	
	Dense, moist, yellowish brown, SILTY fine grained SAND (SM-SP), micaceous.							
30			7	X	31	0.2	0840	
	Bottom of Boring at 31 feet.							Note: Vertical boring No well installed.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 3TW

Fig. C-6

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-2	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-27-87 / DATE FINISHED 8-27-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 6 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering.							
	Dense, moist, gray, SANDY GRAVEL (GP).(FILL)		1	X	14	0.2	1105	
	Medium dense, moist, brown, SILTY SAND (SM).(FILL)							
	Stiff, damp, dark gray, SILTY CLAY, (CL).(FILL)							
	Loose, moist, yellowish brown, SILTY fine grained SAND (SM).(FILL)							
5			2	X	5	0.1	1120	Disturbed sample. Gravelly layer logged from cuttings and drillers information.
	Moist, brown, SANDY GRAVEL (GP) (pea gravel) (FILL)							
	Stiff, moist, olive brown, SILTY CLAY (CL) to CLAYEY SILT (ML).							
10			3	X	9	0	1130	
15	With fine sand, grades to CLAYEY SILT (ML)		4	X	14	0	1140	
	Becomes very stiff.							
20			5	X	19	0	1150	
	Hard, moist, olive brown, SILTY CLAY (CH).							
25			6	X	25	0	1200	
	With fine grained sand.							
30			7	X	24	0.4	1210	
	Medium dense, moist, yellowish brown, SILTY fine grained SAND (SM).							
	Bottom of Boring at 31 feet.							Note: Angle drilled at 17° due south. Actual vertical depth 29.5'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 4TB

Fig. C-7

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-3	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc. / DRILLER M. Smith	DATE STARTED 8-31-87	DATE FINISHED 8-31-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC / SCREEN PERFORATION .02" Slot	DIAMETER OF BORING (in.) 8	DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Concrete (6").		1	X	12	0.2	0745	
	Stiff, damp, brown, SANDY CLAY (CL), some asphalt chunks in the top 1".(FILL)							
5	Dense, moist, brown, CLAYEY SAND (SC).		2	X	49	1.4	0800	
	Becomes medium dense, more Clayey (SC-CL).							
10			3	X	13	1.1	0810	
	Medium dense, moist, brown, SILTY SAND to SANDY SILT (SM-ML), micaceous.							
15			4	X	14	2.1	0820	
20	Becomes less Sandy (ML).		5	X	19	2.3	0825	
	Very stiff, moist, brown, SANDY CLAY (CH).							
25			6	X	29	1.2	0830	
	Medium dense, moist, brown, SILTY SAND to SANDY SILT (SM-ML) with irregular rock fragments.							
30			7	X	30	2.1	0840	
	Bottom of Boring at 31 feet.							Note: Vertical boring.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 9TW

Fig. C-10

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-3	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-20-87 / DATE FINISHED 8-20-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION .02" Slot	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) –
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalr covering. Stiff, damp, brown, SANDY SILT (ML), micaceous.		1	X	12	1.8	1430	
5	Becomes moist, yellowish brown.		2	X	42	0.8	1450	
	Stiff, moist, yellowish brown, SILTY SAND (SM) grading to SANDY SILT (ML), at about 10 feet, micaceous.							
10			3	X	12	2.0	1505	
	Medium dense, moist, yellowish brown, SILTY fine grained SAND (SM), micaceous.							
15			4	X	11	1.8	1520	
	Very stiff, moist, yellowish brown, SANDY SILT (ML), micaceous, small amounts of (1/10") dark spots in soil.							
20			5	X	17	2.2	1530	
25	No dark spots.		6	X	15	2.0	1540	
30			7	X	22	2.0	1550	
	Bottom of Boring at 31 feet.							Note: Angle drilled 17° due west. Actual vertical depth 29.5'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 10TB

Fig. C-12

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-4	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-25-87 / DATE FINISHED 8-25-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 26	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION .02 Slot	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 6 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering							
	Stiff, moist, yellowish brown, SANDY SILT (ML), little mica.		1	X	10	0	1440	
	CLAYEY SILT (ML).							
	Stiff, moist, brown SANDY, CLAYEY SILT (ML) micaceous, (1/8") dark spots.							
5			2	X	11	0	1450	
	Stiff, moist, yellowish brown, SANDY SILT (ML), micaceous, dark specks.							
10			3	X	12	0	1500	
15	No dark specks, becomes very stiff.		4	X	16	0	1510	
20			5	X	19	0	1520	
25	Becomes CLAYEY (ML).		6	X	16	0.1	1530	
	Bottom of Boring at 26 feet.							Note: Vertical boring.
30								
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 11TW

Fig. C-13

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-4	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-25-87 / DATE FINISHED 8-25-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman, D. Ingebretson	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering							
	Loose, moist, reddish brown, SILTY fine to medium grained SAND (SM).		1	X	9	1.0	0815	
	CLAYEY SILT (ML).							
	Firm, moist, dark brown, SANDY SILT (ML). micaceous.							
5			2	X	8	0.5	0835	
10	Becomes very stiff, yellowish brown.		3	X	20	0.1	0845	
15			4	X	26	0.4	0905	
20	Medium dense, moist, yellowish brown, SILTY SAND (SM).		5	X	14	0.1	0915	
	Stiff, moist, olive brown, CLAYEY SILT (ML), micaceous.							
25	Medium dense, moist, yellowish brown, SILTY SAND to SANDY SILT (SM-ML), micaceous.		6	X	18	0	0925	
30	Very stiff, moist, olive brown, CLAYEY SILT (ML) with dark specks, micaceous.		7	X	26	0	0940	
	Bottom of Boring at 31 feet.							Note: Angle drilled at 17° due south. Actual vertical depth 29.6'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 11TB

Fig. C-14

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-4	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-25-87 / DATE FINISHED 8-25-87
DRILLING EQUIPMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 26	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION .02" Slot	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 6 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Loose, moist, reddish brown SILTY fine to medium grained SAND (SM).		1	X	8	0	1245	
	CLAYEY SILT (ML). Stiff, moist, brown SANDY SILT (ML) dark specks, micaceous.							
5			2	X	13	0	1255	
10	Becomes very stiff.		3	X	26	0	1305	
15	Becomes stiff.		4	X	9	0	1310	
	Stiff, moist, olive brown, CLAYEY SILT (ML), micaceous.							
20			5	X	9	0	1315	
	Very stiff, moist, medium brown, SANDY SILT (ML), micaceous.							
25			6	X	16	1.0	1325	
	Bottom of Boring at 26 feet.							Note: Vertical boring.
30								
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 12TW

Fig. C-15

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-4	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-25-87 / DATE FINISHED 8-25-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. –	UNDIST. 7	CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST –	COMPL. –	24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering							
	Medium dense, moist, reddish brown, SILTY SAND (SM) with gravel.		1	X	11	0.5	1030	
	CLAYEY SILT (ML).							
	Firm, moist, brown SILT (ML), micaceous.							
5			2	X	7	0.7	1045	
	Medium dense, moist, yellowish brown, SILTY SAND (SM), micaceous.							
10			3	X	23	0	1055	
15			4	X	16	0	1105	
	Loose, moist, yellowish brown, SILTY fine grained SAND (SP-SM), micaceous.							
20			5	X	9	0	1115	
25	Becomes medium dense, more SILTY (SM), micaceous.		6	X	14	0.3	1125	
	Very stiff, moist, olive brown, CLAYEY SILT (ML), micaceous. Some white deposits and black specks.							
30			7	X	18	0.2	1135	
	Bottom of Boring at 31 feet.							Note: Angle drilled at 17° south ~ 20 west Actual Vertical depth 29.5'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 12TB

Fig. C-16

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-4	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-31-87 / DATE FINISHED 8-31-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION .02" Slot	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Medium dense, damp, yellowish brown, GRAVELLY SAND (SM).(FILL)		1	X	11	0.3	1000	
	Stiff, damp brown, SANDY CLAY (CL)							
5	Becomes yellowish brown.		2	X	12	0.6	1010	
	Very stiff, moist, brown, SANDY CLAY (CH), with specks of black.							
10			3	X	27	0	1025	
15	Becomes stiff, (CL).		4	X	13	0	1030	
	Medium dense, moist, olive brown, SANDY SILT to CLAYEY SILT (ML).							
20	With grayish specks.		5	X	24	0	1040	
25			6	X	20	0	1045	
30	Sandy layer (SM-ML), very dense.		7	X	39	0.1	1100	
	Bottom of Boring at 31 feet.							Note: Vertical boring.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 87418 :30

LOG OF BORING 13TW

Fig. C-17

WOODWARD-CLYDE CONSULTANTS

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-5-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V4
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	ND	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-5-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/KG(PPB)
1	1,3-DIOXOLANE	VOA	600.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-7-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V11
LEVEL:	MEDIUM	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G:1ML,200UL:1ML,5		

CAS #	COMPOUND	CONC: UG/G(PPM)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	810.	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	840.	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-7-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V11
LEVEL:	MEDIUM	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G:1ML,200UL:1ML,5		

CAS #	COMPOUND	CONC: UG/G(PPM)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	ND	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-7-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/G(PPM)
1	NONE FOUND	VOA	

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.

ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.

TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

September 15, 1987

RECEIVED
SEP 16 1987

WCAS
WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMIST

WOODWARD-CLYDE
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Allistair Callendar

JOB NO. 6995

LABORATORY REPORT

Samples Received: Twenty-one (21) soil samples
Date Received: 8-31-87
Released for Analysis: 9-9-87
Purchase Order No: Proj: 41863C/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Six soils	Fuel Hydrocarbons by modified EPA 8015	Table I
Three soils	pH by EPA 9040	Table II
Three soils	Conductivity	Table II

James Bonde
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225

August 31, 1987

RECEIVED
SEP 2 1987

WCAS
WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEM.

WOODWARD-CLYDE CONSULTANTS
203 N. Golden Circle Dr.
Santa Ana, CA. 92705

Attn: Allistaire Callendar

JOB NO. 6887

LABORATORY REPORT

Samples Received: Eight (8) soils
Date Received: 8/19/87
Purchase Order No: 41863C

Samples	Analysis	Results
Three (3) soils	Gas Chromatography by modified EPA 8015	Table I

TABLE I

Parts Per Million

Sample No	Gasoline	Diesel Fuel	Kerosene	Mineral Spirits
20B-2-3	ND	69	ND	ND
20B-3-3	ND	ND	ND	ND
20B-4-3	ND	ND	ND	ND
Detection Limit	10	10	10	10

ND - Not Detected

Date Analyzed: 8/28/87

Page 1 of 1

James Bonde
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225

Woodward-Clyde Consultants

SHIPMENT NO.: 7

PAGE 1 OF 2

DATE 8/28/87

CHAIN OF CUSTODY RECORD

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C-1000

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
ITW-1-3	ITW	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT:
ITW-2-3			CALIF.				ALISTAIRE
ITW-3-3	–					8015 mod	CALLENDAR
ITW-4-3	–					"	
ITW-5-3	–						8015 mod
ITW-6-3							
ITW-7-3							
ZTB-1-3	ZTB						
ZTB-2-3	–						8015
ZTB-3-3	–						"
ZTB-4-3	–						"
ZTB-5-3							
ZTB-6-3							
ZTB-7-3							
ZTB-8-3							
ZTW-1-3	ZTW						
ZTW-2-3	–						8015
ZTW-3-3	–						"
ZTW-4-3	–						"
ZTW-5-3	–						"

Total Number of Samples Shipped: 29 | Sampler's Signature:

Relinquished By:	Received By:	Date / Time
Signature: Larry R. Rapp Printed Name: Larry R. Rapp Company: Woodward-Clyde Consultants Reason:	Signature: [signature] #~~6985~~ [signature] Printed Name: G. K. Kanick Company: WCAS #6986	Date: 8/28/87 Time: 1700
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

