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Woodward-Clyde Consultants

DOUGLAS AIRCRAFT COMPANY
TORRANCE (C6) FACILITY
PHASE III GROUNDWATER AND SOIL
INVESTIGATION REPORT

Prepared for:

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DOUGLAS AIRCRAFT COMPANY'S
TORRANCE (C6) FACILITY
PHASE III GROUNDWATER AND SOIL INVESTIGATION REPORT

1.0 INTRODUCTION

The purpose of this report is to present the results of Task I and IA of the Phase III groundwater and soil investigation at the Douglas Aircraft Company's Torrance (C6) facility. The C6 facility is located at 19503 South Normandie Avenue in Los Angeles, California (Figure 1). Woodward-Clyde Consultants (Woodward-Clyde) has conducted two previous investigations (1987 and 1988) in the area of Tank Cluster 15T through 18T. The results from these investigations identified this tank cluster as a potential source of volatile organic compounds (VOCs) identified in the groundwater. Additional background information and analytical results from these earlier Woodward-Clyde investigations can be found in the reports submitted to the California Regional Water Quality Control Board (CRWQCB), Los Angeles Region, dated April 1987 and 10 May 1988.

2.0 SCOPE AND OBJECTIVES

The specific scope and objectives of the Phase III groundwater and soil investigation are outlined below. Objectives were to:

1. Evaluate the quality of the groundwater entering the site in the apparent hydraulic upgradient direction of Tanks 15T through 18T.
2. Assess the lateral and vertical extent of VOCs in the groundwater in the vicinity of Tanks 15T through 18T.
3. Evaluate the potential for offsite migration of VOCs in the groundwater.

4. Obtain quantitative estimates for aquifer parameters in the shallow and deep zones within the semi-perched aquifer (to depths of 130 to 150 feet). These parameters are required for design of a remedial program.

5. To estimate the lateral and vertical extent of VOCs in the soil around Tank Cluster 15T through 18T.

These objectives were accomplished using an approach comprised of the following tasks:

- Task I - Installation of five shallow (70 to 90 feet) observation wells (WCC-6S, -7S, -8S, -9S, and -10S) and two deep (120 to 140 feet) observation wells (WCC-1D, and -3D). In addition, Task I involved advancing four soil borings in the vicinity of Tank Cluster 15T through 18T.
- Task IA - Slug testing of six shallow wells and two deep wells.
- Task III - Aquifer testing.
- Task IV - Evaluation of data and report preparation.

The background for this investigation and a description of the tasks is described in Woodward-Clyde's work plan approved by the CRWQCB entitled "Douglas Aircraft Company Torrance (C6) Facility Phase III Ground Water and Soil Investigation Work Plan," dated 9 February 1989. This report presents the results obtained to date from Tasks I, IA, III and IV. Task II wells were not considered necessary for this phase of investigation, based on results from Task I wells.

2.1 Task I

The work performed during Task I involved advancing four soil borings (B-6, -7, -8, and -9), each to a depth of approximately 65 feet, around Tank Cluster 15T through 18T, to evaluate the extent of VOCs in this area. This task also

involved installing wells at two depths in the upper water-bearing unit called the semi-perched aquifer. The upper zone wells are screened from 60 to 90 feet below ground surface, with the static water level at approximately 70 feet below ground surface. These upper zone wells will henceforth be referred to as "shallow" wells. The lower zone wells are screened from 120 to 140 feet below ground surface. The lower zone wells will henceforth be referred to as "deep" wells. The installation of observation wells within the upper and lower zones of the semi-perched aquifer was designed to evaluate differences in vertical gradient and concentrations of VOCs within the semi-perched aquifer. Observation Wells WCC-1D, -3D, -6S, -7S, -8S, -9S, and -10S have been installed in accordance with Task I of the work plan. The observation well locations are shown on Figure 2. Task I also included development of the observation wells, and the collection and analysis of groundwater samples. Wells WCC-1S through WCC-5S had been installed during an earlier phase of work.

2.2 Task IA

The objective of Task IA was to conduct slug tests on six shallow wells and two deep observation wells to provide preliminary estimates of hydraulic conductivity in the shallow and deep zones of the semi-perched aquifer. These data have been used in estimating groundwater velocity and the distribution of VOCs in the groundwater within the subject area.

2.3 Task III

Woodward-Clyde conducted a pump test at the Torrance facility to observe the response of the semi-perched aquifer to hydraulic stresses created by pumping. The results obtained from the pump test and the method of conducting the test are described in Appendix A.

3.0 FIELD PROGRAM

3.1 Soil Boring Installation

Four soil borings, B-6, -7, -8, and -9, were drilled around Tank Cluster 15T through 18T, as shown on Figure 2. Each soil boring was drilled to a depth of 66.5 feet below ground surface. The purpose of the borings was to assess the vertical and horizontal extent of VOCs in the vadose zone soil in the vicinity of the tanks. Borings B-6 and B-7 were placed along the south side of the tanks, while Borings B-8 and B-9 were placed about 40 feet away, to the east and north of the tanks, respectively.

Field procedures used for drilling and sampling activities are described in Appendix A. The lithologic boring logs from B-6, -7, -8, and -9 are presented in Appendix B. The results of soil sample analyses from these borings are presented in Section 4.4.

3.2 Observation Well Installation

Seven observation wells were installed during Task I of this investigation, as previously discussed in Section 2.1. Five of the wells were completed to a depth of 90 feet, and two were completed to a depth of 140 feet. The locations of these wells are shown on Figure 2 and the procedures involved in the installation are described in Appendix A.

Of the five shallow wells, the first, WCC-10S was completed near the northwest corner of the property. This location was chosen to provide information on the quality of groundwater entering the site. The second and third wells, WCC-7S and -8S, were installed downgradient of Tank Cluster 15T-18T to assist in evaluating the lateral extent of VOCs in the groundwater. Observation Well WCC-7S was placed about 160 feet south of WCC-4S, and WCC-8S was placed

approximately 125 feet north of WCC-1S. These locations were chosen considering variations in the direction of groundwater flow (southeast) previously measured at the site, and the concentration level of VOCs in WCC-1S, -3S, and -4S.

The two deep wells were installed to assess the possibility of VOCs migrating vertically downward into the lower zone of the semi-perched aquifer. Well WCC-3D was installed approximately 30 feet east of the tank cluster, and WCC-1D was completed about 190 feet east-southeast of WCC-3D, next to WCC-1S. These wells were also installed to evaluate the differences in hydraulic conductivity between the deep and the shallow zones of the aquifer.

As proposed in the Phase III work plan, Wells WCC-6S and WCC-9S were installed after receiving chemical analysis results from the three initial shallow observation wells (i.e., WCC-7S, -8S, and -10S). Because the results indicated VOCs were present at elevated concentrations in WCC-7S, Wells WCC-6S and WCC-9S were installed in locations which could intercept a more south to southeast path of migration than the wells previously installed.

3.3 Observation Well Slug Testing

Task IA involved conducting slug tests on six shallow wells, and two deep wells, to obtain estimates of horizontal hydraulic conductivity (k) values in the immediate vicinity of the six wells for the shallow and deep zones. Slug tests were completed on shallow Wells WCC-4S, -5S, -7S, -8S, -9S, and -10S. Two deep wells WCC-1D and WCC-3D were also slug tested. Testing dates were 19 July, 31 August, and 4 October 1989. An Envirolabs Data Logger, model DL-120-MCP equipped with a pressure transducer was used for raw data collection. Slugs of water being introduced and withdrawn

from each well were simulated by volume displacement using a 39-inch-long, 3.25-inch-diameter mandrel constructed of PVC pipe and plugs, and filled with silica sand. The slug test procedures and subsequent data analysis are described in Appendix A, while the slug test results are discussed in Section 4.2.

3.4 Pump Test

As part of Task III of this investigation, Woodward-Clyde conducted a 30-hour, constant discharge pumping test on 20 through 21 December 1989 at the Torrance (C6) facility. Well WCC-4S was pumped using a 1-1/2 horsepower submersible pump. Observation wells included WCC-1S, -4S, -6S, -7S, -8S, -9S, and -1D. Five of the wells were automatically monitored for water level using three Terra-8 data loggers equipped with a total of five pressure transducers. In addition, water levels were measured at regular intervals for all of the wells except WCC-1S, -1D, and -4S (monitored by data logger), using a Solonist electrical well sounder. Water level monitoring continued from the time the pump was switched on until two hours after the pump was switched off. The pump test procedures and the subsequent data analysis are described in Appendix A and the pump test results are discussed in Section 4.3.

4.0 RESULTS

4.1 Geology

The general description of shallow (less than 90 feet below ground surface) geologic deposits beneath the site was developed from borings drilled during this and previous Woodward-Clyde investigations (Woodward-Clyde 1987 and 1988). Knowledge of deep lithologic conditions (between 90 and 140 feet below ground surface) is primarily based on investigations by Hargis and Associates at the Montrose site

adjacent to the southern boundary of the DAC Torrance facility (C6) in 1986 and 1988, and from installation of WCC-1D and -3D in 1989 by Woodward-Clyde.

Borings at the site have encountered predominantly clays and silts to depths of 25 to 50 feet. Below that depth, in an interval previously described as the semi-perched aquifer, sedimentary deposits appear to change laterally over short distances, making correlation of specific lithologic units difficult. This is typical of flood-plain alluvial deposits that include sand-filled channels with interbeds and lateral gradation to finer-grained material.

The upper portion of the semi-perched aquifer appears to consist of sands and silty sands with occasional, discontinuous interbeds of silt and clay. This portion extends from below the near-surface clay deposits to depths of approximately 110 feet below ground surface. The lower portion of the semi-perched aquifer is composed of thinner beds of sand, silty sand, and minor amounts of silt. This portion appears to be confined between clay layers at depths of between 115 and 135 feet below ground surface.

4.2 Slug Testing Results

Results from slug testing of Observation Wells WCC-4S, -5S, -7S, -8S, -9S, -10S, -1D, and -3D, including the data reduction, are summarized in Table 1. Hydraulic conductivity values ranged from 24 to 140 gallons per day per square foot (gpd/ft^2) in the shallow wells. These values are typical of the sandy silts and silty sands encountered during drilling in the shallow water bearing zones of the semi-perched aquifer. The calculated hydraulic conductivity values were 21 gpd/ft^2 for WCC-1D and 6.6 gpd/ft^2 for WCC-3D.

4.3 Pump Test Results

The pump test data from each well showing a discernible response were analyzed using one or more of the following techniques: Recovery (Residual Drawdown) plot, Cooper-Jacob Time Drawdown plot, and/or Distance/Drawdown plot. A summary of the results is presented in Table 2. Slug test values obtained earlier are included for reference.

The hydraulic conductivity value derived from the pump test at the pumping well, WCC-4S, was 470 gpd/ft^2 based on analyses of recovery data (residual drawdown). These values are similar to the pump test values calculated using both the Cooper-Jacob method and the Distance Drawdown method using data from the surrounding observation wells. Overall, the calculated hydraulic conductivity values vary within a factor of two (see Table 2). Local variations in stratigraphy can account for this level of variability.

The conductivity values calculated from the slug tests are not directly comparable with conductivity values calculated from the pump test, since the former only tests the portion of the aquifer immediately adjacent to the well screen, while the pump test stresses a much larger volume of the aquifer. Overall the slug test hydraulic conductivity values are roughly on an order of magnitude lower than the pump test values. This level of variability is not surprising given that the specific assumptions and mechanics of the two test techniques are remarkably different.

Variations in the storage coefficients are somewhat greater than those for transmissivity. Fairly wide variations in the calculated storage coefficient are not unusual and, in general, have a minimal impact on the calculated yield.

4.4 Groundwater Gradient and Velocity

The groundwater gradient was calculated from the groundwater elevation data collected on 18 October 1989 (see Table 3), using Equation 1-1 as follows:

$$I = \frac{h_1 - h_2}{L} \qquad (1\text{-}1)$$

Where:

I = Gradient (ft/ft)

h_1 = Upgradient groundwater contour elevation (feet)

h_2 = Downgradient groundwater contour elevation (feet)

L = Distance between groundwater contours (feet)

Based on groundwater level data of 18 October 1989, the gradient across the C6 facility appears to be south to southeast as shown on Figure 3. The gradient was calculated using the assumption that all water bearing strata in this area act as one hydrogeologic unit. This assumption is considered valid for preliminary evaluation of flow velocity and the extent of VOCs in the groundwater.

A gradient of 0.002 ft/ft towards the south-southeast was calculated using Equation 1-1.

The groundwater velocity was calculated from Darcy's equation:

$$V = \frac{KI}{7.48\ n_e} \qquad (1\text{-}2)$$

Where:

V = Groundwater velocity (feet per day)

K = Hydraulic conductivity of the media based on slug test values calculated in Section 4.3 (gal/day/ft^2)

I = Groundwater gradient calculated from Equation 1-1

7.48 = The number of gallons of water per cubic foot

n_e = Effective porosity of the saturated media

Assuming:

K = 715 gal/day/ft^2 for shallow wells
NOTE: The hydraulic conductivity value used in the calculation was the average of the values obtained from all the pump test analytical methods used.

I = 0.002 ft/ft calculated from Equation 1-1

n_e = 0.30 for silty fine-grained sand.

Based on the calculations and assumptions above and the results obtained from the pump test, the groundwater velocity is approximately 0.64 feet per day or 234 feet per year in the shallow zone of the semi-perched aquifer.

There does not appear to be a significant vertical groundwater gradient between the shallow and deep portions of the aquifer. The approximately equal static groundwater levels measured in the associated shallow and deep observation wells WCC-1S and -1D, and WCC-3S and -3D, indicate the major component of groundwater flow is horizontal.

4.5 Soil Sampling and Analytical Results

Soil samples were collected from all the observation wells and soil borings installed during the field program as described in Appendix A. Samples which had elevated OVA headspace readings and which were in close proximity to tank Cluster 15T through 18T, as well as samples from WCC-6S, were selected for analytical testing. Soil samples at selected depths from B-6, B-7, B-8, B-9, and WCC-6S were analyzed by EPA Method 8240 at West Coast Analytical Service (WCAS) in Santa Fe Springs. A summary of results is presented in Table 4, while the analytical data sheets provided by WCAS, and chain-of-custody forms are presented in Appendix C.

The soil sampling results show low concentrations of organic compounds present in most of the borings installed around tank cluster 15T through 18T. Boring B-6 seems to be located near the source of the release. At this location the soil column contained elevated levels of organic compounds beginning at a depth of 20 feet and continuing down to at least 60 feet. At the other boring locations the organic compound concentrations became elevated at depths of 40 feet or more. Both halogenated and nonhalogenated compounds are present at location B-6, with the higher concentrations of each present at a depth of 20 feet. Toluene was the dominant nonchlorinated hydrocarbon present while 1,1,1-trichloroethane (1,1,1-TCA) and trichloroethylene (TCE) were the dominant chlorinated hydrocarbons. At Boring B-7, which is located about 30 feet east of Boring B-6, a similar mix of compounds is present, however, their concentrations are at a greater depth in the boring. The highest concentrations of compounds are present at a depth of 60 feet, with methylene chloride identified in the soil for the first time at this depth. Samples from Boring B-8, which is located east of the tank cluster, also contained

low (<1 ppm) concentrations of compounds except for toluene, which was present at 25 ppm at a depth of 65 feet. Samples from Boring B-9, which is north of the tank cluster, also contained low concentrations of compounds at depth (generally less than 1 ppm).

Three samples collected at, and just below, the water table from the borehole in which Well WCC-6S was installed, contained low concentrations of MEK (9.4 ppm), MIBK (8.4 ppm), toluene (1 ppm), and a compound tentatively identified as butyl cellosolve (0.3 ppm).

4.6 Groundwater Sampling and Analytical Results

During this task, two rounds of groundwater samples were collected and analyzed during July and August from monitoring Wells WCC-1D, -3D, and -1S through -10S, except WCC-6S and WCC-9S. These two wells were the most recently installed, and water sampling was completed the first week in October. The procedures used during these sampling efforts are described in Appendix A.

All of the water samples tested, including groundwater samples, duplicates, rinse blanks, and trip blanks, were analyzed for VOCs by EPA Method 624 by WCAS. For the first round of sampling, one sample from each well, two duplicate samples, three rinse blanks, and one trip blank were analyzed. Analysis of water samples from the second round included one sample from each well, two rinse blanks, and one trip blank.

The groundwater analytical results are summarized in Table 5. Analytical data sheets provided by WCAS, and chain-of-custody forms are attached in Appendix C.

The data indicate that of the 10 shallow wells sampled at the facility, WCC-2S, located upgradient of Tanks 15T through 18T, WCC-5S and WCC-9S, both located along the eastern boundary of the site, contained total VOCs at or below 30 ppb, predominantly TCE. One well, WCC-10S, contained TCE at about 80 ppb and less than 5 ppb of chloroform. The other six shallow wells all contained a similar mix of VOCs, with the dominant compounds being TCE, 1,1-dichloroethene (1,1-DCE), and 1,1,1-TCA, with lower concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) also present.

The deep well closest to the tank cluster (WCC-3D) contained 1,1,1-TCA at concentrations of around 50 ppb on the first occasion the well was sampled. Trace amounts of TCE, toluene, and cis-1,2-DCE were also present. When the well was resampled one month later only 1,1,1-TCA was detected, but the detection limits were ten times higher for the other compounds measured in the first round of sampling because of a laboratory error. Samples from the other deep well (WCC-1D), contained low concentrations of 1,1,1-TCA (1 ppb), TCE (2 ppb), and cis-1,2-DCE (1 ppb). The total VOC concentration in Well WCC-1D was less than 10 ppb.

The water quality data collected to date indicate the presence of TCE in the groundwater (Well WCC-10S) entering DAC's Torrance (C6) facility. The TCE concentration was measured at approximately 80 ppb, nearly an order of magnitude higher than the TCE concentration in Well WCC-2S, upgradient of Tanks 15T through 18T, and Wells WCC-5S and -9S at the downgradient boundary of the site. Wells WCC-7S and WCC-8S are located south and north, respectively, of the previously identified area of groundwater containing VOCs.

5.0 EVALUATION OF GROUNDWATER TREATMENT OPTIONS

Concurrent with field investigations performed by Woodward-Clyde at the Torrance facility, an evaluation was made of treatment options for groundwater containing chlorinated and non-chlorinated hydrocarbons at the site. It was originally the intent of Douglas Aircraft Company to conduct a pilot evaluation of groundwater treatment systems using water produced during the pump test at the site. However, the quantity of water produced during the pump test was not enough for pilot tests, and so bench scale evaluation will be conducted. The tests will be conducted on some of the systems described in the following sections.

5.1 Description of Treatment Options

There are many treatment systems for the removal of organic compounds from groundwater. Three of these systems are:

- Activated Carbon Adsorption
- Air/steam Stripping
- Oxidation

Woodward-Clyde assumed a flow rate of 50 gallons per minute (gpm) and organic concentrations at the levels found in WCC-4S for the characteristics of the influent in this treatment evaluation. The effluent organic concentrations assumed for this evaluation were the California State Action Levels.

5.1.1 Activated Carbon Adsorption

The process of adsorption onto activated carbon involves contacting the organic contaminated groundwater with the carbon, by flow through a series of packed bed reactors. The activated carbon selectively adsorbs chemical

constituents by a surface attraction phenomenon in which organic molecules are attracted to the internal pores of the carbon granules.