BOE-C6-0220566

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 7

PAGE 2 OF 2

DATE 8/28/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C-1000

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
2TW-6-3	2TW	SOIL	MOD.	BRASS TUBE	ICE	NONE	SEE PAGE 1
2TW-7-3	↓	↓	CALIF.	↓	↓	↓	
10TW-1-3	10TW	↓	↓	↓	↓	↓	
10TW-2-3	↓	↓	↓	↓	↓	↓	8240
10TW-3-3	↓	↓	↓	↓	↓	↓	"
10TW-4-3	↓	↓	↓	↓	↓	↓	"
10TW-5-3	↓	↓	↓	↓	↓	↓	
10TW-6-3	↓	↓	↓	↓	↓	↓	
10TW-7-3	↓	↓	↓	↓	↓	↓	

#6986

Total Number of Samples Shipped: 29

Sampler's Signature:

Relinquished By:	Received By:	Date / Time
Signature: Larry R. Rapp Printed Name: Larry R. Rapp Company: Woodward-Clyde Consultants Reason:	Signature: [signature] #~~6985~~ Printed Name: G. K. Daniels Company: [illegible]	Date: 8/28/87 Time: 1700
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 9

PAGE 1 OF 1

DATE 9/1/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C-1000

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
3TW-1-3	3TW	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT:
3TW-2-3			CALIF.				ALISTAIRE
3TW-3-3							CALLENDAR
3TW-4-3							
3TW-5-3							
3TW-6-3							
3TW-7-3							
4TW-1-3	4TW						
4TW-2-3							

Total Number of Samples Shipped: 9

Sampler's Signature: [illegible]

Relinquished By:	Received By:	Date / Time
Signature: [illegible]	Signature: [illegible]	Date: 9/1/87
Printed Name: Larry R. Kapp	Printed Name: G. K. Daniels	Time: 1130
Company: Woodward-Clyde Consultants	Company: WCAS #7005	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

BOE-C6-0220568

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 4

PAGE 2 OF 2

DATE 8 12/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C-1000

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
11TB-1-3	11TB	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT
11TB-2-3			CALIF.				ALISTAIRE
11TB-3-3						8015	CALLENDOR
11TB-4-3						"	(714) 835-6886
11TB-5-3						"	
11TB-6-3							~~8015 mod~~ inc
11TB-7-4							
11TW-1-3	11TW						
11TW-2-3							
11TW-3-3							8015 Mod
11TW-4-3							" "
11TW-5-3							" "
11TW-6-3							"
12TB-1-3	12TB						
12TB-2-3							
12TB-3-3							"
12TB-4-3							"
12TB-5-3							"
12TB-6-3							
12TB-7-3							

Total Number of Samples Shipped: 26

Sampler's Signature: [signature]

Relinquished By	Received By	Date / Time
Signature: [signature] Printed Name: DAN INGEBRETSON Company: WCC Reason:	Signature: [signature] #6936 Printed Name: G.K. Daniel Company: WCAS	Date: 8/25/87 Time: 1700
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

Woodward-Clyde Consultants

SHIPMENT NO.: 4

CHAIN OF CUSTODY RECORD

PAGE 2 OF 2

DATE 8/25/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
12TW-1-3	12TW	SOIL	MOD.	GLASS TUBE	ICE	NONE	SEE PAGE 1
12TW-2-3			CALIF				
12TW-3-3							8015 mod
12TW-4-3							"
12TW-5-4							"
12TW-6-3							

Total Number of Samples Shipped: 26

Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 8/25/87
Printed Name: DAN INGLEKETSON	Printed Name: G.K. Daniels	Time: 1700
Company: WCC	Company: WCN	
Reason:	#6936	

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Special Shipment / Handling / Storage Requirements:

* Note — This does not constitute authorization to proceed with analysis

LA/OR-0183-421

BOE-C6-0220570

Woodward-Clyde Consultants

SHIPMENT NO.: 6

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 8 12 87

PROJECT NAME: 8741863C-1000

PROJECT NO.: DOUGLAS AIRCRAFT

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
ITB-2-3	ITB	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT:
ITB-3-4	—		CALIF.				ALKTAIRE
ITB-4-3	—						CALLENDAR
ITB-5-3	—						
ITB-6-3	—						8015 mod.
ITB-7-3							
3TB-1-3	3TB						
3TB-2-3							
3TB-3-3	—						
3TB-4-3	—						
3TB-5-3	—						
3TB-6-3							
3TB-7-3							
4TB-1-3	4TB						
4TB-2-3							
4TB-3-3	—						
4TB-4-3							
4TB-5-3	—						
4TB-6-3							
4TB-7-3	—						

Total Number of Samples Shipped: 20 Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 8/27/87
Printed Name: Larry R. Rapp	Printed Name: G. K. Daniels	Time: 1600
Company: Woodward-Clyde Consultants	Company: WCAS #6966	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

BOE-C6-0220571

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 5

PAGE 2 OF 2

DATE 8/26/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
38TBN-7-3	38TBN	SOIL	MOD.	BRASS TUBE	ICE	NONE	SEE PAGE 1
38TBS-1-3	38TBS		CALIF.				
38TBS-2-3							
38TBS-3-3	—						8015 mod
38TBS-4-3	—						" "
38TBS-5-3							
38TBS-6-3	—						" "
38TBS-7-4							
38TS-S-1	38TS-S	—					8015 mod
38TS-E-1	38TS-E	—					" "

Total Number of Samples Shipped: 30

Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 8/26/8
Printed Name: DAN INGETBRETSON	Printed Name: G.K. Daniel #6955	Time: 1750
Company: WCC	Company: WCAS	
Reason:		
Relinquished By:	Received By:	Date / /
Signature:	Signature:	Time
Printed Name:	Printed Name:	
Company:	Company:	
Reason:		
Relinquished By:	Received By:	Date / /
Signature:	Signature:	Time
Printed Name:	Printed Name:	
Company:	Company:	
Reason:		
Relinquished By:	Received By:	Date / /
Signature:	Signature:	Time
Printed Name:	Printed Name:	
Company:	Company:	
Reason:		

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 3

PAGE 1 OF 2

DATE 8 12 87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C-1000

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
15TB-1-3	15TB	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT
15TB-2-3			CALIF.				ALISTAIRE
15TB-3-3						8240	CALLENDAR
15TB-4-3						"	714-835-6886
15TB-5-3						"	
15TB-6-3							
15TB-7-3							
15TB-8-3							
15TB-9-3							
17TB-1-3	17TB						
17TB-2-3						8240	
17TB-3-3						"	
17TB-4-3							
17TB-5-3						8240	
17TB-6-3							
17TB-7-3						8240	
17TB-8-3							
17TB-9-3							
19TW-1-3	19TW						
19TW-2-3							

Total Number of Samples Shipped: 32 | Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature] Printed Name: DAN INGEBRETSON Company: WCC Reason:	Signature: [signature] Printed Name: G.K. Daniels Company: WCAS #6926	Date: 8/24/87 Time: 1805
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR-0183-421

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 3

PAGE 2 OF 2

DATE 8 12 87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 87-1833C-1000

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
A-19TW-2-3	19TW	SOIL	MOD.	BRASS TUBE	ICE	NONE 8015	SEE PAGE 1
A-19TW-4-3	↓	↓	COLIF.	↓	↓	"	
A-19TW-5-3			↓			"	
A-19TW-6-3							
A-19TW-7-3							
~~19TW-8-3~~	—						
A-20TW-1-3	20TW						
A-20TW-2-4	↓						
A-20TW-3-4	↓					8015	
A-20TW-4-3	↓					"	
A-20TW-5-3	↓					"	
A-20TW-6-3							
A-20TW-7-3	↓	↓	↓	↓	↓	↓	

Total Number of Samples Shipped: 32 | Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 8/24/87
Printed Name: DAN INGLEBRETSON	Printed Name: C.K. Daniel #6926	Time: 1805
Company: WCC	Company: WCC	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Relinquished By:	Received By:	Date / Time
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

BOE-C6-0220574

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-2-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/KG(PPB)
1	NONE FOUND	VOA	

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-3-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V3
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	ND	50.
71-55-6	1,1,1-TRICHLOROETHANE	36.	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	8.	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-3-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V3
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	ND	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-3-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/KG(PPB)
1	NONE FOUND	VOA	

Woodward-Clyde Consultants

SHIPMENT NO.: 8

CHAIN OF CUSTODY RECORD

PAGE 1 OF 2

DATE 8/31/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C-1000

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
9TW-1-3	9TW	SOIL	MOD	BRASS TUBE	ICE	NONE	CONTACT:
9TW-2-4			CALIF				ALLISTAIRE
9TW-3-3							CALLENDAR
9TW-4-3							
9TW-5-3							
9TW-6-4							
9TW-7-3							
13TW-1-3	13TW						
13TW-2-3							
13TW-3-3							
13TW-4-3							
13TW-5-3							
13TW-6-3							
13TW-7-3							
14TW-1-3	14TW						
14TW-2-3							
14TW-3-3							
14TW-4-3							
14TW-5-3							
14TW-6-3							

Total Number of Samples Shipped: 21 | Sampler's Signature:

Relinquished By:	Received By:	Date / Time
Signature: Larry R. Rapp Printed Name: Larry R. Rapp Company: WOODWARD-CLYDE CONSULTANTS Reason:	Signature: Mary Coleywall Printed Name: Mary C Company: WCAS, #6995	Date: 8/31/87 Time: 2:10 p.m.
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

BOE-C6-0220579

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 8

PAGE 2 OF 2

DATE 8/31/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C-1000

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
14TW-7-3	14TW	SOIL	MOD CALIF	BRASS TUBE	ICE	NONE	See page 1

Total Number of Samples Shipped: 21

Sampler's Signature:

Relinquished By	Received By	Date / Time
Signature: Larry R. Rapp Printed Name: Larry R. Rapp Company: WOODWARD-CLYDE CONSULTANTS Reason:	Signature: Mary Cederwall Printed Name: MARY C Company: WCAS #6995	Date: 8/31/87 Time: 2:00 PM
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 2

PAGE 1 OF 2

DATE 8/20/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: ~~[illegible]~~ 8741863C-1000

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
X 19TB-2-4	19TB	SOIL	MOD.	BRASS	ICE	NONE	CONTACT
19TB-3-3	↓	↓	CALIF.	TUBE	↓	8015m ↓	* ALISTAIRE
19TB-4-3	↓	↓	↓	↓	↓	↓	* CALLENDAR
19TB-5-3	↓	↓	↓	↓	↓	↓	* 74 835 68BG
19TB-6-3	↓	↓	↓	↓	↓	↓	
19TB-7-3	↓	↓	↓	↓	↓	↓	
215B-1-3	215B	↓	↓	↓	↓	↓	
215B-2-3	↓	↓	↓	↓	↓	↓	* Hold for
215B-3-3	↓	↓	↓	↓	↓	↓	* Analysis
215B-4-3	↓	↓	↓	↓	↓	↓	* spec.
215B-5-3	↓	↓	↓	↓	↓	↓	
215B-6-3	↓	↓	↓	↓	↓	↓	
215B-7-3	↓	↓	↓	↓	↓	↓	
↑							
S							

Total Number of Samples Shipped: 27

Sampler's Signature: [signature] #8904

Relinquished By:	Received By:	Date / Time
Signature: Dan Ingebretson Printed Name: DAN INGEBRETSON Company: WCC Reason:	Signature: [signature] Printed Name: G.K. Daniels Company: WLAS	Date: 8/20/87 Time: 1730
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

Woodward-Clyde Consultants

SHIPMENT NO.: 2

CHAIN OF CUSTODY RECORD

PAGE 2 OF 2

DATE 8 20 87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.: 8741863C TASK 1000

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
10TB-1-3	10TB	SOIL	MOD	BRASS TUBE	ICE	NONE	CONTACT
10TB-2-3			CALIF.				AUSTAIRE
10TB-3-3						8015 *	CALLENDAR
10TB-4-3						*	
10TB-5-3						*	
10TB-6-3							
10TB-7-3							
225B 1-3	225B						
225B-2-3							* 8015
225B-3-3							*
225B-4-3							*
225B-5-3							
225B-6-3							
225B-7-3							

Total Number of Samples Shipped: 27 | Sampler's Signature:

Relinquished By	Received By	Date / Time
Signature: Dan Ingebretson Printed Name: DAN INGEBRETSON Company: WCC Reason:	Signature: [illegible] #6904 Printed Name: G.W. Daniels Company: WCC	Date: 8/20/87 Time: 1730
Signature: Printed Name: Company: Reason:	Signature: Printed Name: Company:	Date: / / Time:
Signature: Printed Name: Company: Reason:	Signature: Printed Name: Company:	Date: / / Time:
Signature: Printed Name: Company: Reason:	Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 1

PAGE 1 OF 1

DATE 8/19/87

PROJECT NAME: DOUGLAS AIRCRAFT

PROJECT NO.:

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
20TB-1-3	20TB	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT
20TB-2-3			CALIF.			8015 m	ALISTAIRE
20TB-3-3							CALLAHAN
20TB-4-3							(714) 835-6886
20TB-5-3							
20TB-6-3							
20TB-7-3							
20TB-8-3							

Total Number of Samples Shipped: 8

Sampler's Signature:

Relinquished By	Received By	Date / Time
Signature: Don Engebretsen Printed Name: DON ENGEBRETSEN Company: WCC Reason:	Signature: Printed Name: G.K. Daniels Company: WCHS #6887	Date: 8/19 Time: 1510
Signature: Printed Name: Company: Reason:	Signature: Printed Name: Company:	Date: / / Time:
Signature: Printed Name: Company: Reason:	Signature: Printed Name: Company:	Date: / / Time:
Signature: Printed Name: Company: Reason:	Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

* Note – This does not constitute authorization to proceed with analysis

LA/OR–0183–421

BOE-C6-0220583

WEST COAST ANALYTICAL SERVICE, INC.

Woodward-Clyde
Mr. Allistair Callendar

Job # 6955
Sept. 2, 1987

LABORATORY REPORT

TABLE III

Conductivity

Sample No.	Microhms/cm
9TB-3-3	140
9TB-4-3	71
9TB-5-3	52
26TB-3-3	130
26TB-4-3	72
26TB-5-3	95

Date Analyzed: 9-1-87

September 3, 1987

WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMI

WOODWARD-CLYDE
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Allistair Callendar

JOB NO. 6926

LABORATORY REPORT

Samples Received: Thirty-two (32) soil samples
Date Received: 8-24-87
Released for Analysis: 8-31-87
Purchase Order No: Proj: 41863C-1000/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Seven soils	Volatile Organics by EPA 8240	Data Sheets
Six soils	Fuel Hydrocarbons by modified EPA 8015	Table I

TABLE I

Parts Per Million

Sample No.	Gasoline	Diesel Fuel	Kerosene	Mineral Spirits
19TW-3-3	ND	ND	ND	ND
19TW-4-3	ND	ND	ND	ND
19TW-5-3	ND	ND	ND	ND
20TW-3-4	ND	ND	ND	ND
20TW-4-3	ND	ND	ND	ND
20TW-5-3	ND	ND	ND	ND
Detection Limit	10	10	10	10

ND - Not Detected
Date Analyzed: 9-2-87

Page 1 of 1

Michael Shelton
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-3-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V1
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	18.	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	ND	50.
71-55-6	1,1,1-TRICHLOROETHANE	570.	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	56.	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-3-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V1
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	11.	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	110.	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-3-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/KG(PPB)
1	CHLORINATED HYDROCARBONS	VOA	300.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-4-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V7
LEVEL:	MEDIUM	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G:1ML,200UL:1ML,5		

CAS #	COMPOUND	CONC: UG/G(PPM)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	160.	50.
71-55-6	1,1,1-TRICHLOROETHANE	27.	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	10.	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	870.	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-4-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V7
LEVEL:	MEDIUM	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G:1ML,200UL:1ML,5		

CAS #	COMPOUND	CONC: UG/G(PPM)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	41.	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	460.	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-4-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/G(PPM)
1	NONE FOUND	VOA	

WCAS

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-5-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V8
LEVEL:	MEDIUM	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G:1ML,100UL:1ML,5		

CAS #	COMPOUND	CONC: UG/G(PPM)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	50.
74-83-9	BROMOMETHANE	ND	50.
75-01-4	VINYL CHLORIDE	ND	50.
75-00-3	CHLOROETHANE	ND	50.
75-09-2	METHYLENE CHLORIDE	ND	100.
67-64-1	ACETONE	ND	100.
107-02-8	ACROLEIN	ND	100.
107-13-1	ACRYLONITRILE	ND	100.
75-15-0	CARBON DISULFIDE	ND	10.
75-35-4	1,1-DICHLOROETHENE	ND	10.
75-34-3	1,1-DICHLOROETHANE	ND	10.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	10.
109-99-9	TETRAHYDROFURAN	ND	10.
75-69-4	TRICHLOROFLUOROMETHANE	ND	10.
76-13-1	FREON-TF	ND	10.
106-93-4	ETHYLENE DIBROMIDE	ND	10.
123-91-1	1,4-DIOXANE	ND	10.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	10.
67-66-3	CHLOROFORM	ND	10.
107-06-2	1,2-DICHLOROETHANE	ND	10.
78-93-3	2-BUTANONE	1800.	100.
71-55-6	1,1,1-TRICHLOROETHANE	38.	10.
16-23-5	CARBON TETRACHLORIDE	ND	10.
108-05-4	VINYL ACETATE	ND	50.
75-27-4	BROMODICHLOROMETHANE	ND	10.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	10.
78-87-5	1,2-DICHLOROPROPANE	ND	10.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	10.
79-01-6	TRICHLOROETHENE	94.	10.
124-48-1	DIBROMOCHLOROMETHANE	ND	10.
79-00-5	1,1,2-TRICHLOROETHANE	ND	10.
71-43-2	BENZENE	ND	10.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	10.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	100.
75-25-2	BROMOFORM	ND	10.
119-78-6	2-HEXANONE	ND	50.
108-10-1	4-METHYL-2-PENTANONE	ND	50.
127-18-4	TETRACHLOROETHENE	ND	10.
108-88-3	TOLUENE	6300.	10.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-5-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V8
LEVEL:	MEDIUM	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G:1ML,100UL:1ML,5		

CAS #	COMPOUND	CONC: UG/G(PPM)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	10.
100-41-4	ETHYLBENZENE	180.	10.
100-42-5	STYRENE	ND	10.
95-47-6	TOTAL XYLENES	1300.	10.
108-41-8	M-CHLOROTOLUENE	ND	10.
95-50-1	1,2-DICHLOROBENZENE	ND	10.
541-73-1	1,3-DICHLOROBENZENE	ND	10.
106-46-7	1,4-DICHLOROBENZENE	ND	10.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 15TB-5-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/G(PPM)
1	NONE FOUND	VOA	

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-2-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V2
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	ND	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-2-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V2
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	ND	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SITE: DOUGLAS AIRCRAFT
SAMPLE: 17TB-5-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/24/87	GCMS FILENAME:	6926V4
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/01/87	DATE ANALYZED:	09/01/87
STANDARD ID:	VOA397	INSTRUMENT ID:	5101
SAMPLE AMOUNT:	1.0G		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	14.	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	ND	50.
71-55-6	1,1,1-TRICHLOROETHANE	13.	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	7.	5.

BORING LOCATION	See Location Map C6-4	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc. / DRILLER M. Smith	DATE STARTED 8-31-87	DATE FINISHED 8-31-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC / SCREEN PERFORATION .02" Slot	DIAMETER OF BORING (in.) 8	DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY L. Rapp	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Concrete cover (6"D.		1	X	0	0	1205	Sampler sinks under weight of hammer.
	Thin layer of very loose, damp, gray SAND (SP)							
	Very stiff, damp, brown, SANDY CLAY to CLAYEY SAND (SC-CL).(FILL)							
5	Firm, moist, yellowish brown, SANDY CLAY to CLAYEY fine grained SAND (CL-SC).		2	X	7	0	1210	Sand on side of sampler.(tank backfill?)
	Very stiff, moist, yellowish brown with black specks, SANDY CLAY (CL-CH).							
10			3	X	19	0.2	1220	
15	Interbedded with layers of yellowish brown SANDY SILT (SM-ML), micaceous.		4	X	17	0	1225	
20			5	X	19	0.3	1230	
25			6	X	15	0.4	1240	
30			7	X	21	0.2	1250	
	Bottom of Boring at 31 feet.							Note: Vertical Boring.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 14TW

Fig. C-18

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-5	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Romero	DATE STARTED 8-24-87 / DATE FINISHED 8-24-87
DRILLING EQUIPMENT	CME 45, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 41	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) –
No OF SAMPLES	DIST. – / UNDIST. 9 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Medium dense, damp, yellowish brown, SILTY fine to medium grained SAND (SM), micaceous, 4-inch CLAYEY layer near surface. (FILL)		1	X	9	10	1230	Definite odor.
5	**Loose, damp, yellowish brown, fine to medium grained SAND (SP-SM), with some SILT, micaceous, (FILL).**		2	X	2	52	1240	Strong odor.
10	Color changing to gray with some yellowish brown mixed in. Less silt, micaceous (SP).(FILL)		3	X	2	600	1250	Strong odor.
	Stiff, moist, olive brown, CLAYEY SILT (ML), micaceous.							
15			4	X	11	>1000	1300	Strong odor.
	Stiff, moist, olive brown, SANDY SILT (ML), micaceous.							
20			5	X	9	>1000	1310	Strong odor.
	Stiff to very stiff, moist, olive brown, CLAYEY SILT (ML).							
25			6	X	14	>1000	1320	Strong odor.
30			7	X	20	>1000	1335	Strong odor.
35	With some fine grained SAND (ML).		8	X	10	>1000	1345	Strong odor.

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 15TB

Fig. C-19

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
	Stiff, moist, olive brown, CLAYEY SILT (ML), micaceous.							
40			9	X	17	>1000	1400	Strong odor.
	Bottom of Boring at 41 feet.							
45								
50								
55								
60								
65								
70								
75								
80								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

CONT. LOG OF BORING 15TB

Fig. C-20

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-5	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Romero	DATE STARTED 8-24-87 / DATE FINISHED 8-24-87
DRILLING EQUIPEMENT	CME 45, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 41	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 9 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Medium dense, moist, yellowish brown, SILTY fine to medium grained SAND (SM), micaceous. (FILL)		1	X	11	75	1500	Little odor.
5			2	X	2	200	1510	Sample was between the tank backfill and natural material. One edge of sample included natural material, SANDY SILT (ML)
	Stiff to very stiff, moist, yellowish brown, SANDY SILT (ML), micaceous.					30	1515	
10			3	X	16			No odor.
15			4	X	12	45	1530	Slight odor.
20			5	X	17	60	1540	Slight odor.
25			6	X	17	950	1545	Definite odor.
30	Olive brown, CLAYEY SILT layer (ML).		7	X	18	>1000	1600	Strong odor.
35			8	X	16	>1000	1610	

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 17TB

Fig. C-21

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
40	Very stiff, moist, olive brown, CLAYEY SILT (ML), little mica.		9	X	26	>1000	1620	
	Bottom of Boring at 41 feet.							Note: Vertical boring.
45								
50								
55								
60								
65								
70								
75								
80								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