Once the micropore surface are saturated with organics, the carbon is "spent" and must be replaced with regenerated or virgin carbon. The time to reach "breakthrough" or exhaustion is the most critical operating parameter. Carbon longevity balanced against influent concentrations governs the operating economics.

5.1.2 Air Stripping

Air or steam stripping is a mass transfer process in which organic constituents in groundwater are transferred to the gas phase (in air/steam). Air or steam stripping is frequently accomplished in a packed tower equipped with an air blower. The packed tower works on the principle of countercurrent flow. The influent water flows down through the packing, while the air/steam flows upward, and is exhausted through the top. Volatile, soluble components have an affinity for the gas phase and tend to leave the aqueous stream for the gas phase. The gas phase effluent must be controlled. This is usually accomplished by using a carbon scrubber for air stripping and a vapor condenser followed by product-water separator for steam stripping.

Woodward-Clyde reviewed the Ejector System, Inc. cascade air stripping. This system is designed to accommodate field changes by allowing for the addition or subtraction of cascade tray modules as conditions dictate. The system is low profile and units are typically shipped completely assembled. Other systems, such as the Aquadetox process, use the same basic principles.

5.1.3 Oxidation

Treatment of groundwater using oxidation is not a new process. New applications using hydroxyl radicals as the oxidizing agent are now available. These radicals can be produced by: ultraviolet (UV) light, hydrogen peroxide, and/or cavitation reactions. Organic constituents are oxidized to carbon dioxide and water by the hydroxyl radicals.

Two types of oxidation systems which Woodward-Clyde evaluated were the CAV-OX process and the Perox-pure process. The CAV-OX process uses induced cavitation and UV light to allow oxidation to occur. The Perox-pure system uses hydrogen peroxide and UV light to cause the oxidation process.

Representatives from each of the vendors expressed the need for bench scale testing in order to better estimate the operation and maintenance costs associated with their system. Such evaluations will be conducted by Douglas Aircraft after bench scale testing has been completed to aid in the selection of an appropriate system.

5.2 Discussion

During this alternative review, vendors contacted indicated that treatability studies done on laboratory scale are completed for a fee. Generally this fee is charged to recoup analytical analysis cost incurred during the testing of the systems. Two types of systems will be evaluated by Douglas Aircraft Company for possible treatment methods for the C6 facility: air/steam stripping and oxidation. These laboratory tests will allow vendors to better conceptualize the required treatment scheme. Also, this will allow an analysis of capital and operation costs for each system and it will help to evaluate the effectiveness of the systems.

6.0 REFERENCES

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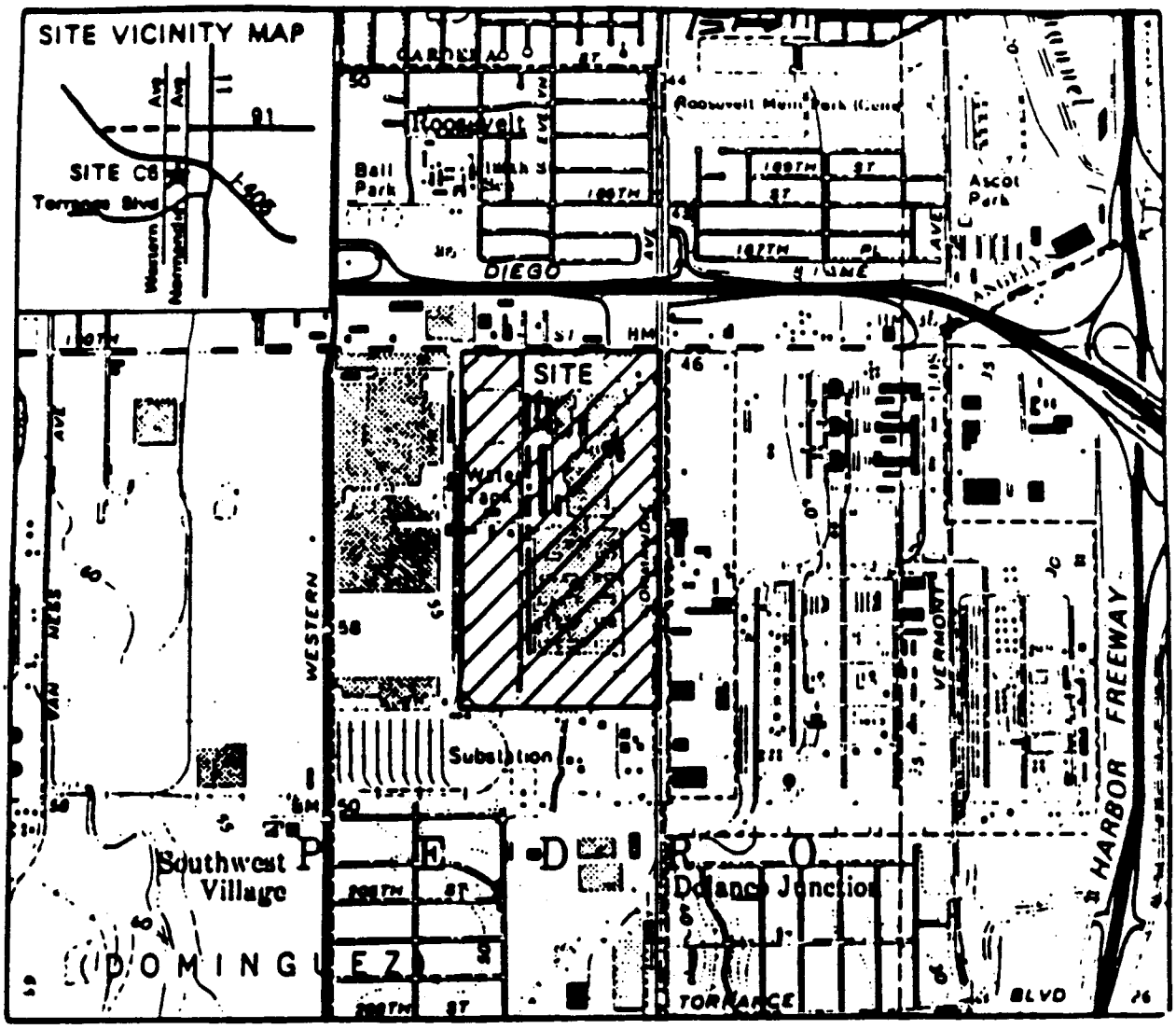
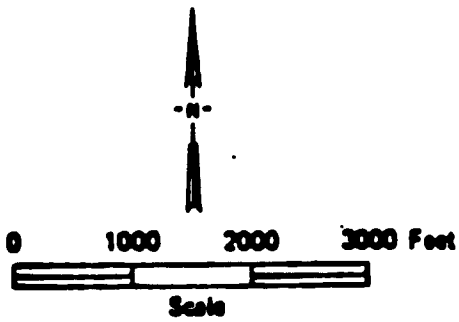


C6 FACILITY



PROJECT: DOUGLAS AIRCRAFT CO. PROJECT NO. 8941863J	C6 FACILITY LOCATION MAP	FIG. 1

WOODWARD-CLYDE CONSULTANTS

TABLE 1
SLUG TEST DATA REDUCTION
DOUGLAS AIRCRAFT C6 FACILITY, TORRANCE CALIFORNIA

Where:

K = Hydraulic Conductivity
Rc = Radius of well casing in feet
Re = Effective Radius of influence (ft)
Yo = Initial drawdown at time t =0 (sec)
H = Distance from base of well to SWL (ft)
A = Constant Based on L/Rw
Yt = Drawdown at time t (sec)
Dw = Depth of well (ft)

Rw = Radius of Boring in feet
L = Length of screen of saturated thickness if entire screen is not saturated in feet
t = Selected time/drawdown semi-log plot (sec)
D = Thickness of aquifer in feet (Bottom of aquifer approx. 150 feet)
B = Constant based on L/Rw

Depth to water(ft) - Measured 19 July, 30 August, and 4 October 1989.

Parameter	WCC-4S		WCC-5S		WCC-7S		WCC-8S	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Rc	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Rw	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Dw	90	90	90	90	90	90	90	90
DTW	69.35	69.35	69.69	69.69	68.41	68.41	70.01	70.01
L = (Dw-DTW)*	20.65	20.65	20.31	20.31	21.59	21.59	19.99	19.99
D = (150-DTW)	80.65	80.65	80.31	80.31	81.59	81.59	79.99	79.99
H = (Dw-DTW)	20.65	20.65	20.31	20.31	21.59	21.59	19.99	19.99
A	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
B	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
L/Rw	49.17	49.17	48.36	48.36	51.40	51.40	47.60	47.60
Yo	0.87	1.5	0.65	2.05	0.84	1.5	0.94	1.5
Yt	0.28	0.33	0.16	0.61	0.38	0.7	0.62	1
t	20	20	11	10	20	20	20	20
Ln Re/Rw =	2.52584	2.52584	2.50616	2.50616	2.57881	2.57881	2.48737	2.48737
K (ft/sec) =	1.00E-04	1.34E-04	2.27E-04	2.16E-04	6.85E-05	6.58E-05	3.74E-05	3.65E-05
AVG K (ft/sec)	1.17E-04		2.22E-04		6.71E-05		3.69E-05	
AVG K (CM/SEC)	3.57E-03		6.76E-03		2.05E-03		1.13E-03	
AVG K (Gal/day/ft2)	7.56E+01		1.43E+02		4.34E+01		2.39E+01	

TABLE 1 (Continued)

Parameter	WCC-9S		WCC-10S		WCC-1D		WCC-3D	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Rc	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Rw	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Dw	90	90	90	90	140	140	140	140
DTW	67.17	67.17	69.51	69.51	70.09	70.09	70.62	70.62
L = (Dw-DTW)*	22.83	22.83	20.49	20.49	20	20	20	20
D = (150-DTW)	82.83	82.83	80.49	80.49	79.91	79.91	79.38	79.38
H = (Dw-DTW)	22.83	22.83	20.49	20.49	69.91	69.91	69.38	69.38
A	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
B	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
L/Rw	54.36	54.36	48.79	48.79	47.62	47.62	47.62	47.62
Yo	0.91	1.9	0.96	1.5	2.25	2.4	1.68	1.7
Yt	0.16	0.21	0.56	0.83	0.39	0.52	1.23	1.36
t	71	77	20	20	117	117	60	60
Ln Re/Rw =	2.64567	2.64567	2.51661	2.51661	3.19028	3.19028	3.18702	3.18702
K (ft/sec) =	4.10E-05	4.79E-05	4.78E-05	5.25E-05	3.45E-05	3.01E-05	1.20E-05	8.56E-06
AVG K (ft/sec)	4.44E-05		5.02E-05		3.23E-05		1.03E-05	
AVG K (CM/SEC)	1.36E-03		1.53E-03		9.86E-04		3.13E-04	
AVG K (Gal/day/ft2)	2.87E+01		3.24E+01		2.09E+01		6.63E+00	

TABLE 2

SUMMARY OF AQUIFER HYDRAULICS TESTING

Well No.	Hydraulic Conductivity (gpd/ft^2)			Coefficient of Storativity (S) (from pump test)
	Slug Test[a]	Pump Test	Pump Test[b] Analysis Method	
1S	--	460	Cooper Jacob	0.014
2S	NT	NM	--	--
3S	NT	ND	--	--
4S	76	470	residual drawdown	--
5S	140	NM	--	--
6S	NT	970	Cooper Jacob	0.004
7S	43	970	Cooper Jacob	0.013
8S	24	560	Cooper Jacob	0.009
9S	29	NR	--	--
10S	32	NM	--	--
1D	NT	NR	--	--
3D	6.6	NM	--	--
1S, 6S, 7S, 8S	--	860	Distance drawdown (500 minutes)	0.007

a Slug test values included for reference, generally not directly comparable to pump test values.

b WCC-4S was pumping well.

NT Not tested.

NR Not responsive.

NM Not monitored.

TABLE 3

GROUND WATER ELEVATION DATA COLLECTED 18 OCTOBER 1989
DOUGLAS AIRCRAFT C6 FACILITY, TORRANCE, CALIFORNIA

Well No.	Elevation[1] Top of Well[2] (ft)	Depth to Ground Water From top of Well (ft)	Elevation of Ground Water (ft)
WCC-1S	50.70	70.18	-19.48
WCC-2S	50.59	69.65	-19.06
WCC-3S	51.19	70.61	-19.42
WCC-4S	49.69	69.28	-19.59
WCC-5S	48.22	67.92	-19.70
WCC-6S	50.95	70.65	-19.70
WCC-7S	48.29	68.36	-20.07
WCC-8S	50.56	69.91	-19.35
WCC-9S	47.01	67.08	-20.07
WCC-10S	51.12	69.54	-18.42
WCC-1D	50.45	69.96	-19.51
WCC-3D	51.18	70.56	-19.38

1 Reference: City of Los Angeles Benchmark CY-3028, datum is Mean Sea Level (MSL).

2 Top of well is top of well casing on north side marked with permanent ink.

(2L-ABC/C6GW3-T2)

TABLE 4

RESULTS OF SOIL ANALYSES AT DAC C6 FACILITY

Boring Number	Depth of Sample (feet)	Halogenated and Aromatic Volatile Organics (EPA Method 8010/8020, concentrations in ppm)	
B-6	10	0.053	methylene chloride
		0.011	DCA
		0.016	TCE
		0.064	toluene
		0.001	ethylbenzene
		0.009	total xylenes
B-6	20	12	TCA
		45	TCE
		1,900	toluene
		51	ethylbenzene
		390	total xylene
B-6	30	48	toluene
		21	total xylenes
B-6	35	19	toluene
		6	total xylenes
B-6	40	59	TCA
		23	TCE
		320	toluene
		2.9	ethylbenzene
		21	total xylenes
B-6	50	0.06	1,1-dicholoroethylene
		0.09	DCA
		0.53	TCA
		0.035	TCE
		0.31	toluene
		0.03	total xylenes
B-6	60	7.7	TCA
		9.9	toluene
		2.9	total xylenes
B-7	30	0.15	TCA
		0.09	TCE
		1.7	toluene
		0.09	total xylenes
B-7	35	1	total xylenes
B-7	40	10	TCA
		40	toluene
		1	total xylenes

(2L-ABC/C6GW3-T3)

TABLE 4 (continued)

Boring Number	Depth of Sample (feet)	Halogenated and Aromatic Volatile Organics (EPA Method 8010/8020, concentrations in ppm)	
B-7	40	12/10 25/40 < 1	TCA toluene xylenes
B-7	50	57 880 4 41 1.7	1,1-dichloroethylene TCA 1,1,2-trichloroethane toluene total xylenes
B-7	60	20,000 600 59,000 140 450	methylene chloride 1,1-dichloroethylene TCA tetrachloroethylene toluene
B-8	45	0.27	toluene
B-8	50	0.04	toluene
B-8	60	0.04 0.44 1.0	DCA TCA toluene
B-8	65	0.05 25	TCA toluene
B-9	40	0.03 0.02 0.08 0.1	DCA TCA TCE toluene
B-9	50	0.02 0.11	TCE toluene
B-9	55	0.03 0.06	TCA toluene
WCC-6S	75	9.4 8.4 1.0 0.30	MEK MIBK Toluene Butyl Cellosolve

(2L-ABC/C6GW3-T3)

TABLE 4 (continued)

Boring Number	Depth (feet)	Halogenated and Aromatic Volatile Organics (EPA Method 8010/8020, concentrations in ppm)	
WCC-6S	80	9.2	MEK
		.24	DCE
		2.50	MIBK
		2.20	toluene
		.08	TCE
		0.70	butyl cellosolve
WCC-6S	85	.550	MEK
		.330	MIBK
		.150	toluene
		.007	TCE

Borings 8 and 9 sampled on 6/14/89, Borings 6 and 7 sampled on 6/13/89.

MEK, 2-Butanone
MIBK, 4-methyl-2-pentanone
TCA, 1,1,1-trichloroethane
TCE, trichloroethylene
DCE, 1,1-dichloroethylene

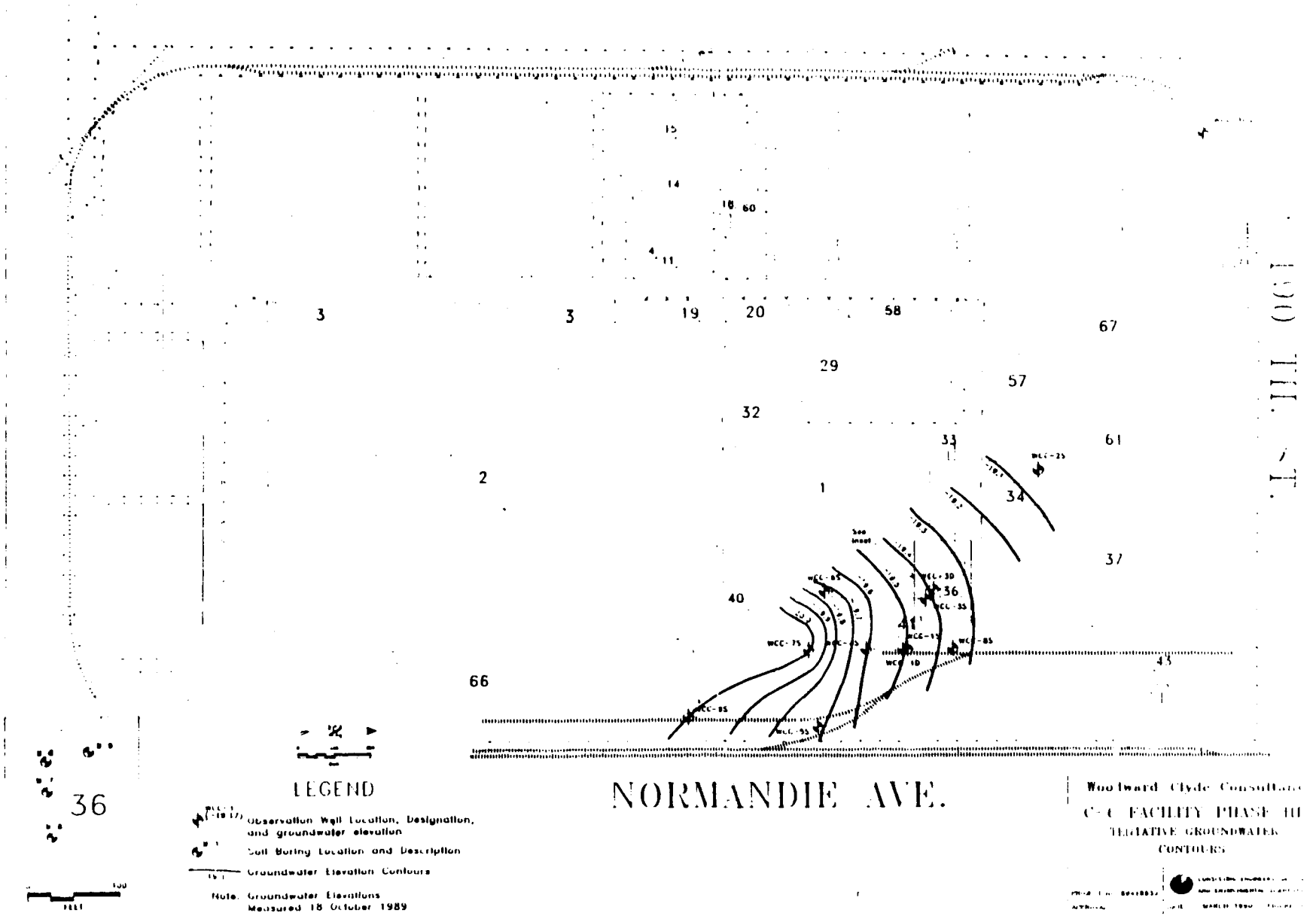
TABLE 5
GROUND WATER ANALYTICAL DATA AT DOUGLAS AIRCRAFT C6 FACILITY, TORRANCE, CALIFORNIA
(Concentration in ug/l)

WELL I.D.	SAMPLE DATE	COMPOUND									
		1,1-DCE	1,1-DCA	1,1,1-TCA	TCE	MIBK	trans-1,2-DCE	Chloroform	Toluene	Benzene	cis-1,2-DCE
WCC-1S	03/27/87	2,800		300	4,600	--	--	--	--	85	--
	04/13/87*	3,700/2,500	--/--	260/120	5,500/3,600	--/--	--/--	--/--	--/--	110/--	--
	11/12/87	3,000	23	160	5,200	--	75	39	--	160	--
	07/13/89	900	<20	67	2,400	<100	<20	<20	<20	<20	<20
	08/23/89	1,500	<30	<30	2,800	<100	<30	<30	<30	<30	41
WCC-2S	11/02/87	5	--	5	14	--	--	--	6	--	--
	11/12/87	2	--	--	4	--	--	--	1	--	--
	07/13/89	<1	<1	<1	5	<5	<1	<1	<1	<1	<1
	08/23/89	<1	<1	<1	3	<5	<1	<1	<1	<1	<1
WCC-3S	11/02/87	38,000	--	110,000	10,000	54,000	--	--	80,000	--	--
	11/12/87	88,000	1,000	54,000	11,000	70,000	1,000	--	140,000	--	--
	07/13/89	18,000	<500	56,000	7,700	<3,000	660	<500	32,000	<500	<500
	08/23/89	56,000	<1,000	78,000	6,000	<5,000	<1,000	<1,000	56,000	<1,000	<1,000
WCC-4S	11/02/87	360	--	14	700	--	2	2	--	--	--
	11/12/87	1,200	--	35	690	--	--	--	--	--	--
	07/13/89	170	<3	11	270	<20	<3	<3	<3	<3	10
	08/23/89	360	<5	7	410	<30	<5	<5	<5	<5	15
WCC-5S	11/30/87	7	--	--	1	--	--	--	1	--	--
	01/08/88	4	--	--	10	--	--	--	--	--	--
	07/13/89*	3/3	<1/<1	<1/<1	13/12	<5/<5	<1/<1	<1/<1	<1/<1	<1/<1	6/6
	08/23/89	<1	<1	<1	12	<5	<1	<1	<1	<1	4
WCC-6S	10/6/89	210	4	130	140	<5	7	<1	<1	<1	12
WCC-7S	07/13/89	850	<10	110	1,300	<50	11	<10	<10	<10	26
	08/23/89	1,100	<30	66	1,400	<100	<30	<30	<30	<30	31
WCC-8S	07/13/89	430	<5	160	240	<30	9	<5	<5	<5	7
	08/23/89	820	<5	130	430	<30	<5	<5	<5	<5	7
WCC-9S	10/6/89	<1	<1	<1	15	<5	<1	<1	<1	<1	7
WCC-10S	07/13/89*	2/1	<1/<1	<1/<1	86/87	<5/<5	<1/<1	3/3	<1/<1	<1/<1	<1/<1
	08/23/89	4	<1	<1	81	<5	<1	4	<1	<1	<1
WCC-1D	07/25/89	<1	<1	<1	2	<5	<1	<1	1	<1	1
	08/23/89	<1	<1	1	2	<5	<1	<1	<1	<1	<1
WCC-3D	07/25/89	<1	<1	49	4	<5	<1	<1	3	<1	11
	08/23/89	<10	<10	32	<10	<50	<10	<10	<10	<10	<10

* Duplicate sample also analyzed
-- Not Detected (Detection limit not specified)

(2L ABC/C6GW1 14)

BOE-C6-0071275



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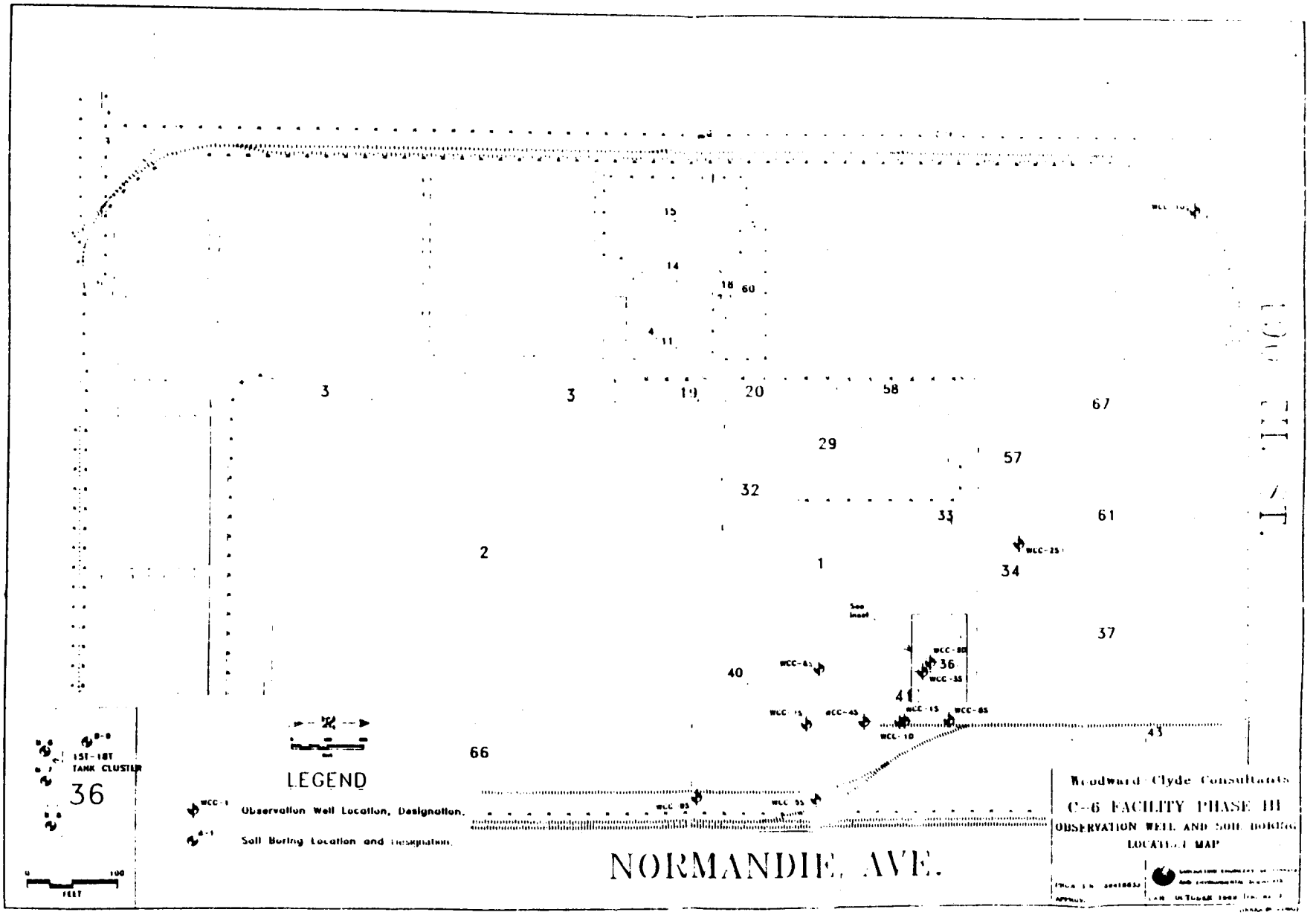
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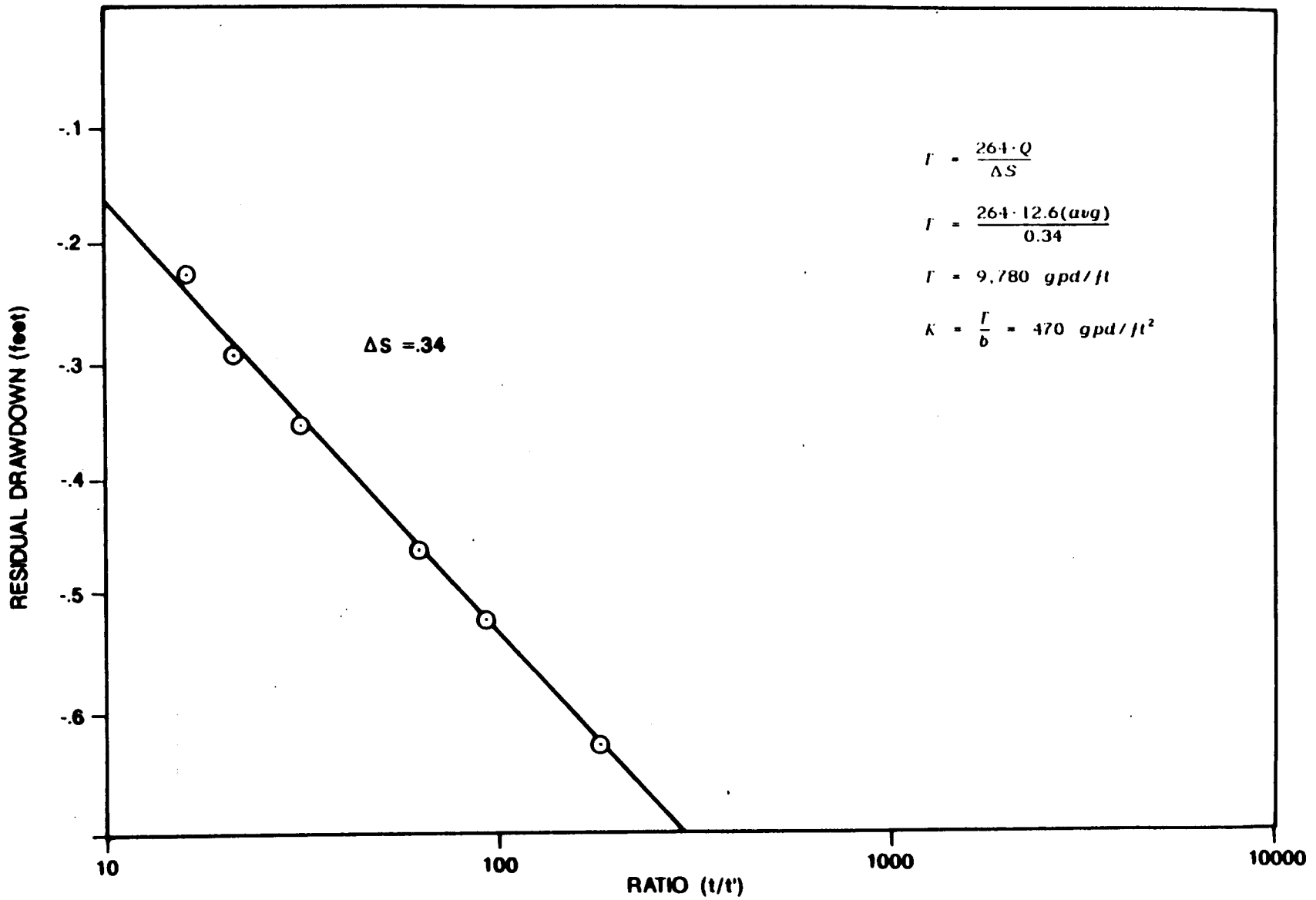
151-18T
TANK CLUSTER
36
LEGEND
Observation Well Location, Designation.
Soil Boring Location and Designation.
NORMANDIE AVE.
Woodward-Clyde Consultants
C-6 FACILITY PHASE III
OBSERVATION WELL AND SOIL BORING
LOCATION MAP
FEET



$$T = \frac{264 \cdot Q}{\Delta S}$$

$$T = \frac{264 \cdot 12.6(avg)}{0.34}$$

$$T = 9{,}780 \ gpd/ft$$

$$K = \frac{T}{b} = 470 \ gpd/ft^2$$

PUMPING WELL (WCC-4S) - RESIDUAL DRAWDOWN PLOT

Project No.: 8941863J	Date: FEB. 1990	Project: DOUGLAS AIRCRAFT CO.	Fig. A-23

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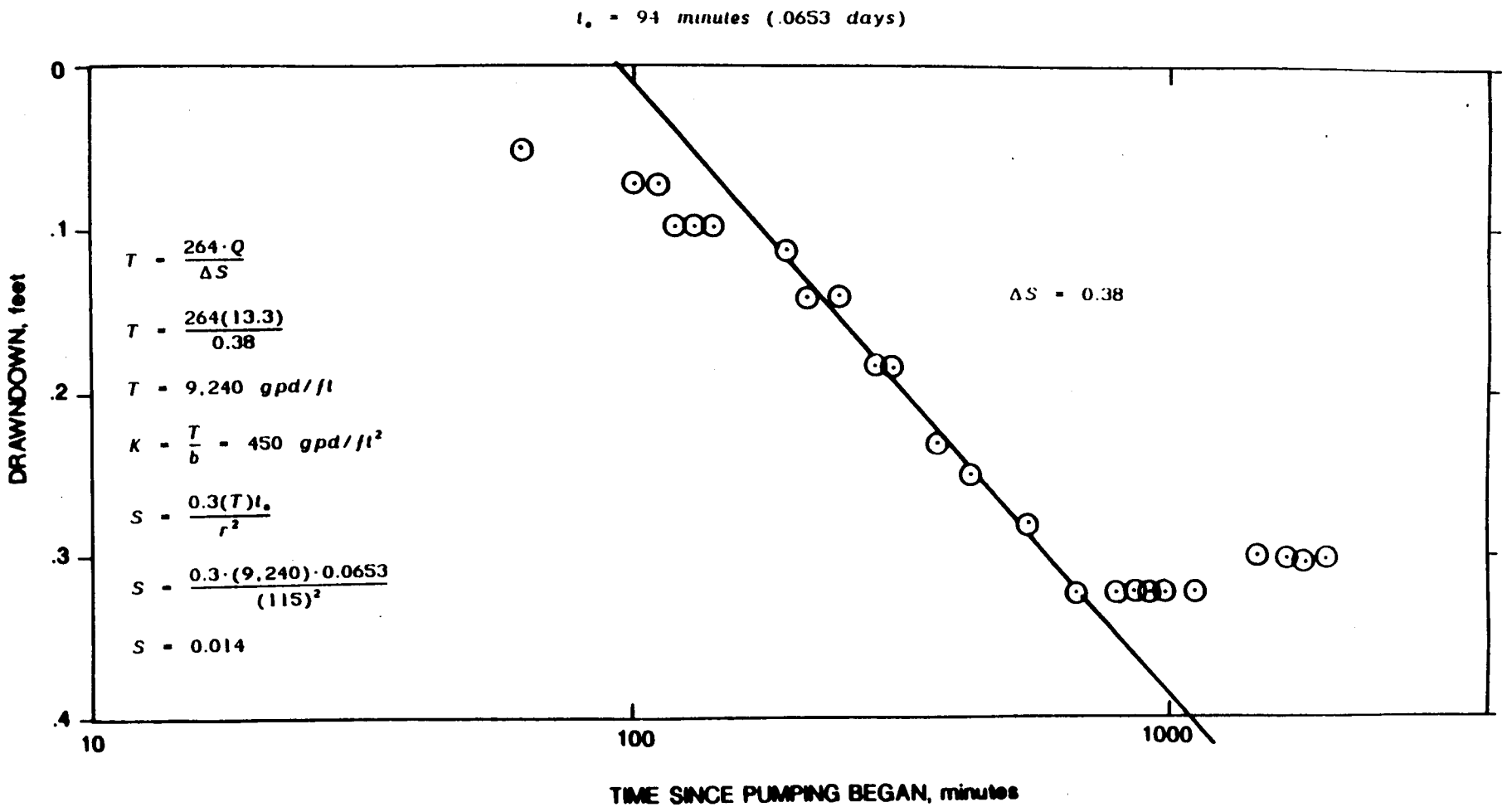
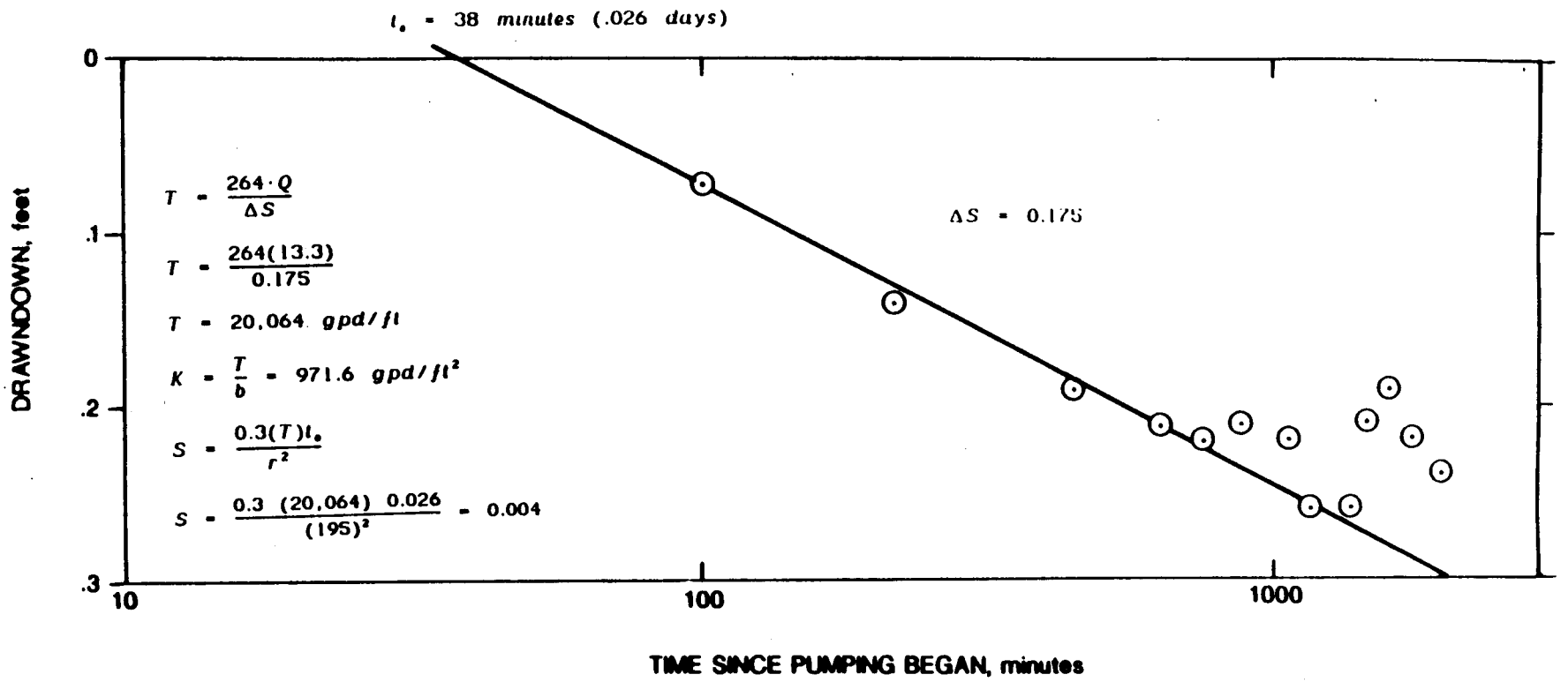