CONT. LOG OF BORING 17TB

Fig. C-22

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-6	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-20-87 / DATE FINISHED 8-20-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Medium dense, damp, brown, GRAVELLY fine to coarse grained SAND (SW).		1	X	11	0.2	0730	No full sample to be sent to laboratory.
	Medium dense, moist, brown, SILTY fine grained SAND (SM), micaceous, with little coarse sand.							
5			2	X	12	0.1	0750	
	Dense, moist, yellowish brown, SILTY fine grained SAND to SANDY SILT (SM-ML), micaceous.							
10			3	X	34	0.8	0805	
15	Stiff, moist, yellowish brown, SANDY SILT (ML), micaceous.		4	X	14	1.4	0815	
20	Becomes medium dense, SILTY fine grained SAND (SM).		5	X	19	1.5	0820	
25	Becomes very stiff, SANDY SILT (ML).		6	X	18	4.0	0835	
30	Very stiff, moist, olive brown, CLAYEY SILT (ML), with some fine grained sand and white deposits, micaceous.		7	X	20	2.2	0845	
	Bottom of Boring at 31 feet.							Note: Angle drilled at 17° due west. Actual vertical depth 29.5'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 19TB

Fig. C-23

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-7	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-20-87 / DATE FINISHED 8-20-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Very stiff, moist to damp, medium gray to dark gray, SANDY SILT (ML).		1	X	24	3.4	1230	
	Very stiff, moist, orangish brown, SANDY SILT (ML), with gravel.							
5	Becomes stiff, dark gray, with some clay and mica.		2	X	9	4.1	1250	
10	Becomes brown with dark spots.		3	X	8	0.2	1305	
	Very stiff, moist, olive brown, SILT (ML), with some fine grained SAND and micaceous (1/8") dark spots.							
15			4	X	14	17	1315	Definite odor.
	Loose, moist, olive brown to dark olive brown, SILTY fine grained SAND (SM-SP), micaceous.							
20			5	X	9	25	1325	Definite odor.
	Medium dense, moist, olive brown to brown SILTY fine grained SAND (SM), micaceous.							
25			6	X	22	0.2	1330	
	Very stiff, moist, brown, SANDY SILT (ML), micaceous.							
30			7	X	21	0.3	1345	
	Bottom of Boring at 31 feet.							Note: Angle drilled at 17° due west. Actual vertical depth 29.5'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 22SB

Fig. C-28

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-8	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 8-26-87 / DATE FINISHED 8-26-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 29.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) N/A
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Concrete covering. Very stiff, moist, dark brown changing to brown SANDY SILT changing to CLAYEY SILT (ML).		1	X	26	0.4	0820	
	Very stiff, moist, yellowish brown, SANDY SILT (ML), micaceous.							
5			2	X	27	0.4	0830	
10	Becomes CLAYEY SILT (ML).		3	X	26	0.4	0845	
	Medium dense, moist, yellowish brown, SILTY fine grained SAND (SM), micaceous.							
15			4	X	13	0.8	0855	
	Very stiff, moist, olive brown, SANDY, CLAYEY SILT (ML), micaceous.							
20			5	X	20	2.8	0910	Cuttings are nearly dry.
	Very stiff, moist, yellowish brown, SANDY SILT (ML), micaceous, with little clay.							
25	Very stiff, moist, yellowish brown, SANDY		6	X	15	1.6	0920	Cuttings become moist again.
	Very stiff, moist, olive brown, CLAYEY SILT (ML), micaceous.							
30			7	X	21	2.5	0930	
	Bottom of Boring at 31 feet.							Note: Angle drilled at 17° due west. Actual Vertical depth 29.5'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 26SB

Fig. C-29

WOODWARD-CLYDE CONSULTANTS

APPENDIX D

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORMS

BORING LOCATION	See Location Map C6-6	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Romero	DATE STARTED 8-24-87 / DATE FINISHED 8-24-87
DRILLING EQUIPEMENT	CME 45, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION .02" Slot	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Stiff, moist, brown to dark brown, SILTY CLAY (CL), micaceous.		1	X	14	0.6	1030	
5	Very stiff, moist, yellowish brown and brown, SANDY SILT (ML), micaceous, some small black deposits and little organics.		2	X	19	0.4	1045	
10	Stiff, moist, brown and olive brown mixed SILT (ML), micaceous, some tan deposits.		3	X	14	1.4	1100	
15	Firm, moist, yellowish brown, SANDY SILT (ML), micaceous.		4	X	7	3.3	1110	
	Stiff to very stiff, moist, yellowish brown brown, SILT (ML).							
20	Little SAND (ML), some orange spots (1/8") occasional gravel.		5	X	23	3.2	1120	
25	No orange spots or gravel.		6	X	13	5.2	1130	
	Very stiff, moist, olive brown, CLAYEY SILT (ML), some white deposits.							
30			7	X	22	3.6	1140	
	Bottom of Borings at 31 feet.							Note: Vertical borings.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 19TW

Fig. C-24

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-6	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc. DRILLER M. Smith	DATE STARTED 8-19-87	DATE FINISHED 8-19-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 34	ROCK DEPTH (ft) –
TYPE OF WELL CASING N/A	SCREEN PERFORATION N/A	DIAMETER OF BORING (in.) 8	DIAMETER OF WELL (in.) N/A
No OF SAMPLES DIST. –	UNDIST. 8 CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft) FIRST –	COMPL. – 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Very stiff, damp, dark gray, SANDY SILT (ML).		1	X	23	0.4	1205	
5	Stiff, moist, yellowish brown, SILT (ML), little mica, some dark gray spots.		2	X	13	0.8	1230	Drill rig down from 1230 to 1500
	Medium dense, moist, yellowish brown, SILTY fine grained SAND (SM), micaceous.							
10			3	X	29	3	1515	
15	Becomes more SILTY (SM-ML).		4	X	16	4	1530	
20	Much less SILTY (SP-SM). Becomes more SILTY (SM).		5	X	12	3	1540	
25	With some small orange spots (1/16").		6	X	21	3.2	1550	
	Stiff, damp, olive brown, CLAYEY SILT (ML) micaceous, some white deposits in tube #4.							
30			7	X	14	3.5	1600	
	Medium dense, damp, yellowish brown, SILTY fine grained SAND (SM), micaceous.							Note: angle drilled at 17° due east. Actual vertical depth 34'.
35			8	X	23	1.0	1615	
	Bottom of Boring at 36 feet.							

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 20TB

Fig. C-25

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-6	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Romero	DATE STARTED 8-24-87 / DATE FINISHED 8-24-87
DRILLING EQUIPEMENT	CME 45, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft) 31	ROCK DEPTH (ft) –
TYPE OF WELL CASING	Schedule 40 PVC	SCREEN PERFORATION .02" Slot	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (in.) 2
No OF SAMPLES	DIST. – / UNDIST. 7 / CORE –	LOGGED BY P. Glaesman	CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST – / COMPL. – / 24 HRS. –		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Stiff, damp, brown to dark brown, SANDY SILT (ML).		1	X	11	0	0800	
5	Hard, moist, light brown and yellowish brown mixed, SANDY SILT (ML).		2	X	41	0.2	0820	
	Very stiff, moist, light brown and little olive brown, mixed CLAYEY SILT (ML), micaceous.							
10			3	X	29	0.4	0830	
	Firm, damp, yellowish brown, SANDY SILT (ML) micaceous.							
15			4	X	8	4.0	0840	
20	Stiff, moist, olive brown, CLAYEY SANDY SILT (ML), micaceous, few orange spots (1/16")		5	X	10	3.4	0850	
	Medium dense, moist, yellowish brown, SILTY fine grained SAND (SM), micaceous.							
25			6	X	15	8.0	0900	
	Very stiff, moist, olive brown, CLAYEY SILT (ML), with some white deposits.							
30			7	X	27	6.0	0915	
	Bottom of Boring at 31 feet.							Note: Vertical boring.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 20TW

Fig. C-26

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map C6-7	ELEVATION AND DATUM	Not Available
DRILLING AGENCY	A & R Drilling, Inc. DRILLER M. Smith	DATE STARTED	8-20-87
		DATE FINISHED	8-20-87
DRILLING EQUIPEMENT	CME 75, 8-inch O.D.,H.S.A.	COMPLETION DEPTH (ft)	29.5
		ROCK DEPTH (ft)	–
TYPE OF WELL CASING	N/A	SCREEN PERFORATION	N/A
		DIAMETER OF BORING (in.)	8
		DIAMETER OF WELL (in.)	N/A
No OF SAMPLES	DIST. – UNDIST. 7 CORE –	LOGGED BY	P. Glaesman
WATER DEPTH (ft)	FIRST – COMPL. – 24 HRS. –	CHECKED BY	M. Razmdjoo

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt covering. Very stiff, moist to damp, medium gray to dark gray, SANDY SILT (ML).		1	X	24	3.4	1230	
	Very stiff, moist, orangish brown, SANDY SILT (ML), with gravel.							
5	Becomes stiff, dark gray, with some clay and mica.		2	X	9	4.1	1250	
10	Becomes brown with dark spots.		3	X	8	0.2	1305	
	Very stiff, moist, olive brown, SILT (ML), with some fine grained SAND and micaceous (1/8") dark spots.							
15			4	X	14	17	1315	Definite odor.
	Loose, moist, olive brown to dark olive brown, SILTY fine grained SAND (SM-SP), micaceous.							
20			5	X	9	25	1325	Definite odor.
	Medium dense, moist, olive brown to brown SILTY fine grained SAND (SM), micaceous.							
25			6	X	22	0.2	1330	
	Very stiff, moist, brown, SANDY SILT (ML), micaceous.							
30			7	X	21	0.3	1345	
	Bottom of Boring at 31 feet.							Note: Angle drilled at 17° due west. Actual vertical depth 29.5'.
35								

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8741863C

LOG OF BORING 22SB

Fig. C-28

WOODWARD-CLYDE CONSULTANTS

ANALYTICAL RESULTS

September 11, 1987

WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEM

WOODWARD-CLYDE
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Allistair Callendar

JOB NO. 6986

LABORATORY REPORT

Samples Received: Twenty-nine (29) soil samples
Date Received: 8-28-87
Released for Analysis: 8-31-87
Purchase Order No: Proj: 8741863-1000/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Three soils	Volatile Organics by EPA 8240	Data Sheets
Ten soils	Fuel Hydrocarbons by modified EPA 8015	Table I

Michael Shelton
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225

WEST COAST ANALYTICAL SERVICE, INC.