WCC-1S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig. A-24

BOE-C6-0071280

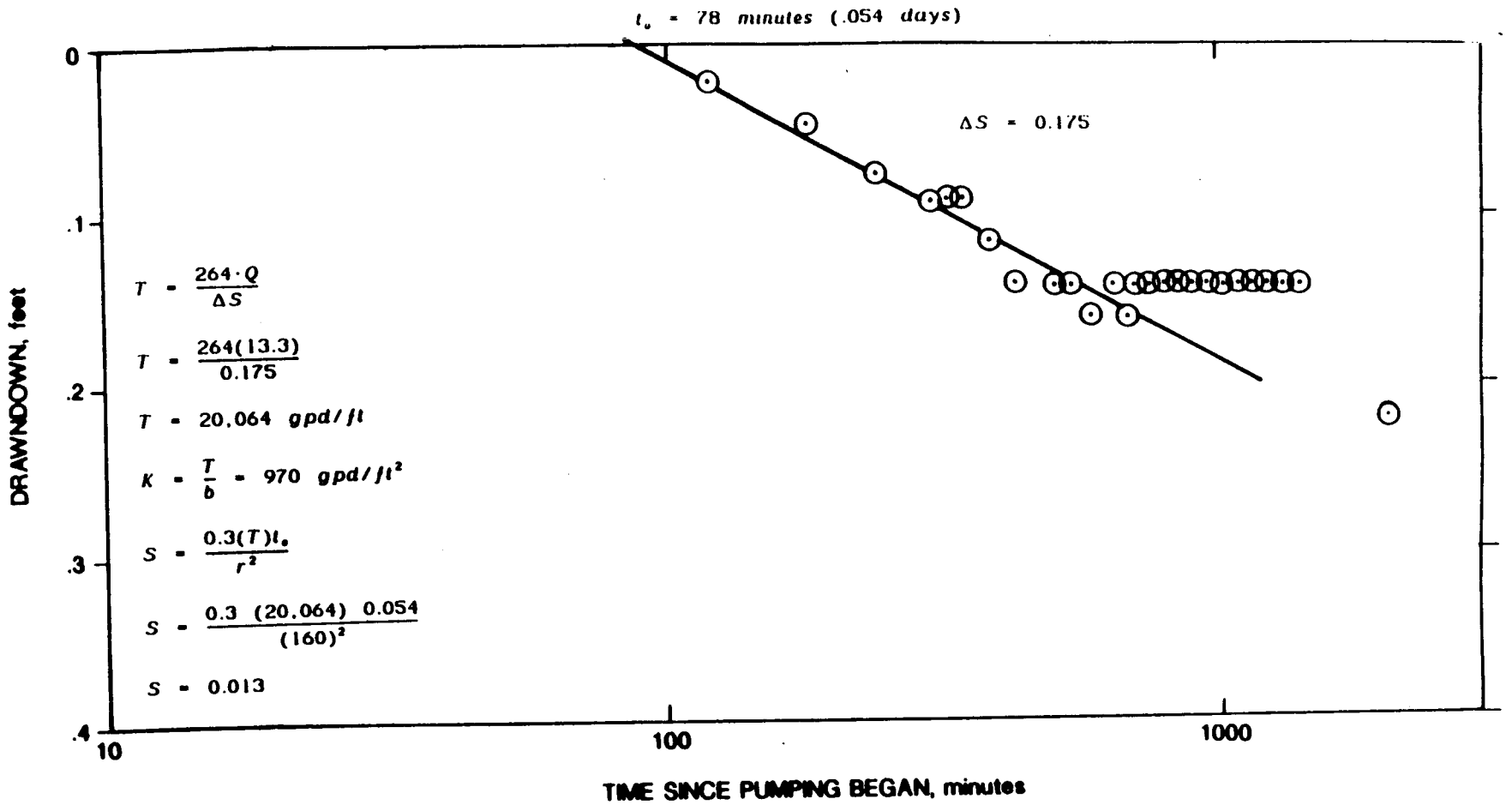


WCC-6S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig. A-25

Woodward-Clyde Consultants

BOE-C6-0071281



$$T = \frac{264 \cdot Q}{\Delta S}$$

$$T = \frac{264(13.3)}{0.175}$$

$$T = 20.064 \ gpd/ft$$

$$K = \frac{T}{b} = 970 \ gpd/ft^2$$

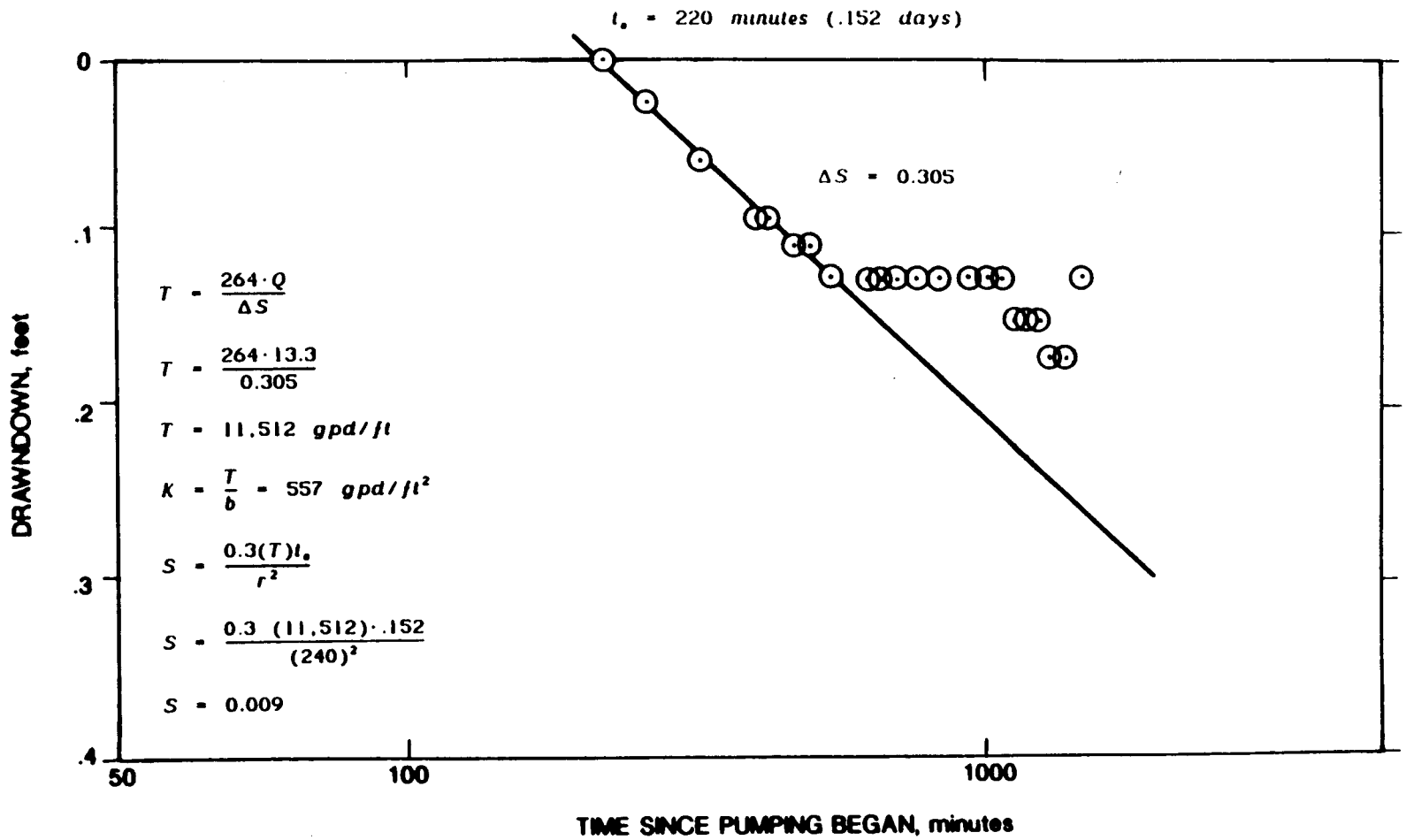
$$S = \frac{0.3(T)t_o}{r^2}$$

$$S = \frac{0.3 \ (20.064) \ 0.054}{(160)^2}$$

$$S = 0.013$$

WCC-7S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig. A-26

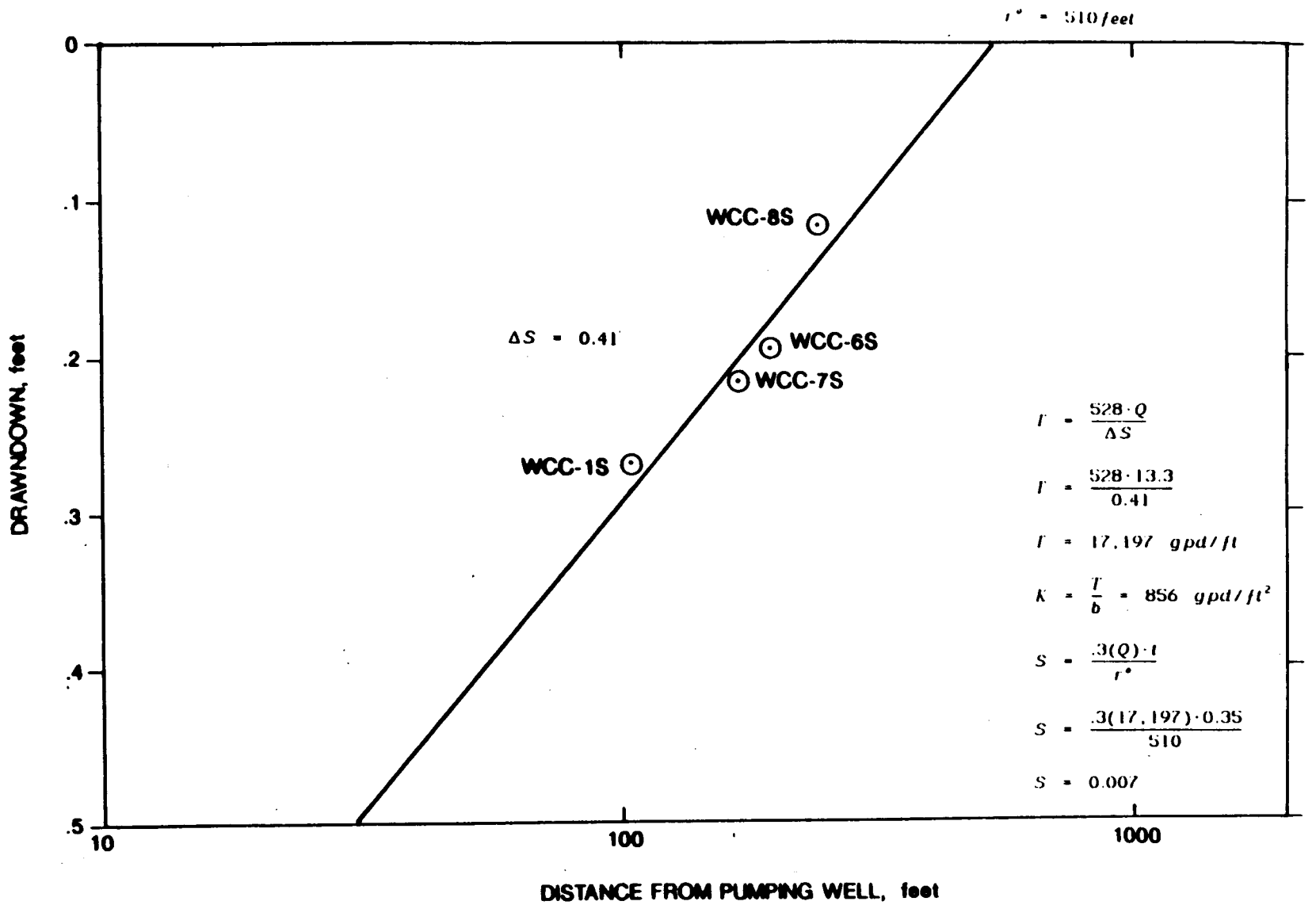


WCC-8S: COOPER-JACOB PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig. A-27

Woodward-Clyde Consultants

BOE-C6-0071283



DISTANCE/DRAWDOWN PLOT

Project No.: 8941863J	Date: MARCH 1990	Project: DOUGLAS AIRCRAFT CO.	Fig. A-28

BOE-C6-0071284

TABLE A-1

WELL DEVELOPMENT SUMMARY
DOUGLAS AIRCRAFT C6 FACILITY

Well No.	Sand Bailer and Surge Block Time (min)	Sand Bailer Volume Removed (gallons)	Pumping Time (min)	Pumping Volume Removed (gallons)	Total Removed (gal)	Comments
WCC-6S	15	45	75	400	445	Water became completely clear.
WCC-7S	60	100	70	500	600	Water became completely clear.
WCC-8S	55	70	90	430	500	Water became completely clear.
WCC-9S	15	60	70	310	370	Water became completely clear.
WCC-10S	95	190	45	370	560	Water became completely clear.
WCC-1D	15	40	540	1,170	1,210	Well was damaged by bailing on 7 July 1989. Well was repaired on 20 July 1989. Well was developed by pumping only, following repair.
WCC-3D	320	500	--	--	500	Water became slightly cloudy. Well was only pumped just before sampling, see Table A-2.

(2L-ABC/C8GW3TA1)

TABLE A-2

WATER SAMPLING DATA
DOUGLAS AIRCRAFT C6 FACILITY

Well No.	Sample Date	Sample Interval (gal)	Electrical Conductivity EC (µmhos)	Total Dissolved Solids TDS (ppm)	pH	Temperature F°
WCC-1S	7/12/89	1		490	9.0	74.5
		4		560	7.2	74.7
		6		540	7.2	74.3
		8		580	7.2	74.7
		10		540	7.2	74.3
	8/23/89	2	1220		7.3	71.1
		4	1320		7.3	71.0
		6	1340		7.3	71.0
		8	1330		7.3	70.6
		10	1330		7.3	70.6
WCC-2S	7/11/89	15		310	7.3	72.1
		25		320	7.2	72.0
		35		320	7.2	72.0
		40		320	7.2	71.6
	8/22/89	10	760		7.2	70.4
		20	760		7.3	70.4
		30	760		7.3	70.2
		40	760		7.3	70.2
WCC-3S	7/12/89	10		550	6.8	73.9
		20		550	6.7	73.4
		30		560	6.7	73.4
		40		560	6.7	73.4
	8/23/89	10	1270		6.8	70.5
		20	1270		6.8	69.9
		30	1280		6.9	70.2
		40	1280		6.9	70.2
WCC-4S	7/11/89	15		430	7.2	72.7
		25		440	7.2	72.9
		35		420	7.2	72.9
		45		450	7.2	73.0
	8/23/89	10	960		7.2	69.8
		20	990		7.2	69.8
		30	1000		7.2	69.2
		40	1005		7.2	69.4
WCC-5S	7/11/89	15		380	7.3	73.4
		25		370	7.3	72.0
		35		390	7.3	72.1
		45		390	7.3	72.3
	8/22/89	15	885		7.2	69.1
		25	900		7.3	69.1
		35	900		7.3	69.2
		45	900		7.3	69.4
WCC-6S	10/6/89	10	1,180		7.0	69.7
		20	1,190		7.1	69.7
		30	1,190		7.1	69.8
		40	1,190		7.1	69.8

TABLE A-2 (continued)

Well No.	Sample Date	Sample Interval (gal)	Electrical Conductivity EC (µmhos)	Total Dissolved Solids TDS (ppm)	pH	Temperature F°
WCC-7S	7/11/89	15		540	7.2	72.5
		25		520	7.1	72.5
		35		510	7.2	72.7
		45		510	7.2	72.5
	8/23/89	10	1180		7.1	68.8
		20	1225		7.1	69.0
		30	1220		7.2	68.8
		40	1200		7.2	69.5
WCC-8S	7/11/89	15		390	7.3	72.5
		25		390	7.2	72.7
		35		380	7.2	72.5
		45		380	7.2	72.7
	8/23/89	10	880		7.2	69.9
		20	865		7.2	69.6
		30	865		7.2	69.6
		40	875		7.3	69.6
WCC-9S	10/6/89	15	1,110		7.1	69.1
		25	1,070		7.2	69.2
		35	1,050		7.2	69.0
		45	1,000		7.2	69.1
WCC-10S	7/11/89	1		420	7.2	70.9
		10		450	7.3	70.3
		25		420	7.3	70.3
		35		410	7.3	70.7
		40		410	7.2	70.5
		45		420		70.5
	8/22/89	10	1000		7.2	69.1
		20	1010		7.2	69.1
		30	1040		7.3	68.9
		40	1040		7.3	68.8
WCC-1D	7/24/89	15	760		7.2	70.6
		75	720		7.3	71.0
		175	770		7.4	71.3
		275	770		7.5	71.1
		350	770		7.5	71.1
	8/21/89	20	760		7.4	70.1
		40	756		7.4	69.6
		60	730		7.4	69.7
		80	730		7.5	69.2
		100	720		7.4	69.7
		120	720		7.4	69.8
		135	720		7.4	69.8
WCC-3D	7/25/89	10	770		7.4	69.6
		50	760		7.2	70.2
		100	780		7.4	70.3
		200	760		7.6	70.4
		300	750		7.4	71.9
		400	750		7.6	70.2
		500	750		7.8	70.8
	8/21/89	20	710		7.3	69.5
		40	715		7.4	69.2
		60	715		7.4	69.3
		80	720		7.4	69.0
		100	720		7.4	69.3
		120	715		7.4	69.8
		140	715		7.4	69.1

TABLE A-3

SUMMARY OF WELL CONSTRUCTION DETAILS

Well No.	Distance from WCC-4S* (feet)	Depth of Well (feet)	Screened Interval (feet)	Screen Slot Size (inches)	Diameter of Well Casing (inches)	Diameter of Filter Pack (inches)	Filter Pack Material
WCC-1S	115	88.5	78.5-88.5	0.01	2	10	No. 12 Silica sand
WCC-2S	675	90.5	70.5-90.5	0.01	4	10	No. 0/30 Lonestar sand
WCC-3S	220	89	69-89	0.01	4	10	No. 0/30 Lonestar sand
WCC-4S (pumping well)	--	90.5	70.5-90.5	0.01	4	10	No. 0/30 Lonestar sand
WCC-5S	250	91	61-91	0.01	4	10	No. 0/30 Lonestar sand
WCC-6S	200	91	60-90	0.01	4	11	No. 0/30 Monterey sand
WCC-7S	160	90	59.5-89.5	0.01	4	10	No. 0/30 Lonestar sand
WCC-8S	240	89.5	60-90	0.01	4	10	No. 0/30 Lonestar sand
WCC-9S	525	90	120-140	0.01	4	10	No. 0/30 Monterey sand
WCC-10S	2,020	90	60-90	0.01	4	10	No. 0/30 Lonestar sand
WCC-1D	100	140	120-140	0.01	4	10	No. 0/30 Lonestar sand
WCC-3D	250	140	120-140	0.01	4	10	No. 0/30 Lonestar sand

* Measured from well locations plotted on site map provided by DAC.

BOE-C6-0071288

APPENDIX A

FIELD PROCEDURES
AND
AQUIFER TESTING DATA ANALYSIS

APPENDIX A

FIELD PROCEDURES AND AQUIFER TESTING DATA ANALYSIS

A.1 GENERAL INFORMATION

Drilling was performed by two companies: A&R Drilling, Inc. of Carson; and Beylik Drilling, Inc. of La Habra California. Drilling began on 5 June 1989 and was completed on 30 June 1989. Soil sample borings and shallow observation well borings were drilled using a CME-75 drill rig equipped with 6-1/2 inch O.D. hollow stem augers for soil sampling and 11-inch O.D. hollow stem augers for well installation. The deep observation well borings were completed by mud rotary drilling using an Ingersoll-Rand drill rig equipped with a 10-inch tri-cone drill bit.