Woodward-Clyde
Mr. Allistair Callendar

Job # 6986
Sept. 11, 1987

LABORATORY REPORT

TABLE I

Parts Per Million

Sample No.	Gasoline	Diesel Fuel	Kerosene	Mineral Spirits
1TW-3-3	ND	ND	ND	ND
1TW-4-3	ND	ND	ND	ND
ITW-5-3	ND	ND	ND	ND
2TB-2-3	ND	ND	ND	ND
2TB-3-3	ND	ND	ND	ND
2TB-4-3	ND	ND	ND	ND
2TW-2-3	ND	ND	ND	ND
2TW-3-3	170	ND	ND	ND
2TW-4-3	24000	ND	ND	ND
2TW-5-3	ND	ND	ND	ND
Detection Limit	10	10	10	10

Spike Recovery

Parts Per Milion

	1TW-5-3	2TB-4-3
Amount in Sample	ND	ND
Amount Spiked	506.2	506.2
Amount Found	440	440
Percent Recovery	87%	87%
Spiked with	Kerosene Standard	Kerosene Standard

Date Analyzed: 9-4-87

ND - Not Detected

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-3-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/28/87	GCMS FILENAME:	6986V1
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/09/87	DATE ANALYZED:	09/09/87
STANDARD ID:	VOA561	INSTRUMENT ID:	5100
SAMPLE AMOUNT:	1.0GMS		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	ND	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	CHLORODIBROMOMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	15.	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-3-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/28/87	GCMS FILENAME:	6986V1
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/09/87	DATE ANALYZED:	09/09/87
STANDARD ID:	VOA561	INSTRUMENT ID:	5100
SAMPLE AMOUNT:	1.0GMS		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	ND	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-3-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/KG(PPB)
1	NONE FOUND	VOA	

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-4-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/28/87	GCMS FILENAME:	6986V2
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/09/87	DATE ANALYZED:	09/09/87
STANDARD ID:	VOA561	INSTRUMENT ID:	5100
SAMPLE AMOUNT:	1.0GMS		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	ND	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	CHLORODIBROMOMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-4-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/28/87	GCMS FILENAME:	6986V2
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/09/87	DATE ANALYZED:	09/09/87
STANDARD ID:	VOA561	INSTRUMENT ID:	5100
SAMPLE AMOUNT:	1.0GMS		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	ND	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-4-3

TENTATIVELY IDENTIFIED COMPOUNDS

	COMPOUND NAME	FRACTION	CONCENTRATION UG/KG(PPB)
1	NONE FOUND	VOA	

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-5-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/28/87	GCMS FILENAME:	6986V3
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/09/87	DATE ANALYZED:	09/09/87
STANDARD ID:	VOA561	INSTRUMENT ID:	5100
SAMPLE AMOUNT:	1.0GMS		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
74-87-3	CHLOROMETHANE	ND	30.
74-83-9	BROMOMETHANE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
75-00-3	CHLOROETHANE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	50.
67-64-1	ACETONE	ND	50.
107-02-8	ACROLEIN	ND	50.
107-13-1	ACRYLONITRILE	ND	50.
75-15-0	CARBON DISULFIDE	ND	5.
75-35-4	1,1-DICHLOROETHENE	ND	5.
75-34-3	1,1-DICHLOROETHANE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
76-13-1	FREON-TF	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
123-91-1	1,4-DIOXANE	ND	5.
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	ND	5.
67-66-3	CHLOROFORM	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
78-93-3	2-BUTANONE	ND	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
16-23-5	CARBON TETRACHLORIDE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
79-01-6	TRICHLOROETHENE	ND	5.
124-48-1	CHLORODIBROMOMETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
71-43-2	BENZENE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	50.
75-25-2	BROMOFORM	ND	5.
119-78-6	2-HEXANONE	ND	30.
108-10-1	4-METHYL-2-PENTANONE	ND	30.
127-18-4	TETRACHLOROETHENE	ND	5.
108-88-3	TOLUENE	13.	5.

WEST COAST ANALYTICAL SERVICE, INC.

CLIENT: WOODWARD-CLYDE
SAMPLE: 10TW-5-3
ANALYSIS TYPE: EPA METHOD 8240 (624)

ORGANICS ANALYSIS DATA RESULTS

DATE RECEIVED:	08/28/87	GCMS FILENAME:	6986V3
LEVEL:	LOW	MATRIX:	SOIL
DATE PREPARED:	09/09/87	DATE ANALYZED:	09/09/87
STANDARD ID:	VOA561	INSTRUMENT ID:	5100
SAMPLE AMOUNT:	1.0GMS		

CAS #	COMPOUND	CONC: UG/KG(PPB)	DETECTION LIMIT
108-90-7	CHLOROBENZENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
100-42-5	STYRENE	ND	5.
95-47-6	TOTAL XYLENES	ND	5.
108-41-8	M-CHLOROTOLUENE	ND	5.
541-73-1	1,3-DICHLOROBENZENE	ND	5.
106-46-7	1,4-DICHLOROBENZENE	ND	5.
95-50-1	1,2-DICHLOROBENZENE	ND	5.

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the Detection Limit (DL), the value is reported.

ND - Indicates that the compound was analyzed for but not detected. The minimum DL for the sample with the ND is reported based on necessary concentration or dilution actions.

TR - Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified DL but greater than zero.

September 11, 1987

WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMI

WOODWARD-CLYDE
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Allistair Callendar

JOB NO. 7005

LABORATORY REPORT

Samples Received: Nine (9) soil samples
Date Received: 9-1-87
Released for Analysis: 9-4-87
Purchase Order No: Proj: 8741863C-1000/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Five soils	Fuel Hydrocarbons by modified EPA 8015	Table I

TABLE I

Parts Per Million

Sample No.	Gasoline	Diesel Fuel	Kerosene	Mineral Spirits
3TW-3-3	ND	ND	ND	ND
3TW-4-3	ND	ND	ND	ND
3TW-5-3	ND	ND	ND	ND
4TW-1-3	ND	ND	ND	ND
4TW-2-3	42	ND	ND	ND
Detection Limit	10	10	10	10

ND - Not Detected

Date Analyzed: 9-10-87

James Bonde
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225

September 9, 1987

RECEIVED
SEP 10 1987

WCAS
WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMI

WOODWARD-CLYDE
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Allistair Callendar

JOB NO. 6936

LABORATORY REPORT

Samples Received: Twenty-six (26) soil samples
Date Received: 8-25-87
Released for Analysis: 8-31-87
Purchase Order No: Proj: 8741863C-1000/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Twelve soils	Fuel Hydrocarbons by modified EPA 8015	Table I

James Bonde
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225

Woodward-Clyde
Mr. Allistair Callendar

Job # 6936
Sept.9, 1987

LABORATORY REPORT

TABLE I

Parts Per Million

Sample No.	Gasoline	Diesel Fuel	Kerosene	Mineral Spirits
11TB-3-3	ND	ND	ND	ND
11TB-4-3	ND	ND	ND	ND
11TB-5-3	ND	ND	ND	ND
11TW-3-3	ND	ND	ND	ND
11TW-4-3	ND	ND	ND	ND
11TW-5-3	ND	ND	ND	ND
12TB-3-3	ND	ND	ND	ND
12TB-4-3	ND	ND	ND	ND
12TB-5-3	ND	ND	ND	ND
12TW-3-3	ND	ND	ND	ND
12TW-4-3	ND	ND	ND	ND
12TW-5-3	ND	ND	ND	ND
Detection Limit	10	10	10	10

ND - Not Detected

Date Analyzed: 9-3-87

September 9, 1987

WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMIS

WOODWARD-CLYDE
203 N. Golden Circle Drive
Santa Ana, CA 92705

Attn: Allistair Callendar

JOB NO. 6966

LABORATORY REPORT

Samples Received: Twenty (20) soil samples
Date Received: 8-27-87
Released for Analysis: 8-31-87
Purchase Order No: Proj: 8741863C-1000/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Ten soils	Fuel Hydrocarbons by modified EPA 8015	Table I

James Bonde
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225

WEST COAST ANALYTICAL SERVICE, INC.

Woodward-Clyde
Mr. Allistair Callendar

Job # 6966
Sept.9, 1987

LABORATORY REPORT

TABLE I

Parts Per Million

Sample No.	Gasoline	Diesel Fuel	Kerosene	Mineral Spirits
1TB-3-4	ND	ND	ND	ND
1TB-4-3	ND	ND	ND	ND
1TB-5-3	ND	ND	ND	ND
1TB-6-3	ND	ND	ND	ND
3TB-3-3	ND	ND	ND	ND
3TB-4-3	ND	ND	ND	ND
3TB-5-3	ND	ND	ND	ND
4TB-3-3	ND	ND	ND	ND
4TB-5-3	ND	ND	ND	ND
4TB-7-3	ND	ND	ND	ND
Detection Limit	10	10	10	10

ND - Not Detected

Date Analyzed: 9-5-87

September 3, 1987

RECEIVED
SEP 4 1987

WCAS
WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEM...

WOODWARD-CLYDE
203 N. Golden Circle Drive
Sanata Ana, CA 92705

Attn: Allistair Callendar

JOB NO. 6955

LABORATORY REPORT

Samples Received: Thirty (30) soil samples
Date Received: 8-26-87
Released for Analysis: 8-31-87
Purchase Order No: Pro:41863C/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Nine soils	Fuel Hydrocarbons by modified EPA 8015	Table I
Six soils	pH by EPA 9040	Table II
Six soils	Conductivity	Table III

James Bonde
Senior Chemist

D.J. Northington, Ph.D.
Technical Director

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225

BOE-C6-0220628

WEST COAST ANALYTICAL SERVICE, INC.

Woodward-Clyde
Mr. Allistair Callendar

Job # 6955
Sept. 2, 1987

LABORATORY REPORT

TABLE I

Parts Per Million

Sample No.	Gasoline	Diesel Fuel	Kerosene	Mineral Spirits	C_{18}-C_{25} Hydrocarbons
38TBN-3-3	ND	ND	ND	ND	ND
38TBN-4-3	ND	ND	ND	ND	ND
38TBN-5-3	ND	ND	ND	ND	ND
38TBN-6-3	ND	ND	ND	ND	ND
38TBS-3-3	ND	ND	ND	ND	ND
38TBS-4-3	ND	ND	ND	ND	ND
38TBS-6-3	ND	ND	ND	ND	ND
38TS-S-1	ND	ND	ND	ND	TR<100
38TS-E-1	ND	ND	ND	ND	ND
Detection Limit	10	10	10	10	100

Date Analyzed: 9-2-87

ND - Not Detected
TR - Trace

TABLE II

Sample No.	pH (units)
9TB-3-3	8.2
9TB-4-3	8.3
9TB-5-3	7.9
26TB-3-3	8.2
26TB-4-3	8.6
26TB-5-3	7.9

Date Analyzed: 9-1-87

SECTION 1 - GENERAL INFORMATION

A. Organization of Request for Proposal (RFP)

This RFP is divided into eight sections as follows :

Section 1 : General Information
Section 2 : Background to the Statement of work
Section 3 : Statement of Work
Section 4 : Applicable Codes and Standards
Section 5 : Contractor Supplied Materials
Section 6 : Execution of Work
Section 7 : Health and Safety Requirements
Section 8 : Proposal Format and Contents
Section 9 : Evaluation and Selection Criteria

B. Proposed Schedule

RFP Mailed Out _____
Written Proposal Due _____
Contract Awarded _____

C. Questions Regarding This RFP

Questions regarding this RFP should be directed to Daniel Palacios at (213) 533-5716.

D. Proposal Delivery

Proposals are considered confidential and must be stamped "Attorney Client Priveledged". One original and two copies of your proposal must be recieved in a single sealed package to the DAC Service Contracts Office by the due date specified above.

E. Draft and Final Reports

Until finalized per DAC review, all reports should be clearly marked "DRAFT". Further all reports are considered confidential and must be stamped "Attorney Client Priveleged". The original and one copy of all reports shall be delivered to DAC at:

DOUGLAS AIRCRAFT COMPANY
19503 So. Normandie Ave.
Torrance, CA 90502
Attn : Daniel Palacios
Mail Code C6-71

SECTION 2 - BACKGROUND TO THE STATEMENT OF WORK

In the subject area of this RFP, ~~There~~ are six (6) underground storage tanks located at Douglas Aircraft Company (DAC), Torrance Facility (C6) which will require removal (See Fig 1). Four tanks, Tank 15 through 18, each have a capacity of 5000 gallons and three are currently used to store solvent products. Tank 9T has a capacity of 3000 gallons and was formerly usedto store acid waste but has since been taken out of service. Tank 10T has a capacity of 10,000 gallons and is currently being used to store alkaline condensate from a steam cleaning operation. In 1988 all six underground storage tanks and their associated piping tested tight.

Soil investigations have been conducted in the vicinity of all six tanks. Soil samples from borings_____and more recent borings_____show elevated ova results (See Fig. 1). The analytical results along with the OVA readings for these soil samples also indicated the presence of volatile organic compounds in the soil. The compounds detected in the soil and their concentrations are summarized in table 1.

SECTION 3 - STATEMENT OF WORK

3.1 Scope

This RFP provides standards for the removal and disposal of underground storage tanks at:

DOUGLAS AIRCRAFT COMPANY
Torrance Facility (C6)
19503 So. Normandie Ave.
Torrance, CA 90502

It also covers pumping and disposal of any residual hazardous substances which may be contained in the tanks.

3.2 Tank Removal (Alternative 1)

Based on the background information provided, contractor shall determine whether tanks 15, 16, 17, and 18T can be removed without releasing organic vapors to the atmosphere which may impact the health and safety of unprotected contract workers and DAC employees working in the vicinity.