A.1.1 Shallow Observation Well Installation

Observation Wells WCC-7S, 8S, and 10S were constructed of threaded 4-inch diameter, Schedule 40 PVC casing and screen and set to a depth of approximately 90 feet. The observation wells were installed by first drilling a sampling borehole with the 6-1/2-inch outside diameter (O.D.) hollow stem augers. In general, soil samples were collected at near-surface, 5 feet and then at approximately 5 foot intervals. Next, these augers were removed from the boring and the 11-inch O.D. hollow stem augers with a wooden plug placed in the bottom were used to ream out the boring to its total depth of 90 feet. Upon reaching total depth the inside of the augers were quickly filled with tap water and the wooden plug was knocked out of the bottom auger. The water was used to form hydrostatic pressure in the augers to help hold out the surging sands which would otherwise fill up the inside of the bottom augers and prevent a proper well installation. After knocking out the wooden plug, the 4-inch diameter wells were installed by

inserting the casing into the hollow stem auger and allowing the well casing to rest on the bottom of the boring. Filter pack material (Lone Star No. 0/30) was poured from the surface into the annulus between the casing and hollow stem auger. As filter pack material was introduced into the borehole, the hollow stem augers were slowly withdrawn from the hole to allow the filter pack to fall in place between the well casing and native soil. The same procedure was followed in placing the bentonite plug and the volclay grout backfilling.

A.1.2 Deep Observation Well Installation

Observation Wells WCC-1D and WCC-3D were also constructed of threaded 4-inch diameter, Schedule 40 PVC casing and screen and set to a depth of approximately 140 feet. The wells were installed by first completing a sampling borehole using a wire line coring system which was used to attempt continuous coring from 120 to 140 feet. This sampling system worked satisfactorily on WCC-3D, but had little success in WCC-1D. After completing the sampling borehole, the geologic formation was electrically logged (E-logged) by Geo-Hydro-Data, Inc. of Tehachapi, California. Next, the boring was reamed out to the total depth with a 10-inch diameter drill bit.

Once the boring was completed for the casing installation, the drilling mud was thinned to help break down the mud cake formed on the sidewalls of the boring. In both WCC-1D and WCC-3D the mud was thinned too much on the first attempt, and the boring sidewalls caved in and had to be redrilled. The well casing was placed down the 10-inch boring with centralizers installed at five locations along its length to keep it centered in the boring and not laying against the sidewalls. Filter pack sand was placed outside the screened interval of the casing using 1-1/2 inch diameter tremie pipe

and washing it down with tap water. A bentonite plug was set in the boring on top of the filter pack by pouring 1/4-inch bentonite pellets directly into the boring.

After allowing the bentonite pellets to settle into place the remainder of the annulus was backfilled by tremie pipe with volclay grout up to 8 feet below the surface. The top 8 feet of the annulus was backfilled with concrete.

A.1.3 Well Construction

The observation wells were constructed of 4-inch O.D. Schedule 40 PVC flush-threaded blank pipe, and screened with 0.010-inch slotted PVC screen. Adhesives were not used. The shallow wells were installed with 70 feet of blank casing and 30 feet of screen. The deep wells were installed with 120 feet of blank casing and 20 feet of screen. The well screen was filter packed by pouring or treming the filter material into the borehole from the surface. A filter pack material of Lone Star No. 0/30 sand was selected based on a field sieve analysis. Filter pack analysis and design procedures are discussed in Section C.4. The filter pack was placed from the well bottom to about 5 feet above the top of the well screen.

An approximately 5-foot thick bentonite pellet plug was placed on top of the filter pack, to minimize movement of fluids through the annular space. In addition, volclay bentonite grout was placed in the annulus from the top of the bentonite plug to approximately 8 feet below ground surface. A concrete plug was placed from the top of the volclay to the surface, to minimize seepage of surface fluids into the well and to provide strength to the backfill. The top of the well casings were completed 3 to 6 inches below grade with a waterproof locking well cap and protected with a moisture resistant steel traffic-rated

Christy box. Figure A.0 is a schematic of the general observation well design. Appendix D presents the boring logs and graphic well construction details.

A.1.4 Soil Borings

Four soil borings, B-6 through B-9, to collect soil samples for chemical analysis and lithologic logging, were completed in the vicinity of the underground tank cluster, 15T through 18T. Each boring was completed to a depth of 65 feet.

Soil sampling as described in Section A.2 was completed in each boring just below the surface, and at 5-foot intervals to the total depth of each boring.

A.1.5 Soil Boring Backfill

Soil borings B-6 through B-9 were backfilled with silica sand and bentonite powder, at a ratio of 4 to 1. The top 1 to 2 feet of the borings were backfilled with asphalt.

A.2 SOIL SAMPLING

Soil samples were collected at 5-foot intervals in the soil borings and the shallow well borings to make observations regarding subsurface stratigraphic conditions and the presence of contamination, to perform field headspace tests, and to conduct laboratory analyses. Soil samples were collected using a modified California sampler that contained four brass tubes. The brass tubes were filled by driving the sampler 18 inches into undisturbed soil with the drop hammer. The number of blows required to drive the sampler 12 inches was recorded on the boring log and used to evaluate the density or consistency of the soil.

Additional soil sampling was completed for logging purposes only in the deep well borings beginning at 120 foot depth

and continuing to 140 feet. This sampling was performed using a wire line coring system which had a 2-inch diameter by 5-foot long split barrel sampler.

A.2.1 OVA Headspace Measurements

In general, one brass tube from each sample was extruded and placed into a sealable plastic bag. The bag was sealed and after approximately 5 to 10 minutes, an organic vapor analyzer (OVA) probe was inserted into the bag, and the vapor concentration in the headspace was measured and recorded on the boring log.

A.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
- Date
- Sampler's initials

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, California for 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. Copies of the chain-of-custody forms are presented in Appendix C.

A.2.3 Drilling Residuals

Drill cuttings from the soil borings and the shallow well borings were placed in Department of Transportation (DOT) Class 17H 55-gallon drums, and the contents of the drums were labeled using a permanent ink marker and a spray-painted inventory number corresponding to an inventory list compiled by the field engineer. The drums were sealed and stored inside the facility hazardous waste storage area. Drilling mud and soil cuttings produced during installation of the two deep observation wells were pumped into separate roll-off bins next to the wells. Douglas Aircraft was advised of the locations and contents of the drums, and the need for proper management of the drill cuttings.

A.3 FIELD OBSERVATIONS

Observations by Woodward-Clyde Consultants' personnel during the drilling, sampling, and well installation operations were recorded on boring logs, as presented in Appendix B. These observations related to visual soil classifications, geologic and stratigraphic sample descriptions, observation well construction details, sampling efforts, OVA measurements, and other pertinent information.

A.4 FILTER PACK ANALYSIS

The selection of the proper filter pack material and well screen slot size is essential in collecting a sediment-free or low sediment content water sample. In all observation wells, soil samples were collected for sieve analysis. Filter pack design calculations were made based on the grain size distribution of these finest grained soil samples

collected within the designed screen interval and below the ground water table. For observation Wells WCC-1D, 3D, 7S, 8S, and 10S the depths of the samples analyzed were 123, 122, 75, 75, and 80 feet, respectively.

Soil sieve analyses for selection of well screen slot and filter pack size were conducted in the field. Each soil sample was heated with a portable propane stove to evaporate water from the soil. When the sample was dry, it was weighed on a scale to the nearest gram. The soil sample was then poured into the top of an eight sieve stack and shaken for approximately 5 minutes. The sieve sizes used in the analysis are shown in Figure A-1. The soil retained in each sieve was weighed and the cumulative percent retained was calculated for each sieve. The gradation analyses for the wells are illustrated in Figures A-1 through A-5.

A well design using a Lonestar No. 30 sand filter pack and a screen slot width of 0.01 inches (10 slot) was used for the five wells based on the gradation analyses. An ideal gradation of filter pack and screen slot width are plotted on Figures A-1 through A-5 along with the actual material sizes used. These ideal sizes were calculated using the well design formulas presented in "Ground Water and Wells" by Driscoll, 1986." A commercially blended filter pack material was then selected that best matched the calculated filter pack curve, since custom made filter pack materials were not readily available. The grain size analysis curves for Wells -1D, -3D, -7S, -8S, and -10S were similar, and the soils were classified as silty sands to sandy silts. This lithologic classification also correlated with the field descriptions of WCC--1D, -3D, -1S, -2S, -3S, and -4S.

A.5 WELL DEVELOPMENT

Observation Wells WCC-7S, -8S, -10S, -1D, and -3D were developed by Howard Pumps, Inc. of Barstow, California. Development occurred on 5 through 7 July 1989. During this development WCC-1D was damaged by breaking the bottom plug out of the well while bailing. Due to the formation conditions, sand surged up about 8 feet into the casing. This damage was repaired on 20 July 1989 by filling the well casing with drilling mud and then bailing the sand out of the bottom. Then a 2-foot plug of bentonite clay was set in the bottom of the well by pouring dehydrated bentonite pellets down the well and allowing them to hydrate. Once the pellets had hydrated, and formed a new bottom plug, the well was redeveloped.

All of the wells were developed, first by bailing and surging, to remove the maximum amount of sediment possible. Next the wells were pumped by submersible pump to remove a large volume of water and assure the ground water around the well was formation water which had not been affected by the well installation. The two deep observation wells, WCC-1D and -3D, required a greater effort in their development because they were installed using mud rotary drilling. In Table A-1 the development times, and the ground water volumes removed during development are presented. The water removed from each well was observed to become clearer during development and was completely clear upon completion of development. Water removed from the wells during development was stored in one large, steel, temporary "Baker" storage tank on site near Building No. 41, prior to treatment and discharge.

A.6 GROUND WATER SAMPLING

Two rounds of ground water sampling were completed from all ten of the observation wells. On 11, 12, 24, and 25 July 1989 the first round of sampling occurred (the two deep observation wells were sampled on the later two dates due to the damage of WCC-1D), and on 21 through 23 August 1989 the second round of sampling was completed.

Prior to beginning sampling procedures the static ground water level was measured in each well to the nearest one hundredth of a foot using an electronic well sounder. Then each well was purged, to remove possible stagnant water, by evacuating a minimum of three casing volumes of ground water. This was accomplished by bailing the well with a 3-1/2-inch-diamter PVC bailer attached to new polypropylene rope. The exception to this was the purging of WCA-1D and -3D on the first round of sampling only. These wells were purged by setting a submersible pump in the well and pumping a large volume of water for a final effort in development.

Throughout purging, and just prior to sampling the wells, pH, electrical conductivity or total dissolved solids, and temperature were measured and recorded for the evacuated ground water (Table A-2). These measurements were made to confirm that the wells were purged sufficiently. Sampling was done with a 1-1/2-inch-diameter Teflon bailer suspended from a monofilament line. Water samples were collected from each well in two 40 ml VOA vials.

In addition to water samples, bailer rinse samples were also collected in two 40 ml VOA vials for each well prior to collecting the water samples. The rinse samples were collected for possible analysis to confirm the sampling equipment was satisfactorily decontaminated.

The water samples, rinse samples, and two 40 ml VOA trip blanks for each sampling round, were packed on ice in a portable chest immediately after collection. Samples were delivered on the day following collection to West Coast Analytical Services. Chain-of-custody procedures, including the use of sample identification labels and chain-of-custody form, were used for tracking the collection and delivery of the samples. The chain-of-custody form is presented in Appendix C.

A.7 EQUIPMENT DECONTAMINATION PROCEDURES

Soil and ground water sampling equipment was decontaminated between sampling events using the following procedure:

1. Brush-assisted water rinse to remove soil and mud (soil sampling only)
2. Water wash with Liquinox
3. Deionized water rinse to remove Liquinox
4. Second rinse with deionized water
5. Dry with paper towels (soil sampling only).

Prior to use at the site, the brass tubes used in the modified California sampler were cleaned in WCC's laboratory by washing sequentially in dilute sulfuric acid, Liquinox and water, and deionized water. The tubes were then air dried, and stored in sealable plastic bags prior to use at the site. New end caps were carried to the site in sealable plastic bags.

Drill augers or pipes, pumps, bailers, surge blocks, and cables were all steam cleaned prior to working on each boring or well. Steam cleaning was performed by the drilling companies on the facilities steam cleaning pad.

A.8 SLUG TESTING

Slug tests were conducted on observation Wells WCC-4S, -5S, -7S, -8S, -9S, -10S, -1D, and -3D on 19 July, 30 August, and 4 October 1989. Slug testing is a relatively quick and cost-effective method of measuring actual field hydraulic conductivity (K) values. Slug test derived hydraulic conductivity (K) values are not as accurate as aquifer pump test derived values, however, they are useful in preliminary calculations and in identifying large anomalies in hydraulic conductivity (K) values.

Slug tests only measure the average horizontal hydraulic conductivity (K) in the immediate vicinity of the well. In comparison a pump test stresses the aquifer at a greater radial distance, and as a result, a more representative hydraulic conductivity value (K) is obtained.

The slug tests were performed using the following equipment:

- DL-120-MCP Envirolabs data logger with a 25 psi pressure transducer
- One 3.25-inch diameter x 39-inch-long sand weighted mandrel with a 1.4 gallon volume
- Steel tripod and polyethylene rope

The weighted mandrel was used with the tripod and rope to simulate a slug of water being inserted and withdrawn from the well. The pressure transducer and data logger recorded the subsequent drawdown and recovery water level measurements of the well. One cycle of drawdown and recovery was performed on each observation well.

Data from the slug tests were evaluated using the Bouwer-Rice method (June 1976) for calculating hydraulic conductivity (K). Bouwer and Rice developed a procedure

that considers the effects from partially penetrating wells, the radius of the gravel pack, and the effective radius of influence of the test.

The Bouwer and Rice method entails solving the following equation:

$$K = \frac{r_c^2 \ \ln(R_e/R_w)}{2Lt} \ \ln \ (Y_o/Y_t)$$

Where:

K = hydraulic conductivity

r_c = radius of well casing

R_e = effective radius of influence

r_w = radius of the well boring

L = length of screened interval or saturated thickness if entire screen is not saturated

t = arbitrarily selected time from drawdown/time semi-log plot

Y_o = initial drawdown at time t = 0, from drawdown/ time semi-log plot

Y_t = drawdown (distance between water level in well and static water level) at selected time (t) from drawdown/time semi-log plot

The term R_e/r_w, which is a function of the radius over which the drawdown in the well is dissipated, was solved using the following equation:

$$\ln(R_e/r_w) = \left[\frac{1.1}{\ln(H/r_w)} + \frac{A + B\ln[(D-H)/r_w]}{L/r_w}\right]^{-1}$$

Where:

H = distance from base of well to Static Water Level (SWL)

L = length of screen (or saturated thickness if entire screen is not saturated)

D = thickness of aquifer

A = constant based on value of L/r_w

(see Figure A-22)

B = constant based on value of L/r_w

(see Figure A-22)

The test data were plotted on a semi-log diagram of drawdown (Y_t) versus time (t), drawdown being logarithmic (see Figures A-6 through A-21). The data should generate a straight line, although a flat "tail" is frequently observed. A drawdown (Y_t) is recorded for a selected time (t) within the straight line segment of the plot. Y_t and t are used in solving the equation for K.

The Bouwer and Rice method makes the following assumptions:

1. The aquifer is of constant thickness.
2. The soil is homogeneous and isotropic.
3. Flow is horizontal in the aquifer.

These assumptions are judged to be generally reasonable, recognizing that variations in aquifer thickness and anisotropic conditions will have an influence on calculated results.

A.9 PUMP TEST

The pumping well, WCC-4S, was selected because it is centrally located to the surrounding observation wells. In addition information collected during slug testing indicated the well would have a relatively high yield. Wells WCC-1S, -4S, -6S, -7S, -8S, -9S, and -1D served as observation wells.

Details of the well design for the existing ten shallow observation wells and the two deep observation wells are summarized in Table A-3. Depth of groundwater and distance to the pumping well is also included. Figure 2 shows the locations of the wells.

A 1-1/2 horsepower submersible pump was used to pump water from WCC-4S. The pump was switched on at 12:00 p.m. on 20 December 1989 and allowed to pump at 13.3 gpm for 16 hours and 30 minutes. At this rate the water level was nearly stable at a drawdown of approximately 6 feet.

The evacuated groundwater was stored in two 21,000-gallon transportable steel storage tanks. Storage requirements were estimated based on well development activities which indicated a maximum pumping rate of 4 to 5 gallons per minute. Assuming a pumping rate of up to 10 gallons per minute, Woodward-Clyde initially ordered one storage tank and figured if and when a second storage tank was required, it would be more than 24 hours after the pumping began. Because the pumping rate was greater than 10 gpm the second storage tank would have been needed before the tank rental company could respond to our request, if the 13.3 gpm pumping rate was sustained. Therefore, the flow rate was reduced to 8.5 gpm for 4-1/2 hours. After the second tank was delivered to the site, the flow rate of 13.3 was resumed and maintained for the remainder of 30 total hours of "pumping". The overall time weighted pumping rate was

approximately 12.6 gal/min. The pump was switched off at 6:00 p.m. on 21 December 1989. Measurements in the pumping well and all the monitoring wells continued until WCC-4S had recovered 99 percent of its maximum drawdown, two hours after the pump was shut off.

Water was pumped to the surface and approximately 400 feet horizontally to the storage tanks. The volume of water pumped out of WCC-4S was measured by an in-line totalizer. A total of approximately 28,000 gallons of groundwater was evacuated.

Five of the monitoring wells WCC-4S, -1S, -7S, -8S, and -1D had pressure transducers installed and connected to one of three Terra 8 data loggers to automatically measure and record the depth to groundwater. In addition, Woodward-Clyde measured the depth to groundwater on regular intervals in all of the observation wells except WCC-1S, -4S, and -1D. This task was performed using a Solonist electric well sounder. In addition barometric pressure readings were collected at regular intervals throughout the pump test using a Swift, Model 477 barometer.

The data from each well showing a discernable reaction were analyzed using one or more of the following techniques: Recovery (Residual Drawdown) plot, Cooper-Jacob Time-Drawdown plot, and/or Distance/Drawdown plot. A summary of the results is previously presented in Table 2. Slug test values obtained earlier are included for reference.

The nearly instantaneous initial drawdown and the subsequent constant drawdown with time, precluded any valid analyses of the pumping stage drawdown in the pumping well WCC-4S.

Nevertheless the recovery data for the pumping well which did appear valid was analyzed using a residual drawdown plotting technique.

This technique utilizes a semi-log plot of the residual drawdown (in feet) vs. the ratio of t/t′ (see Figure A-23) where:

t = time since pumping started

t′ = time since pumping stopped

The differential change in water level (Δs) is thus obtained from the plot and used in the equation:

$$K = \frac{264Q}{\Delta s \cdot b} \qquad (1)$$

where:

K = Hydraulic conductivity in gpd/ft^2

Q = Pumping rate, in gpm

Δs = Differential change in water level during one log cycle of time, in feet

b = The aquifer thickness (20.65 feet at WCC-4S)

Data for the observation wells WCC-1S, -6S, -7S, and -8S were analyzed using the Cooper-Jacob Time-Drawdown technique as shown on Figures A-24 to A-27. A calculation of μ (from the well function, Driscoll 1986) showed the technique would be appropriate in general. A Distance/Drawdown plot shows the change in drawdown as a function of distance from the pumping well. The equations used and the calculations are shown with the plot. Analytical methods used are discussed

in the literature (Driscoll, 1986; Walton, 1987). The fundamental equation for hydraulic conductivity is identical to Equation (1) above. Other equations include:

$$T = Kb \tag{2}$$

and

$$S = \frac{0.3Tt_o}{r^2} \tag{3}$$

where:

T = Coefficient of transmissivity, in gpd/ft

K = Hydraulic conductivity in gpd/ft^2 (Equation [1])

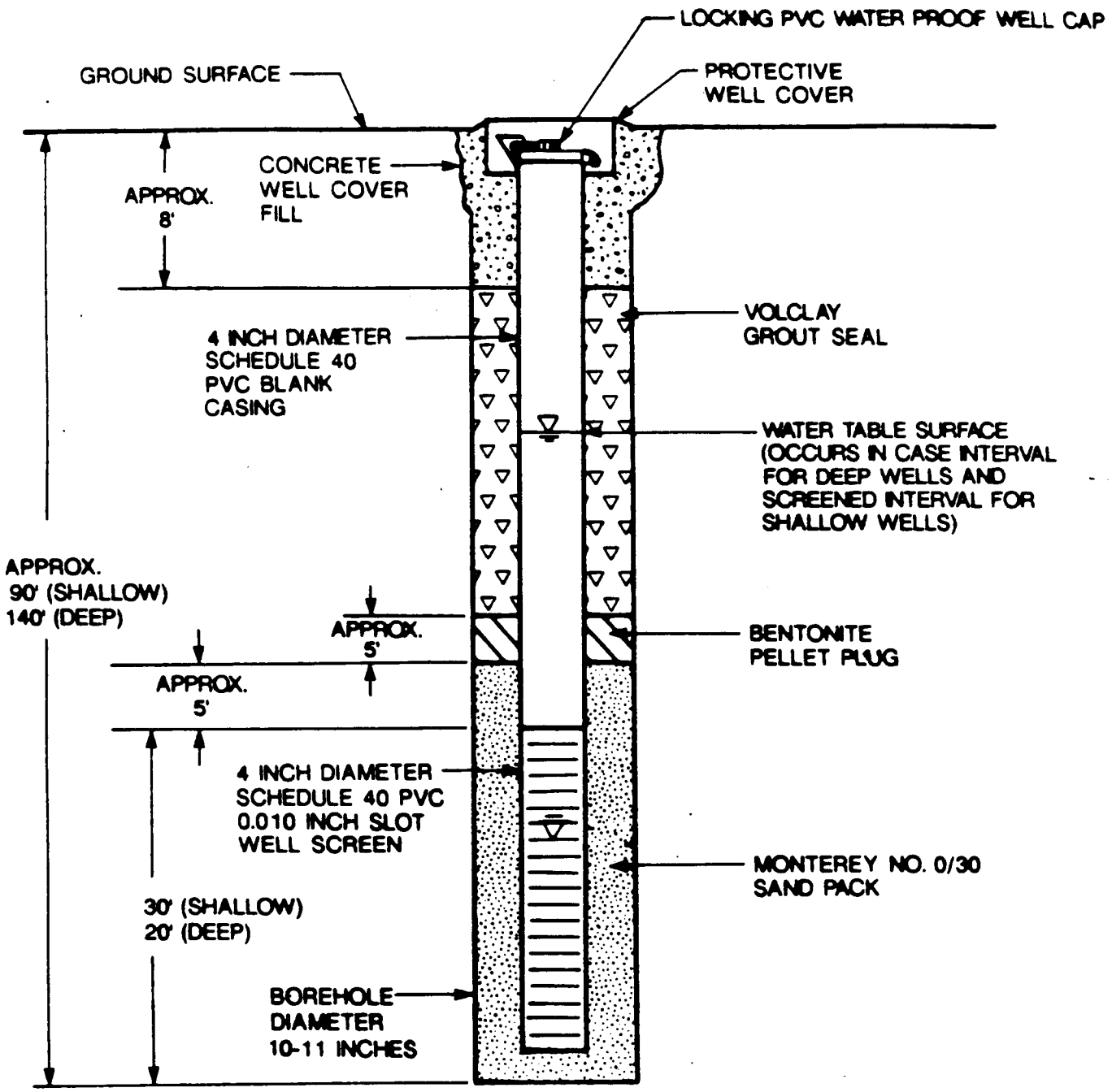
b = Saturated thickness of the aquifer tested in feet

s = Storage coefficient (dimensionless)

t_o = Time, in days, of the intercept of the extrapolated drawdown curve at zero drawdown

r = Distance, in feet, from pumped well to the observation well where drawdown measurements were made

These plots allowed the calculation of both hydraulic conductivity, and storage coefficient according to Equations (1) and (3). The method of plotting and the calculation are shown on Figure A-28.



NOT TO SCALE

SHALLOW WELL DEPTH 90 FEET
DEEP WELL DEPTH 140 FEET

DESIGN APPLIES TO
WCC-7s, -8s, -10s, -1D, AND -3D

GENERAL OBSERVATION WELL DESIGN

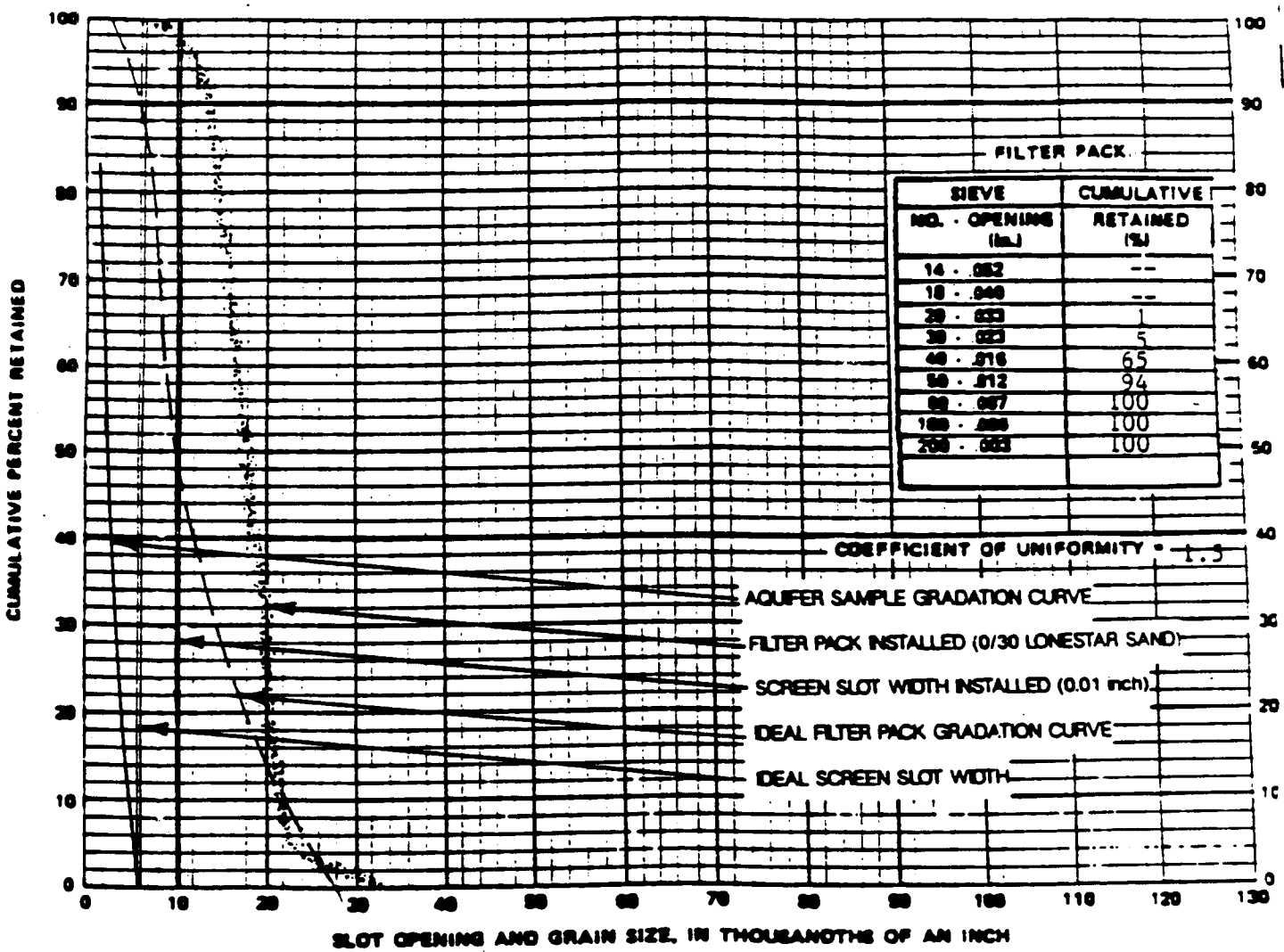
Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT-C6 FACILITY	Fig. A.0

Well Name: WCC-7s Date: 8 June 1989

Well Location: 160 ft. South of WCC-4s

Sample Depth: 75 ft. Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .007	100
100 - .006	100
200 - .003	100

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .0088	--	--	
80 - .007	--	--	
100 - .006	5	2.0	
200 - .003	124	46.0	
Bottom Pan	270	100.0	

Notes: WET WT. of sample: 350 gm
DRY WT. of sample: 270 gm

Recommended Slot Opening:

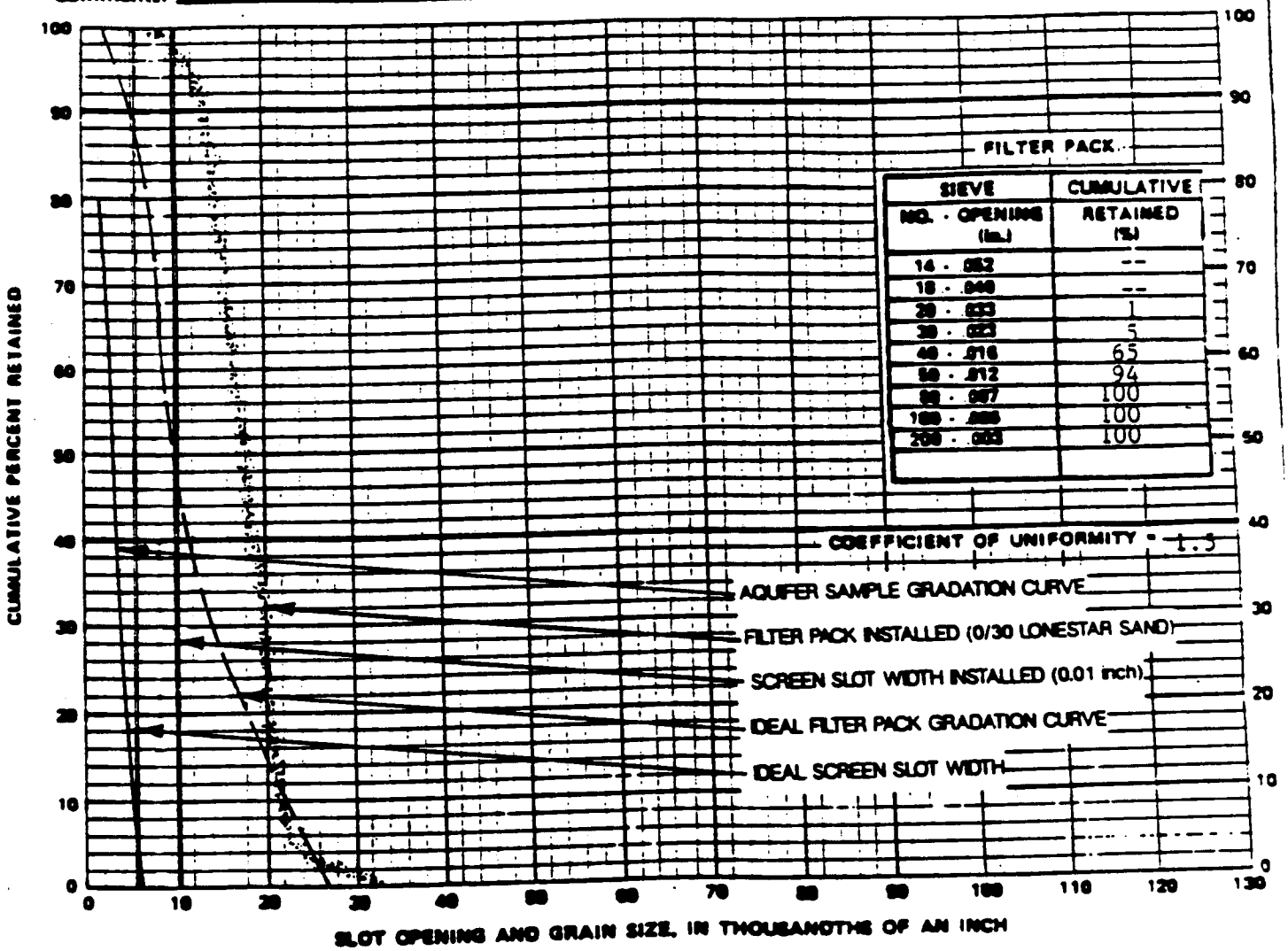
Project DOUGLAS AIRCRAFT CO. - TORRANCE Project No. 8941863J	**GRAIN SIZE ANALYSIS** WCC-7S	Fig. A.1

Well Name: WCC-8s Date: 12 June 1989

Well Location: N125 ft. North of WCC-1s

Sample Depth: 75 ft. Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .009	100
80 - .007	100
100 - .006	100
200 - .003	100

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .009	--	--	
80 - .007	--	--	
100 - .006	3	1.0	
200 - .003	123	52.0	
Bottom Pan	235	100.0	

Notes: WET WT. of sample: 300 gm
DRY WT. of sample: 235 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

GRAIN SIZE ANALYSIS WCC-8S

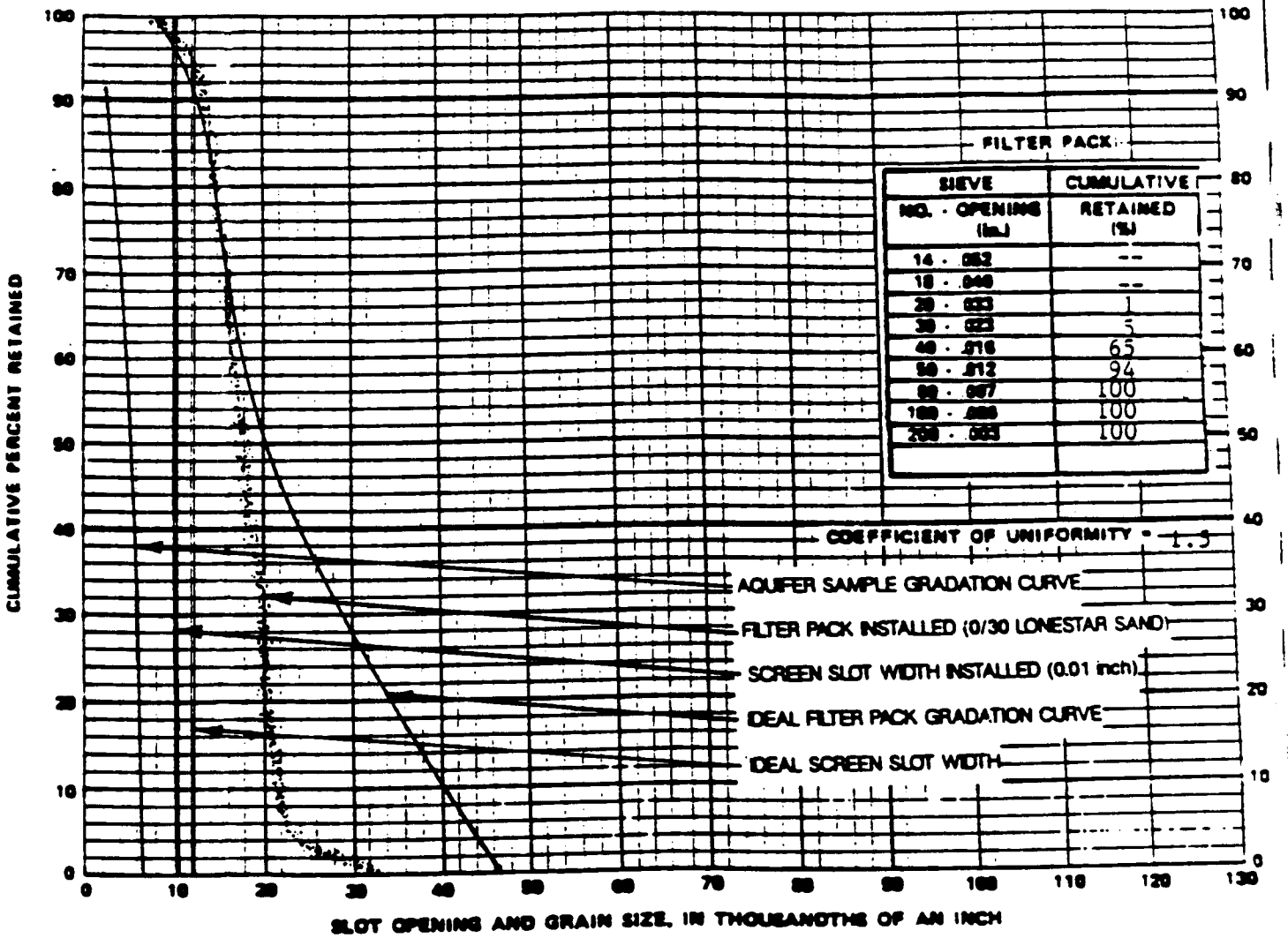
Fig. A.2

Well Name: WCC-10S Date: 6 June 1989

Well Location: Northwest corner of property

Sample Depth: 80 ft. Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .007	100
100 - .006	100
200 - .003	100

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	--	--	
60 - .0098	--	--	
80 - .007	--	--	
100 - .006	157	35.0	
200 - .003	395	88.0	
Bottom Pan	450	100.0	

Notes: WET WT. of sample: 528 gm
DRY WT. of sample: 450 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE Project No. 8941863J	GRAIN SIZE ANALYSIS WCC-10S	Fig. A.3