Based upon this preliminary determination, contractor shall recommend and provide justification for one of the two following courses of action:

A- Installation and operation of a soil vapor extraction system (VES) or other applicable method for reducing the soil VOC (volitile organic carbon) concentration immediately surrounding the tanks to a level appropriate for tank excavation and removal. EITHER PRIOR TO OR DURING TANK EXCAVATION AND REMOVAL

B- Immediate removal of tanks without the need for preliminary soil cleanup. Please refer to Section 3.3 Tank Removal (Alternative 2) if this course of action is recommended.

Excavation of underground storage tanks 9T and 10T is not expected to require VES and will be handled according to Alternative 2 unless contractors evaluation recommends otherwise.

Any recommended course of action other than A or B above will be documented by contractor and will include details of method of evaluation, regulatory authority cited, and final conclusions reached.

If course of action A is selected, contractor shall perform the following tasks:

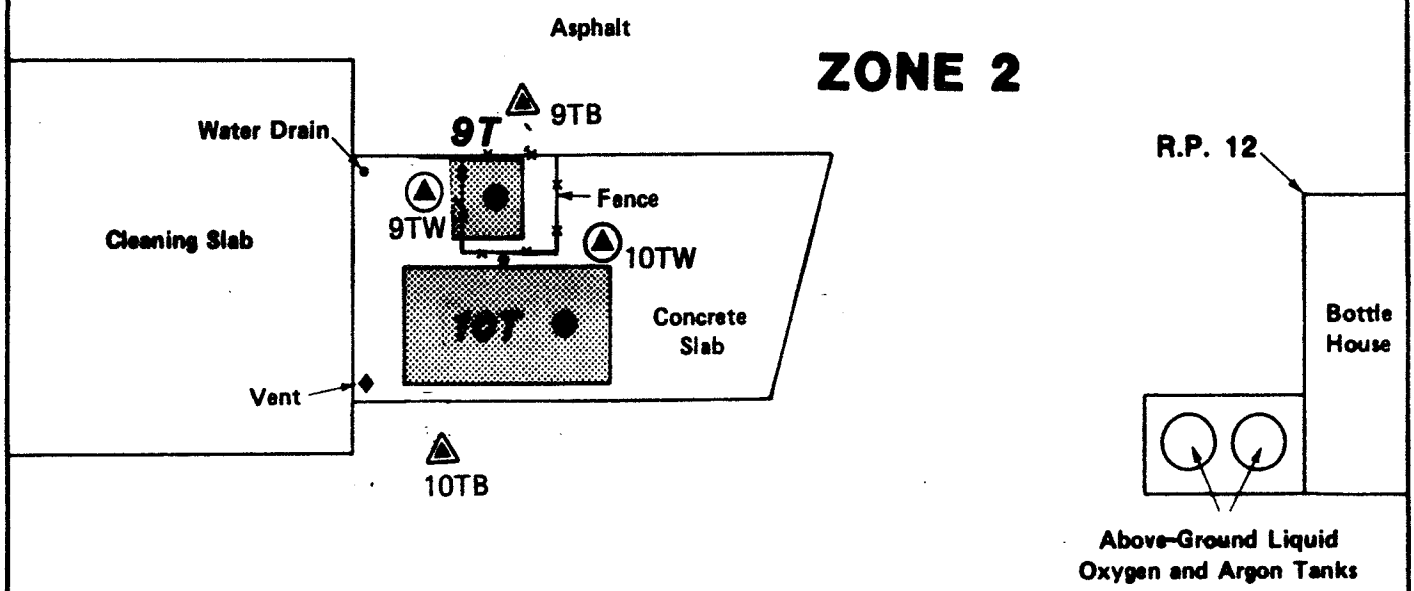
3.2.1 Prepare a Health and Safety Plan.
3.2.2 Prepare a work plan for further soil investigation if needed, ~~and provide recommendations~~.
3.2.3 Prepare a work plan for installing a Vapor Extraction System or other appropriate technology.
3.2.4 Participate in negotiation with applicible regulatory agencies to define "cleanup level" prior to tank removal.
3.2.5 Install AND OPERATE Vapor Extraction System or other applicable technology ~~and operate same~~ to meet defined cleanup level.
3.2.6 Provide status reports on the installation and operation of the above system and the projected cleanup schedule upon request. See below for detailed requirements.
3.2.7 Prepare a draft and final report on the the entire soil cleanup program once acceptable cleanup level has been reached. This shall include but not be limited to :

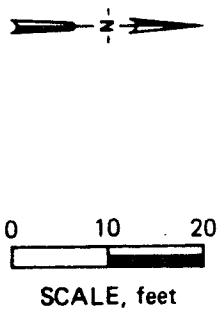
A- Weekly concentration levels in extracted air stream or other weekly method of quantifying the level of cleanup achieved.
B- Weekly record of utilities and chemicals used.
C- Weekly record of hazardous waste generated.
D- Weekly record of hazardous waste transported off of DAC property.
E- Summary of final results, recommendations for further action, and disposition of all vapor extraction equipment and associated debris.

3.3 Tank Removal (Alternative 2)

If it is determined that VES or other methods of soil/vaopr extraction are not needed proior to underground storage tank removal, and /or upon completion of Alternative 1, contractor shall perform the following tasks:

3.3.1 Prepare a Health and Safety Plan.
3.3.2 Whith DAC approval, contact all appropriate regulatory agencies and obtain all necessary permits for groundbreaking, excavation, tank removal, tank disposal, backfilling, and repaving and all other activities associated with underground tank removal of tanks 9T 10T, 15T, 16T, 17T, and 18T.





NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material over tanks 9 and 10 is concrete with asphalt surrounding.
3. No restrictions other than those shown.

October 1987

Project: DOUGLAS AIRCRAFT CO. Project No. 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 9T AND 10T	Fig. C6-3

WOODWARD–CLYDE CONSULTANTS

3.3.3 Triple rinse the interior of the tanks where such cleaning is consistent with the final disposition of the tanks and dispose of the rinsate in an environmentally acceptable manner, submitting full documentation to DAC.

3.3.4 Excavate and remove all six tanks and their associated piping as part of a scheduled program submitted in writing to, and approved by DAC. This scheduled program shall include but not be limited to :

A- Estimated date of removal of each individual tank.
B- Estimated quantity of soil to be removed.
C- Final anticipated disposition of soil and tank.
D- Not to exceed amount for labor, material and disposal costs associated with excavation, removal and backfill.

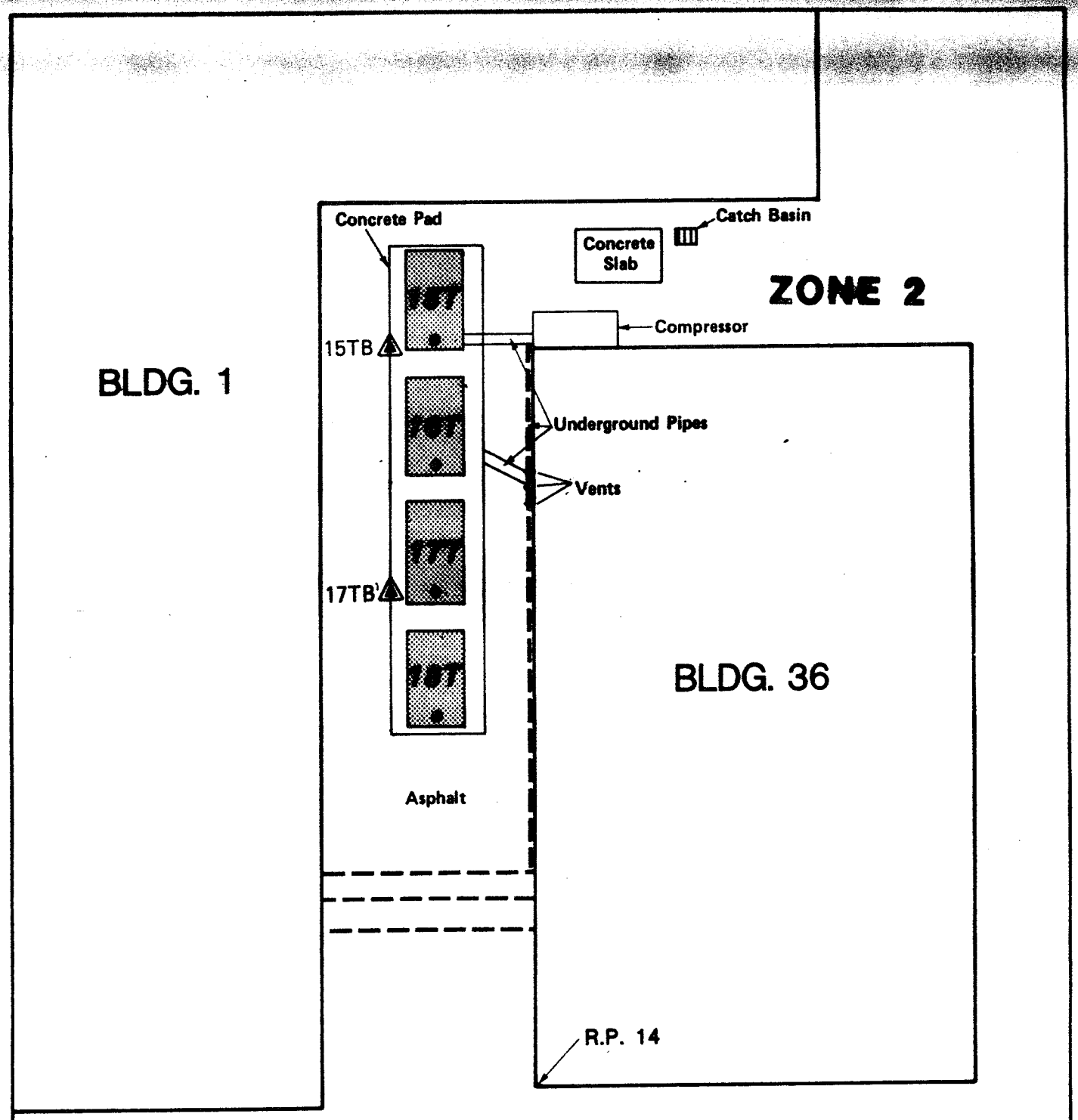
3.3.5 Perform verification check of each excavated pit to verify that the remaining contamination in the soil does not exceed acceptable cleanup levels.

3.3.6 Backfill and compact to 90% with clean soil.

3.3.7 Repave work areas to original condition.

3.3.8 Dispose of any excavated contaminated soil, tanks, piping and associated debris in an environmentally safe manner, ~~AND WITH DAC~~ PER DAC'S PRE-APPROVAL.

3.3.9 Prepare a final report on tank removal including, but not limited to final closure report for each tank, final disposition of soil and tanks, and detailed explaination of unanticipated problems which were encountered during the excavation.



0 10 20

SCALE, feet

NOTES:

1. Underground utilities (water and sewer) supplied by Douglas Aircraft. Utilities are shown only within approximately 30 feet of the tank/sump.
2. The surface material over the tanks is concrete with asphalt surrounding.
3. No restrictions other than those shown.

October 1987

Project: DOUGLAS AIRCRAFT CO. **Project No.** 8741863C-PHASE III	BORING AND WELL LOCATION MAP FOR TANKS 15T TO 18T	**Fig.** C6-5

WOODWARD—CLYDE CONSULTANTS

SECTION 1 - GENERAL INFORMATION

A. Organization of Request for Proposal (RFP)

This RFP is divided into nine sections as follows :

Section 1 : General Information
Section 2 : Background To The Statement of Work
Section 3 : Statement of Work
Section 4 : Applicable Codes and Standards
Section 5 : Contractor Supplied Materials
Section 6 : Execution of Work
Section 7 : Health and Safety Requirements
Section 8 : Proposal Format and Contents
Section 9 : Evaluation and Selection Criteria

B. Proposed Schedule

SITE WALK SPECIFY DATE

RFP Mailed Out
Written Proposal Due
Contract Awarded

C. Questions Regarding This RFP

Questions regarding this RFP should be directed to Boramy Ith at (714) 229 - 3161.