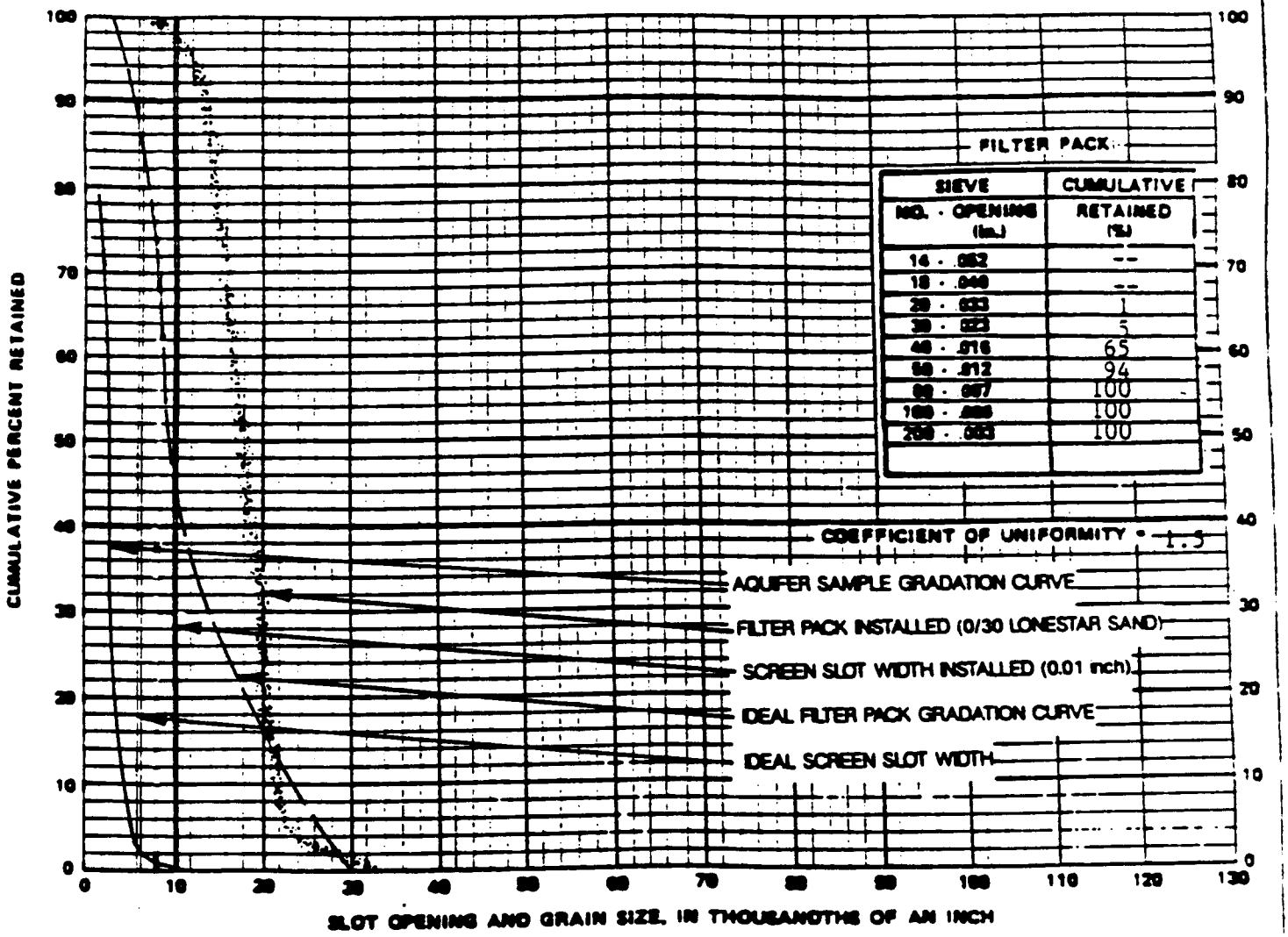
BOE-C6-0071310

Well Name: WCC-1D Date: 6-29-89

Well Location: 10 feet south of WCC-1S

Sample Depth: 123 feet Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .052	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .0098	100
80 - .007	100
100 - .006	100
200 - .003	

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	--	--	
30 - .023	--	--	
40 - .016	--	--	
50 - .012	2	0.8	
60 - .0098	2	0.8	
80 - .007	2	0.8	
100 - .006	8	3.1	
200 - .003	100	39.4	
Bottom Pan	254	100.0	

Notes: WET WT. of sample: 300 gm
DRY WT. of sample: 254 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

GRAIN SIZE ANALYSIS WCC-1D

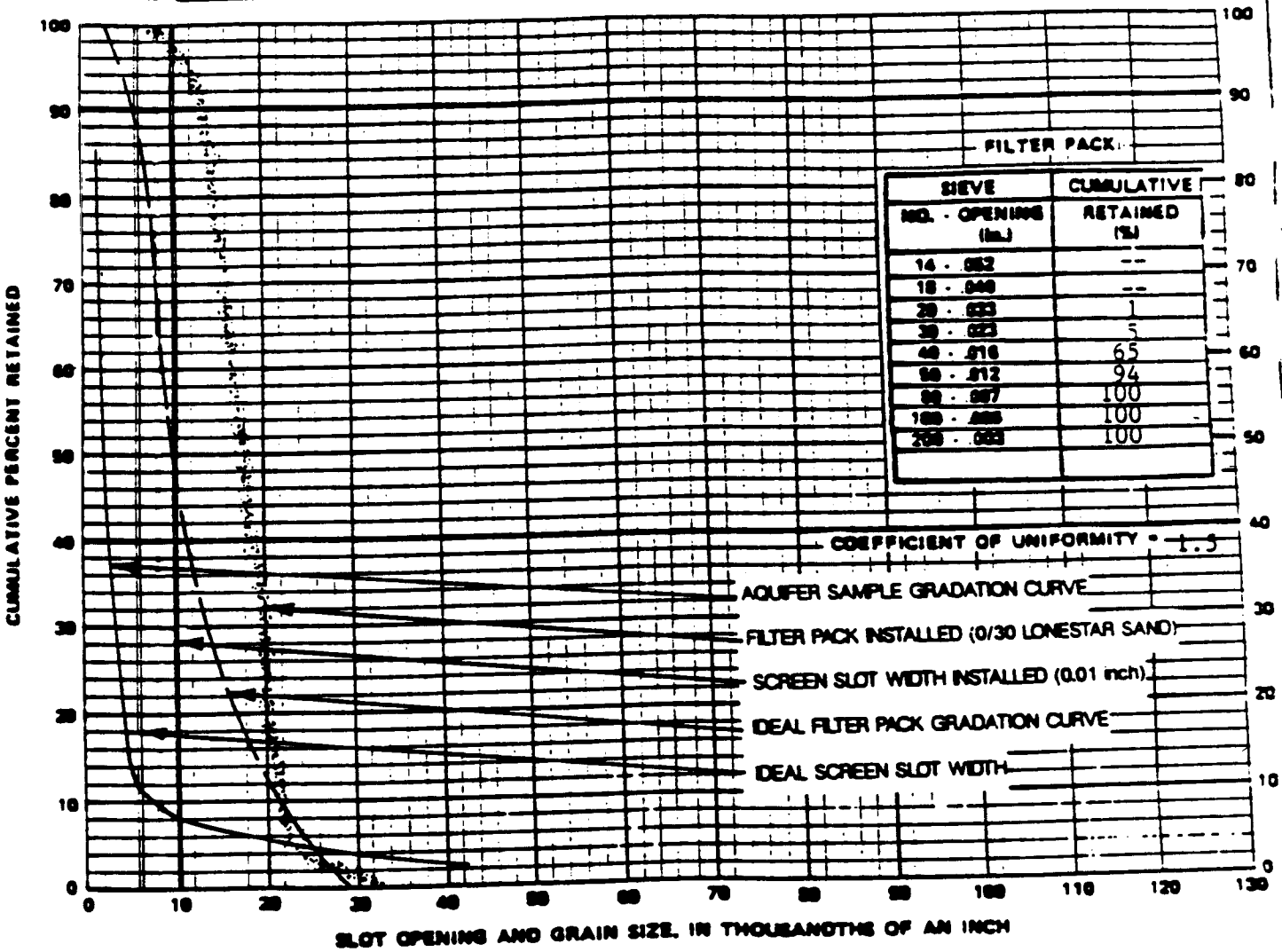
Fig. A.4

Well Name: WCC-3D Date: 6-27-89

Well Location: 35 feet northwest of WCC-3S

Sample Depth: 122 feet Performed By: P.GLAESMAN/H. REYES

Comments:



SIEVE NO. - OPENING (in.)	CUMULATIVE RETAINED (%)
14 - .062	--
18 - .040	--
20 - .033	1
30 - .023	5
40 - .016	65
50 - .012	94
60 - .007	100
100 - .005	100
200 - .003	100

SIEVE NO. - OPENING (in.)	SAMPLE WEIGHT (gms)	CUMULATIVE PERCENT RETAINED (%)	CUMULATIVE PERCENT PASSING (%)
18 - .040	--	--	
20 - .033	9	3.6	
30 - .023	10	4.0	
40 - .016	12	4.8	
50 - .012	19	7.6	
60 - .0085	20	8.0	
80 - .007	22	8.8	
100 - .005	25	10.0	
200 - .003	122	48.8	
Bottom Pan	250	100.0	

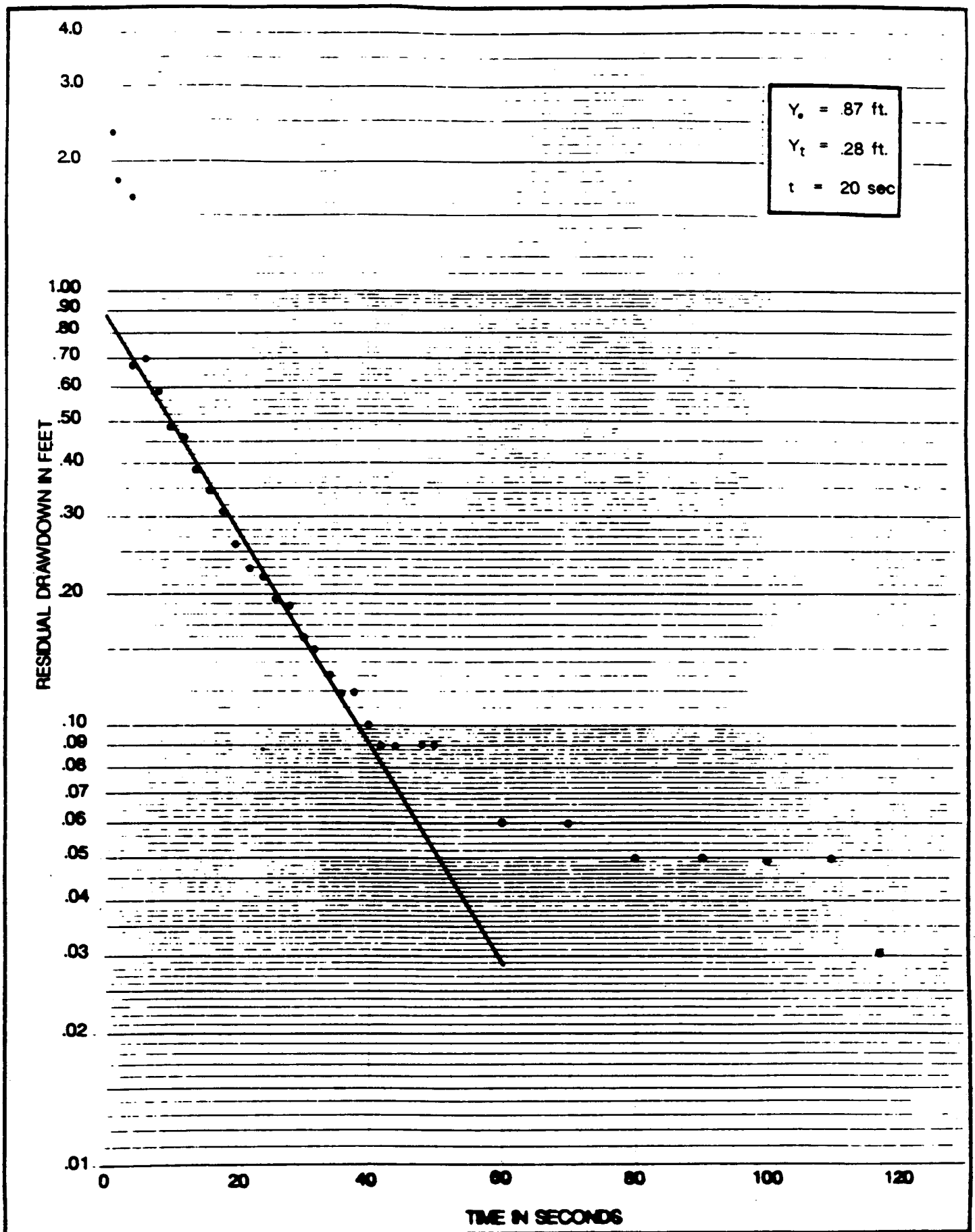
Notes: WET WT. of sample: 300 gm
DRY WT. of sample: 250 gm

Recommended Slot Opening:

Project DOUGLAS AIRCRAFT CO. - TORRANCE
Project No. 8941863J

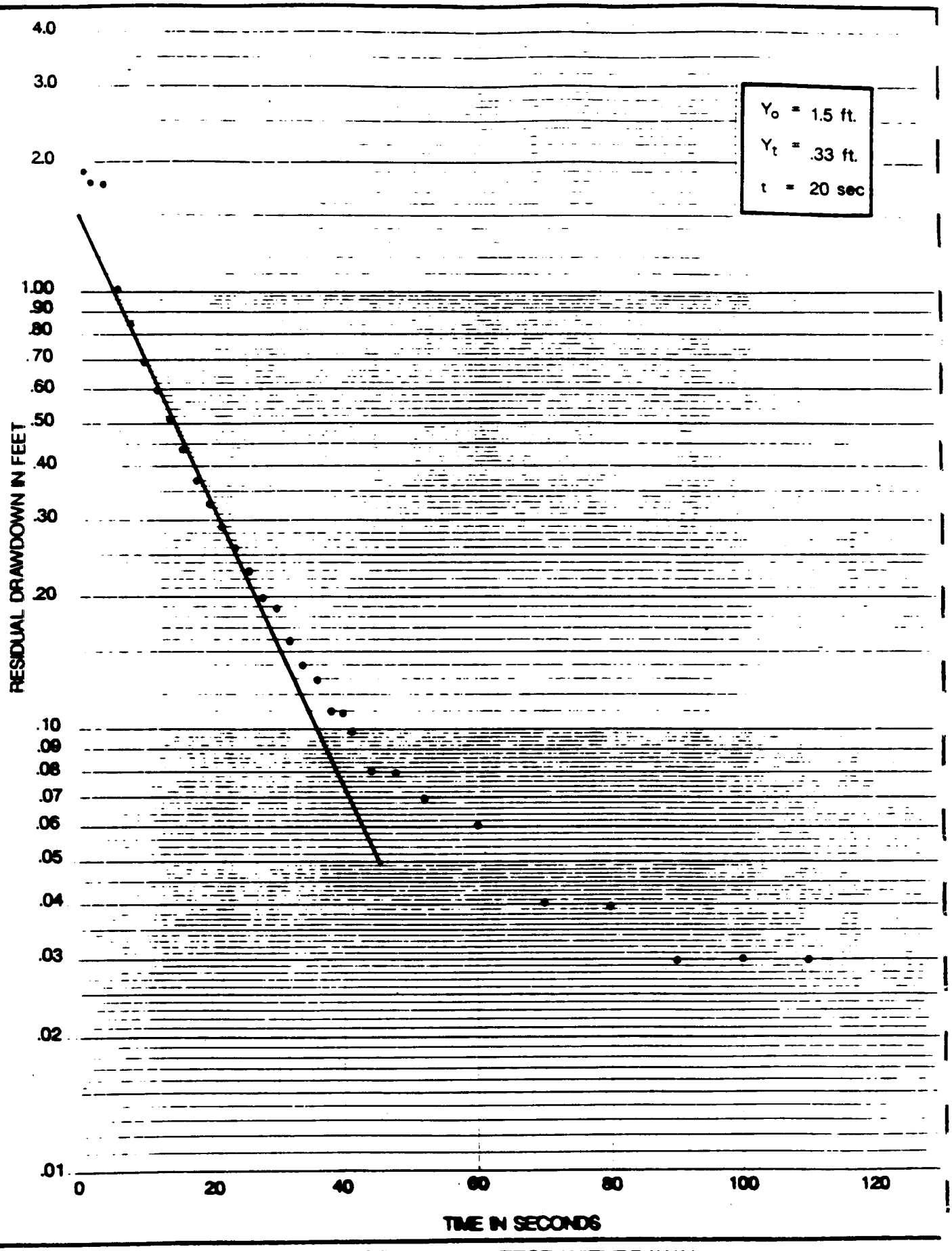
GRAIN SIZE ANALYSIS WCC-3D

Fig. A.5



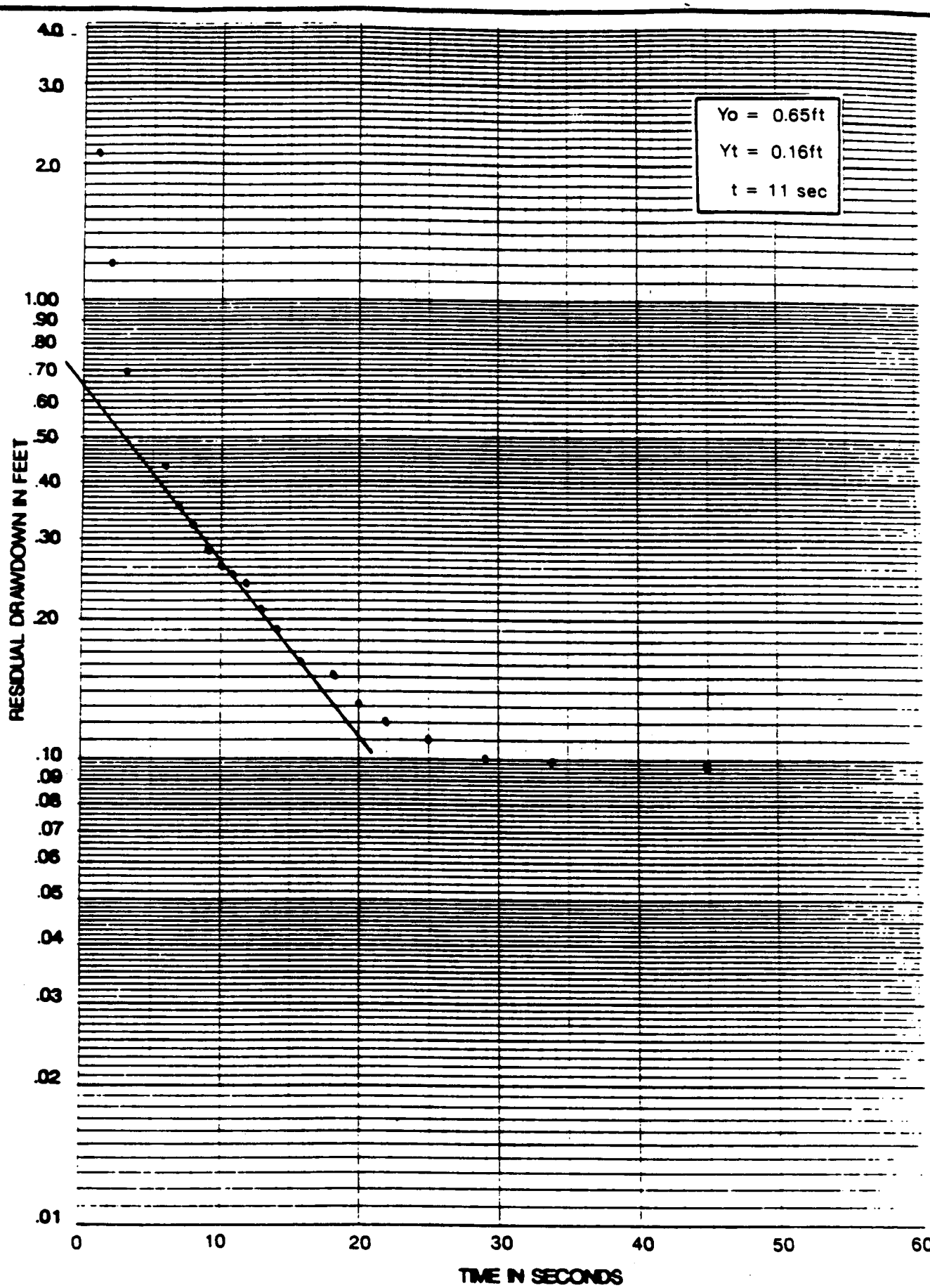
WCC-4S SLUG TEST INSERT

Project No.: [illegible]	Date: AUGUST [illegible]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.6