D. Proposal Delivery

Proposals are considered confidential and must be stamped "Attorney Client Privileged". One original and two copies of your proposal must be delivered in a single sealed package to service contracts by the specified date.

E. Draft and Final Reports

Until finalized per DAC review, all reports should be clearly marked "DRAFT". Further, all draft reports are considered confidential and must be stamped "Attorney Client Privileged". The original and one copy of all reports shall be delivered to DAC at :

DOUGLAS AIRCRAFT COMPANY
10833 Valley View Blvd
Cypress, CA 90630
Attn : Boramy Ith

SECTION 2 - BACKGROUND TO THE STATEMENT OF WORK

In the subject area of this RFP, are six (6) 5,000 gallon underground storage tanks located at the Douglas Aircraft Company (DAC), Long Beach Facility (C1), (See Fig. 1). Tank 1T through 4T contains solvent products and are currently in use. In 1986, all six undrground storage tanks and their associated piping tested tight except tank 6T. The

gravity flow inlet pipe from building 10 and the riser pipe associated with tank 6T failed the integrity test. The suspected leak sources were repaired and the tank system tested tight in June 1987.

Tank 5T and 6T formerly stored wastewater containing solvents, oil, and jet fuel. Tank 6T has since been taken out of service and both tanks (5T & 6T) must now be scheduled for removal.

Soil investigations have been conducted in the vicinity of tanks 1T-6T. Soil samples from borings 6T-B1, 6T-B2, and recent borings B1, B2, and B3 had elevated OVA results (See Fig. 1). The analytical results along with the OVA readings for these soil samples indicated the presence of volatile organic compounds in the soil. The compounds detected in the soil and their concentrations are summarized in Table 1.

SECTION 3 - STATEMENT OF WORK

3.1 Scope

This RFP provides standards for the removal and disposal of underground storage tanks at :

DOUGLAS AIRCRAFT COMPANY
Long Beach Facility (C1)
3855 Lakewood Blvd
Long Beach, CA 90846

It also covers pumping and disposal of any residual hazardous substances which may be contained in the tanks.

3.2 Tank Removal (Alternative 1)

Based on the background information provided, contractor shall determine whether tanks 5T & 6T can be removed with minimal health and safety protection required for contractors and DAC employees.

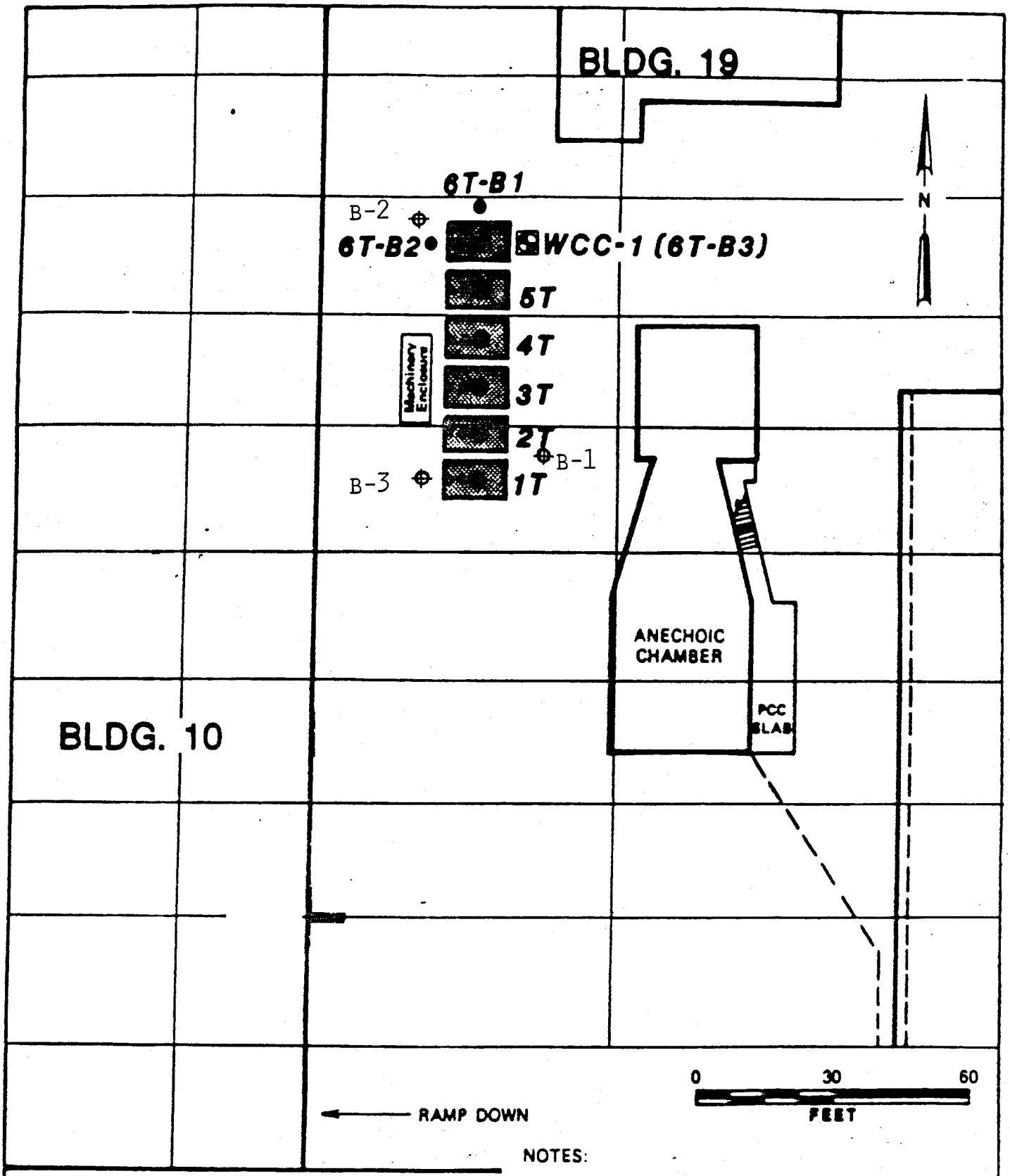
Based on the preliminary determination, contractor shall recommend and provide justification for one of the two following courses of action

A) Install and operate a soil vapor extraction system (VES) or other applicable method for reducing the VOC concentration surrounding the tank area to a level appropriate ~~for tank removal.~~ prior to or during a tank removal.

B) Immediate removal of tanks without the need for preliminary soil cleanup. Refer to Section 3.3 Tank Removal (Alternative 2) if this course of action is recommended.

If VES or other applicable methods are needed, contractor shall perform the work as follows :

3.2.1 Prepare a Health and Safety Plan
3.2.2 Prepare a work plan for further soil investigation if needed
3.2.3 Prepare a work plan for installing and operating a Vapor Extraction System or other applicable methods



LEGEND

6T-B1	●	Boring location
WCC-1	■	Observation well
3T	▬	Tank number and location

NOTES:

1. Utilities shown only within approx. 30 feet of tank.
2. Surface is asphalt.
3. Piping from tanks 1T to 5T runs from west end of tanks into machinery enclosure, then directly into Building 10.

Project: DOUGLAS AIRCRAFT CO. Project No. 41863D	BORING LOCATIONS FOR TANKS 6T, 54T AND 55T	Fig. 1

TABLE 1: SOIL ANALYTICAL RESULTS

SAMPLE NO.	DEPTH (FT)	TPH / OVA (PPM)	MeCl (PPM)	1,1,1-TCA (PPM)	TCE (PPM)	ACETONE (PPM)	1,1-DCE (PPM)	1,1-DCA (PPM)	BENZENE (PPM)	TOLUENE (PPM)
6T-B1-2-3	10	29 / 10		0.170						
(3/10/87)	20	NA /1000 +	3.1		0.57	16.0	0.017	0.05		
	30	24 /1000 +								
	40	NA /1000 +	89.0		0.013					
	50	NA / 220	3.9		0.068					
6T-B2-3-3	15	26 / 700								
(3/10/87)	20	46 /1000 +								
	30	NA /1000 +	3.7	0.013	0.017					
B-1	24	/1000 +	6.6							0.020
(6/09/89)	30	/1000 +	0.19	0.019	0.003				0.001	0.006
	35	/1000 +	2.9							0.020
	39	/1000 +	2.7							
	42.5	/1000 +	130.0	1.400						0.010
	45	/1000 +	97.0	0.420						0.020
B-2	20	/ 650 +	0.5							
(6/12/89)	24	/1000 +	18.0	0.800						
	34	/1000 +	15.0							
	44	/1000 +	56.0				25.0			
	49	/1000 +	290.0				20.0			
B-3	14	/1000 +	36.0							
(6/13/59)	24	/1000 +	0.9						130.0	
	34	/1000 +	320.0	160.0						0.002
	44	/1000 +	120.0							
	46	/1000 +	5,300.0	3,600.0		9.1	150.0			
	49	/1000 +	200.0	9.2						

NOTE: Analyzed by EPA 8015 and 8240
NA = Not Analyzed

BLANK SPACE = Not detected
MeCl = Methylene Chloride

1,1,1-TCA = 1,1,1-Trichlor0ethane
TCE = Trichloroethylene

1,1-DCE = 1,1-Dichloroethene
1,1-DCA = 1,1-Dichloroethane

3.2.4 Participate in negotiation with applicable regulatory agency to define acceptable "cleanup level" prior to tank removal, if necessary.

3.2.5 Install and operate Vapor Extraction System or other applicable methods

3.2.6 Provide status report on VES or other methods used on basis agreed to in the work plan (at least one interim and one final)

3.2.7 Prepare a draft and final report on VES once "acceptable level" has been achieved

3.3 Tank Removal (Alternative 2)

If it is determined that VES or other methods are not needed prior to tank removal, and/or upon completion of Alternative 1, contractor shall perform the tank removal tasks as follow :

3.3.1 Prepare a Health and Safety Plan

3.3.2 Prepare a work plan for tank removal for submittal and approval from regulatory agencies.

3.3.3 Obtain all necessary permits

3.3.4 Triple rinse and dispose of rinsate

3.3.5 Excavate and remove both tanks (5T & 6T) and their associated piping.

3.3.6 Backfill and compact to 90% with clean dirt

3.3.7 Repave work area to its original condition

3.3.8 Dispose of any contaminated soil removed

3.3.9 Prepare a final report on tank removal

SECTION 4 - APPLICABLE CODES AND STANDARDS

4.1 All work must be performed in accordance with accepted Federal, State and Local standards.

4.2 All work must be conducted in a safe manner in accordance with OSHA guidelines and contractor safety guidelines.

4.3 Contractor shall obtain all permits and pay all fees necessary for tank removal from appropriate agencies.

SECTION 5 - CONTRACTOR SUPPLIED MATERIALS

Contractor shall supply all necessary equipment, safety equipment, and materials for removal and disposal of underground storage tanks and associated piping including but not limited to backhoe, crane, dump truck, vacuum truck, dry ice, protective clothing and clean fill dirt .

SECTION 6 - EXECUTION OF WORK

6.1 Contractor Responsibility

6.1.1 Contractor shall be responsible for obtaining all necessary approvals and/or required permits from the applicable agencies in a timely manner.

6.1.2 Contractor shall be responsible for providing all supervision, labor, equipment, and environmental protection to remove and dispose of underground tanks.

6.1.3 Contractor shall be responsible for the diposal of rinsate, tanks, and associated piping at DAC's pre-approved disposal facilities.

6.1.4 Contractor shall be responsible for backfilling of excavated areas and restoration of pavement created by tank removal.

6.2 DAC Responsibility

6.2.1 DAC shall supply available drawings to facilitate the proper removal of underground storage tanks 5T & 6T.

6.2.2 DAC is responsible for providing access to the tanks' location.

6.2.3 DAC is responsible for shutting down all air, water and electrical utilities, as determined to be appropriate .

6.2.4 DAC shall provide a disposal facility location for the disposal of rinsate, tanks, and associated piping and/or potential residual products.

SECTION 7 - HEALTH & SAFETY REQUIREMENTS

7.1 Contractor shall follow OSHA work codes and contracting company safety standards.

7.2 Contractor shall submit their Health & Safety manual to DAC's Occupational Health & Safety Dept. prior to tank removal at :

Occupational Health & Safety Dept. P52
Douglas Aircraft Company
3855 Lakewood Blvd. (MC : 9-19)
Long Beach, CA 90846

7.3 Contractor shall provide all personal protective equipment required to protect their employees during tank removal and closing off the work area to prevent DAC's employees from gaining access.

SECTION 8 - PROPOSAL FORMAT AND CONTENTS

8.1 Table of Contents

8.2 Administrative Information

Give the types and dollar amounts of liability insurance coverage you would provide and any limits or qualifications on such coverage. Name of individuals DAC should contact for further information.

8.3 Personnel Qualifications

Provide a brief biographical sketch of all key personnel who will be utilized for DAC's tank removal and possible soil investigation. The sketch shall include education, background, experience on similar projects and any other pertinent information.

8.4 Technical Approach

8.4.1 Give your company's qualifications and experience with respect to tank removal and soil investigation. When profiling past client projects, list a maximum of three of your most pertinent projects.

8.4.2 Contractor shall describe in detail the technical approach to each of DAC's two Alternative tank removal programs described in Section 3. Provide recommendations as to the location and depth of additional soil borings if needed along with VES recommendations.

8.4.3 Contractor should emphasize any recommended deviations which you may have from DAC's approach.

8.4.4 Describe any work proposed to be subcontracted by task.

8.5 Proposal Costs

Proposal costs shall be given accordingly :

8.5.1 For the different professional levels performing the work, give the fully burdened hourly rates. Finally, provide a description of each professional level.

8.5.2 Give the fully burdened hourly rates for secretaries, typists, drafters, et.al. who will be billing their time to the contract.

8.5.3 Alternative 1 (If determined to be necessary)

a) Give cost for preparing Health & Safety plan and work plans as described in Subsections 3.2.1, 3.2.2, and 3.2.3.

b) Give cost for installing VES or other applicable methods as described in Subsection 3.2.5.

c) Give cost for periodic and final reports as described in Subsection 3.2.6 and 3.2.7.

8.5.4 Alternative 2

a) Cost for preparing Health & Safety plan.

b) Cost of triple rinsing and disposal of rinsate.

c) Cost of tank removal (5 & 6T).

d) Cost of backfilling and compaction with clean dirt.

e) Cost of repaving excavated area to its original condition.

f) Cost for disposal of contaminated soil.

8.6 Schedule

Upon determination of the Alternatives to be implement, provide a task by task schedule in a graphic format .

SECTION 9 - EVALUATION AND SELECTION CRITERIA

9.1 Evaluation of Your Proposal

The emphasis of DAC's proposal evaluation will be on the following subsections which are described below :

a) Administration / Personnel Qualifications
b) Technical Approach
c) Proposal Costs

9.2 Proposal Selection

9.2.1 DAC's selection committee will meet to discuss each proposal.

9.2.2 All proposers will be notified.

9.2.3 After selection of a contractor, the contract will be executed on a standard McDonnell Douglas Corporation - Douglas Aircraft Company contract.

SECTION 1 - GENERAL INFORMATION

A. Organization of Request for Proposal (RFP)

This RFP is divided into eight sections as follows :

Section 1 : General Information
Section 2 : Background To The Statement of Work
Section 3 : Statement of Work
Section 4 : Applicable Codes and Standards
Section 5 : Contractor Supplied Materials
Section 6 : Execution of Work
Section 7 : Health and Safety Requirements
Section 8 : Proposal Format and Contents
Section 9 : Evaluation and Selection Criteria

B. Proposed Schedule

RFP Mailed Out _____
Written Proposal Due _____
Contract Awarded _____

C. Questions Regarding This RFP

Questions regarding this RFP should be directed to Boramy Ith at (714) 229 - 3161.

D. Proposal Delivery

Proposals are considered confidential and must be stamped "Attorney Client Priviledged". One original and two copies of your proposal must bereceived in a single sealed package to service contracts by the specified date.

E. Draft and Final Reports

Until finalized per DAC review, all reports should be clearly marked "DRAFT". Further, all reports ar considered confidential and must be stamped "Attorney Client Priviledged". The original and one copy of all reports shall be delivered to DAC at :

DOUGLAS AIRCRAFT COMPANY
10833 Valley View Blvd
Cypress, CA 90630
Attn : Boramy Ith

SECTION 2 - BACKGROUND TO THE STATEMENT OF WORK

There are six (6) 5,000 gallon underground storage tanks located at the Douglas Aircraft Company (DAC), Long Beach Facility (C1) (See Fig. 1). Tank 1 through 4T contains solvent products and are currently in use. In 1986, all six undrground storage tanks and its associated pipings tested tight accept tank 6T. The gravity flow inlet

pipe and the riser pipe associated with tank 6T failed the integrity test. The suspected leak sources were repaired and the tank system tested tight in June 1987.

Tank 5 and 6T formerly ~~used to~~ stored wastewater containing solvents, oil, and jet fuel. Both tanks (5T & 6T) have since been taken out of service and must now be scheduled for removal.

Soil investigations have been conducted in the vicinity of tank 6T. Soil samples from borings 6T-B1, 6T-B2, and recent borings B1, B2, and B3 had elevated OVA results (See Fig. 1). The analytical results along with the OVA readings for these soil samples also indicated the presence of volatile organic compounds in the soil. The compounds detected in the soil and their concentrations are summarized in Table 1.

SECTION 3 - STATEMENT OF WORK

3.1 Scope

This RFP provides standards for the removal and disposal of underground storage tanks at :

DOUGLAS AIRCRAFT COMPANY
Long Beach Facility (C1)
3855 Lakewood Blvd
Long Beach, CA 90846

It also covers pumping and disposal of any residual hazardous substances which may contained in the tanks.

3.2 Tank Removal (Alternative 1)

Based on the background information provided, contractor shall determine whether tanks 5 & 6T can be removed with minimal health and safety protection required for contractors and DAC employees. Based on the determination made, contractors shall provide reasons as to why or why not a vapor extration system (VES) or other applicable methods are needed to lower the VOC concentration prior to tank removal. If VES or other applicable methods are needed, contractor shall perform the work as follows :

3.2.1 Prepare a Health and Safety Plan
3.2.2 Prepare a work plan for further soil investigation if needed and provide recommendations.
3.2.3 Prepare a work plan for installing a Vapor Extraction System.
3.2.4 Participate in negotiation with applicable regulatory agency to define acceptable "cleanup level" prior to tank removal.
3.2.5 Install Vapor Extraction System or other applicable methods .
3.2.6 Provide status report on VES or other methods used upon request.
3.2.7 Prepare a draft and final report on VES once "acceptable level" has been acheived.

3.3 Tank Removal (Alternative 2)

If it is determined that VES or other methods are not needed prior to tank removal, and/or upon completion of Alternative 1, contractor shall perform the tank removal tasks as follow :

3.3.1 Prepare a Health and Safety Plan
3.3.2 Obtain all necessary permits.
3.3.3 Triple rinse and dispose of rinsate (5T & 6T).
3.3.4 Excavate and remove both tanks (5T & 6T) and its associated pipings.
3.3.5 Backfill and compact to 90% with clean dirt.
3.3.6 Repave work area to its original condition.
3.3.7 Dispose of any contaminated soil removed.
3.3.8 Prepare a final report on tank removal.

SECTION 4 - APPLICABLE CODES AND STANDARDS

4.1 All work must be performed in accordance with accepted Federal, State and Local standards.

4.2 All work must be conducted in a safe manner in accordance with OSHA guidelines and contractor safety guidelines.

4.3 Contractor shall obtain all permits and pay all fees necessary for tank removal from appropriate agencies.

SECTION 5 - CONTRACTOR SUPPLIED MATERIALS

Contractor shall supply all necessary equipment, safety equipment, and materials for removal and disposal of underground storage tanks and associated piping including but [redacted] not limited to backhoe, crane, dump truck, vaccumm truck, dry ice, protective clothings .

SECTION 6 - EXECUTION OF WORK

6.1 Contractor Responsibility

6.1.1 Contractor shall be responsible for obtaining all necessary approvals and/or required permits from the applicable agencies in a timely manners.

6.1.2 Contractor shall be responsible for providing all supervision, labor, equipment, and environmental protection to remove and dispose of underground tanks.

6.1.3 Contractor shall be responsible for conducting all soil tests and providing complete results of all analyses for DAC files

and reporting requirements.

6.1.4 Contractor shall be responsible for backfilling of excavated areas and restoration of pavement created by tank removal.

6.2 DAC Responsibility

6.2.1 DAC shall supply available drawings to facilitate the proper removal of underground storage tanks 5 & 6T.

6.2.2 DAC is responsible for providing acess to the tanks' location.

6.2.3 DAC is responsible for shuting down all air, water and electrical utilities, as determined appropriate by DAC.

SECTION 7 - HEALTH & SAFETY REQUIREMENTS

7.1 Contractor shall follow OSHA work codes and contracting company safety standards.

7.2 Contractor shall submit their Health & Safety manual to DAC's Occupational Health & Safety Dept. prior to tank removal at :

Occupational Health & Safety Dept. P52
Douglas Aircraft Company
~~3855 Lakewood Blvd. (MC : 9-19)~~
Long Beach, CA 90846

7.3 Contractor shall provide all personal protective equipment required to protect their employees during tank removal.

SECTION 8 - PROPOSAL FORMAT AND CONTENTS

8.1 Table of Contents

8.2 Administrative Information

Give the types and dollar amounts of liability insurance coverage you would provide and any limits or qualifications on such coverage. Name of individuals DAC should contact for further information.

8.3 Personnel Qualifications

Provide a biographical resume of all key personnel who will be utilized for DAC's tank removal and possible soil investigation. The sketch shall include education, background, and experience on similar projects, and any other pertinent information.

8.4 Technical Approach

8.4.1 Contractor shall describe in detail the technical approach to

each of DAC's two Alternative tank removal programs described in Section 3.

8.4.2 Contractor should emphasize any recommended deviations ~~which you may have~~ from DAC's SPECIFIED approach.

8.4.3 Give your company's qualifications and experience with respect to tank removal and soil investigation. When profiling past client projects, list a maximum of three of your most pertinent projects.

8.5 Proposal Costs

Proposal NOT TO EXCEED costs shall be given accordingly :

8.5.1 For the different professional levels performing the work, give the fully burdened hourly rates. Finally, provide a description of each professional level.

8.5.2 Give the fully burdened hourly rates for secretaries, typists, drafters, et.al. who will be billing their time to the contract.

8.5.3 Alternative 1 (If determined necessary)

a) Give cost for preparing Health & Safety plan and work plan as described in Subsections 3.1.1, 3.1.2, and 3.1.3.

b) Give cost for installing VES or other applicable methods as described in Subsection 3.1.5.

c) Give cost for periodic and final reports as described in Subsection 3.1.6 and 3.1.7.

8.5.4 Alternative 2

a) Cost for preparing Health & Safety plan.

b) Cost of triple rinsing and disposal of rinsate.

c) Cost of tank removal (5 & 6T).

d) Cost of backfilling and compaction with clean dirt.

e) Cost of repaving excavated area to its original condition.

f) Cost for disposal of contaminated soil.

SECTION 9 - EVALUATION AND SELECTION CRITERIA

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