WCC-4S SLUG TEST WITHDRAWAL

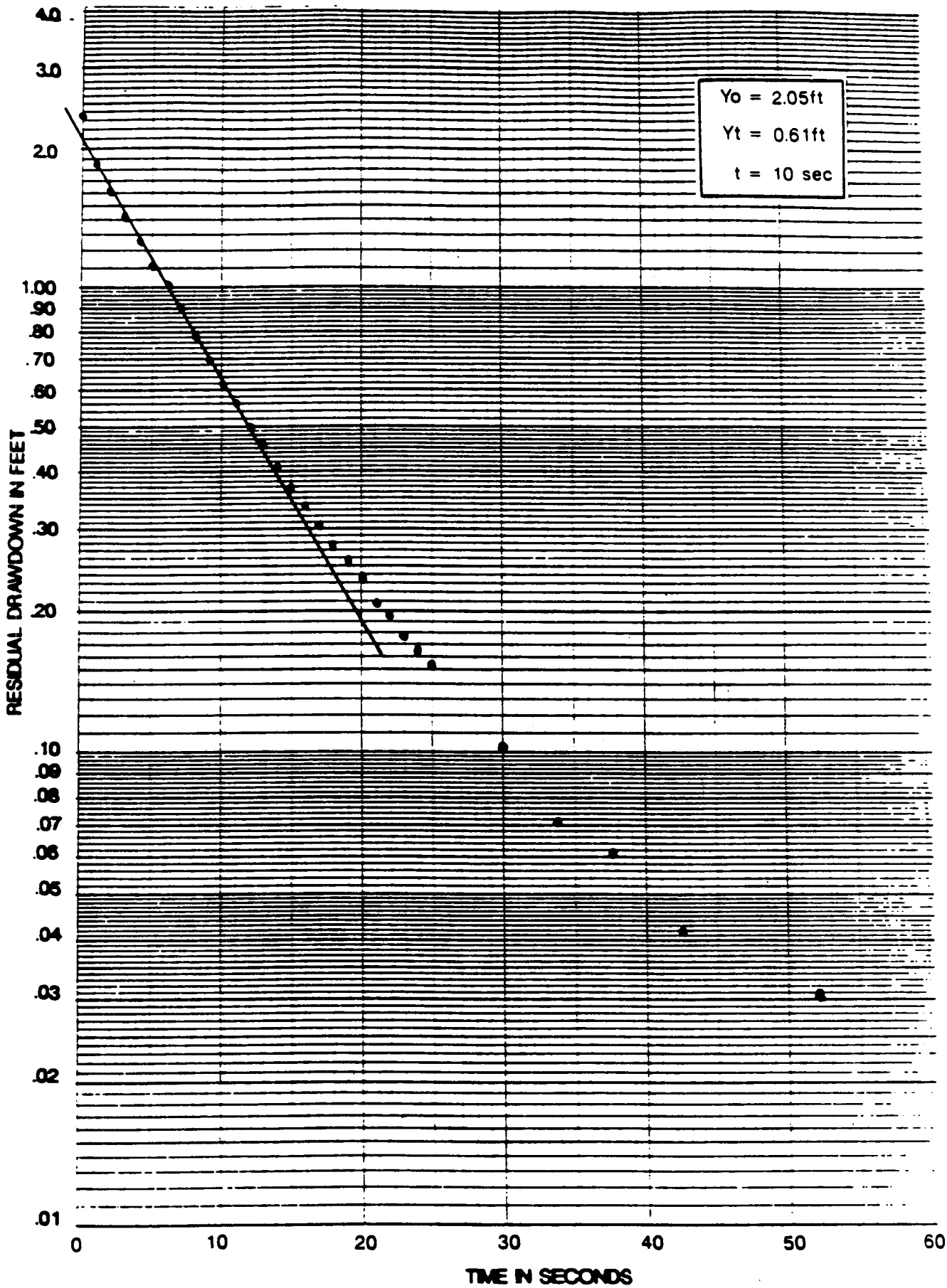
Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.7



WCC-5S SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.8

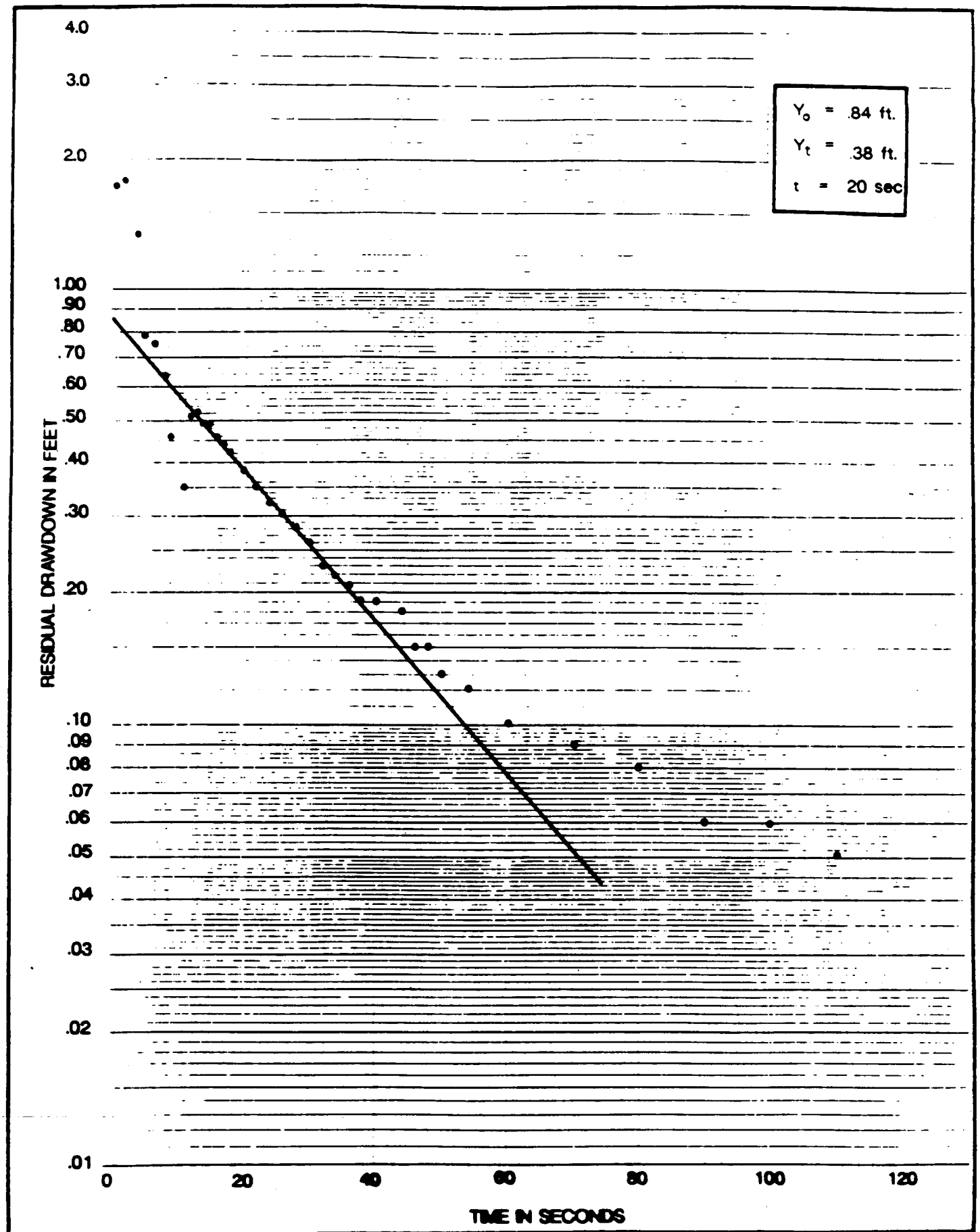
Woodward-Clyde Consultants



WCC-5S SLUG TEST WITHDRAWAL

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.9

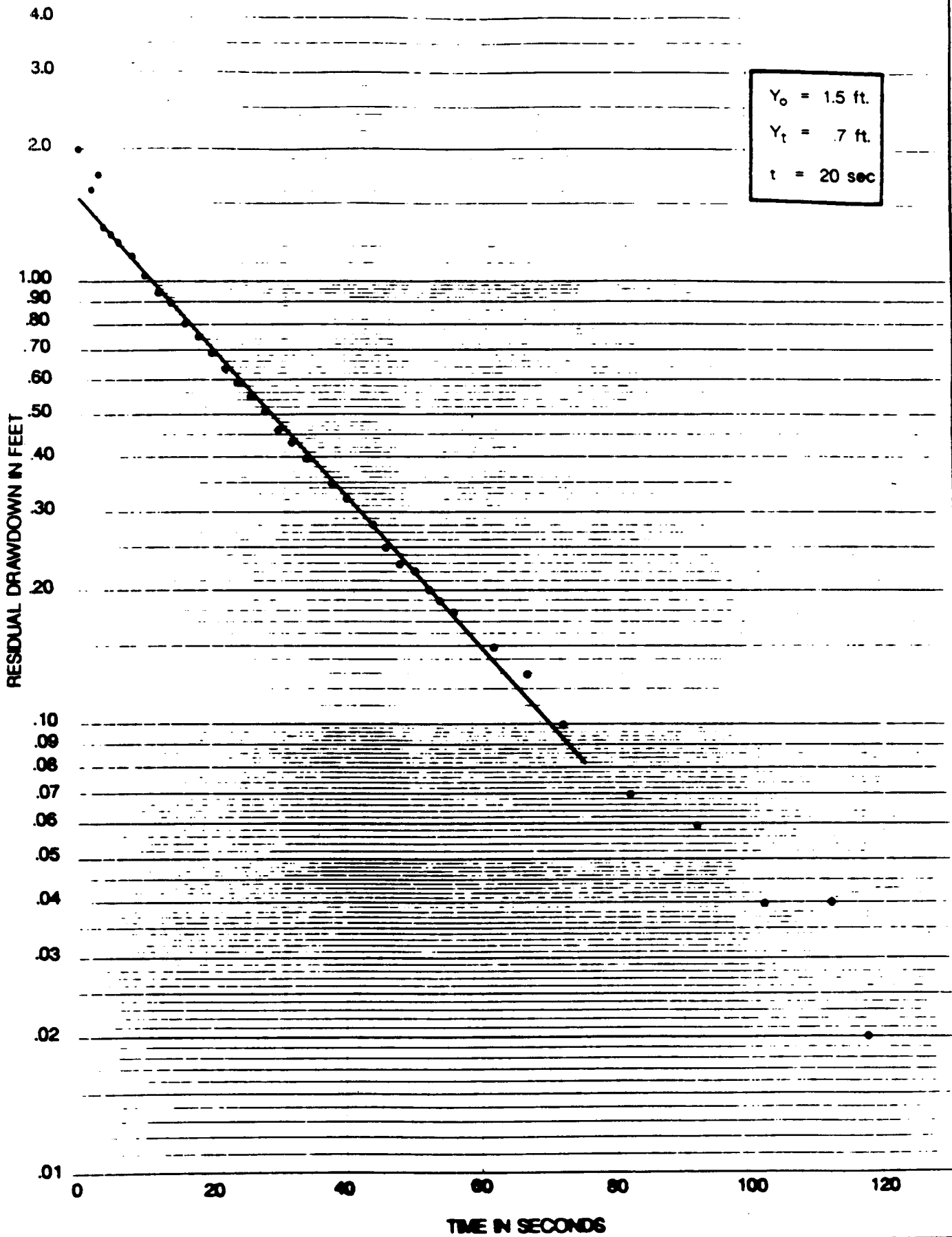
Woodward-Clyde Consultants



WCC-7S SLUG TEST INSERT

Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.10

[redacted]



WCC-7S SLUG TEST WITHDRAWAL

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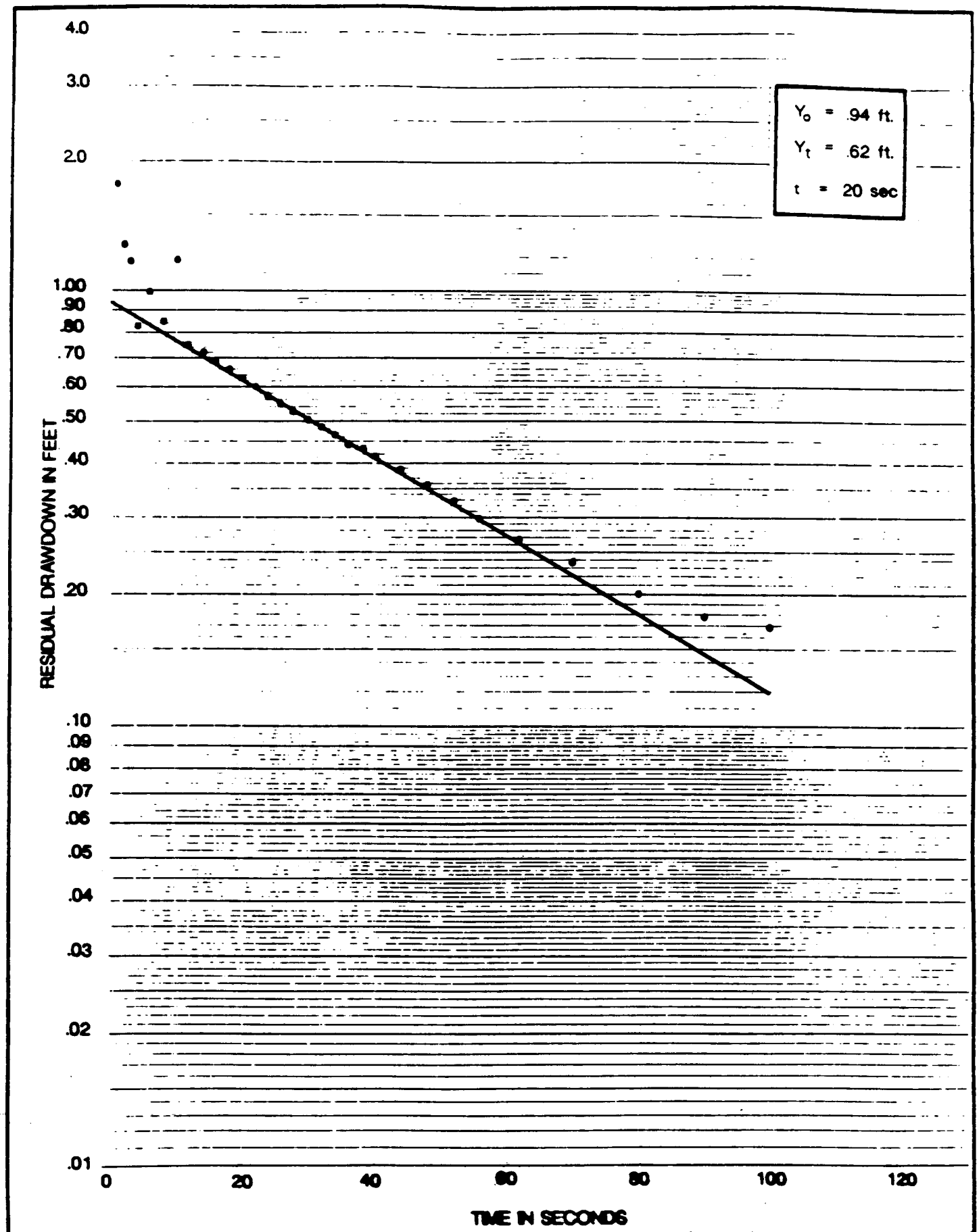
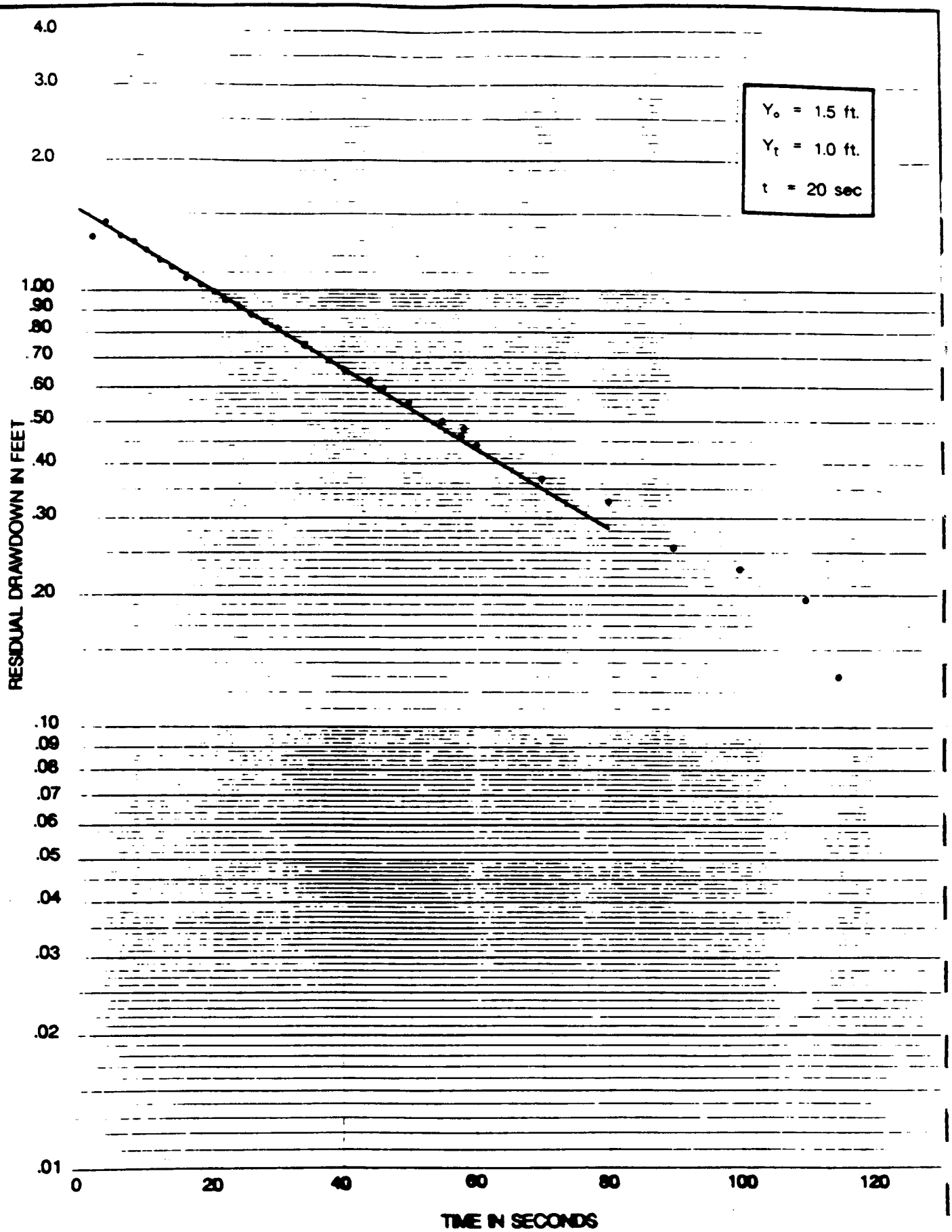
Woodward-Clyde Consultants



WCC-8S SLUG TEST INSERT

Project No.: [redacted]	Date: AUGUST [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.12

BOE-C6-0071319

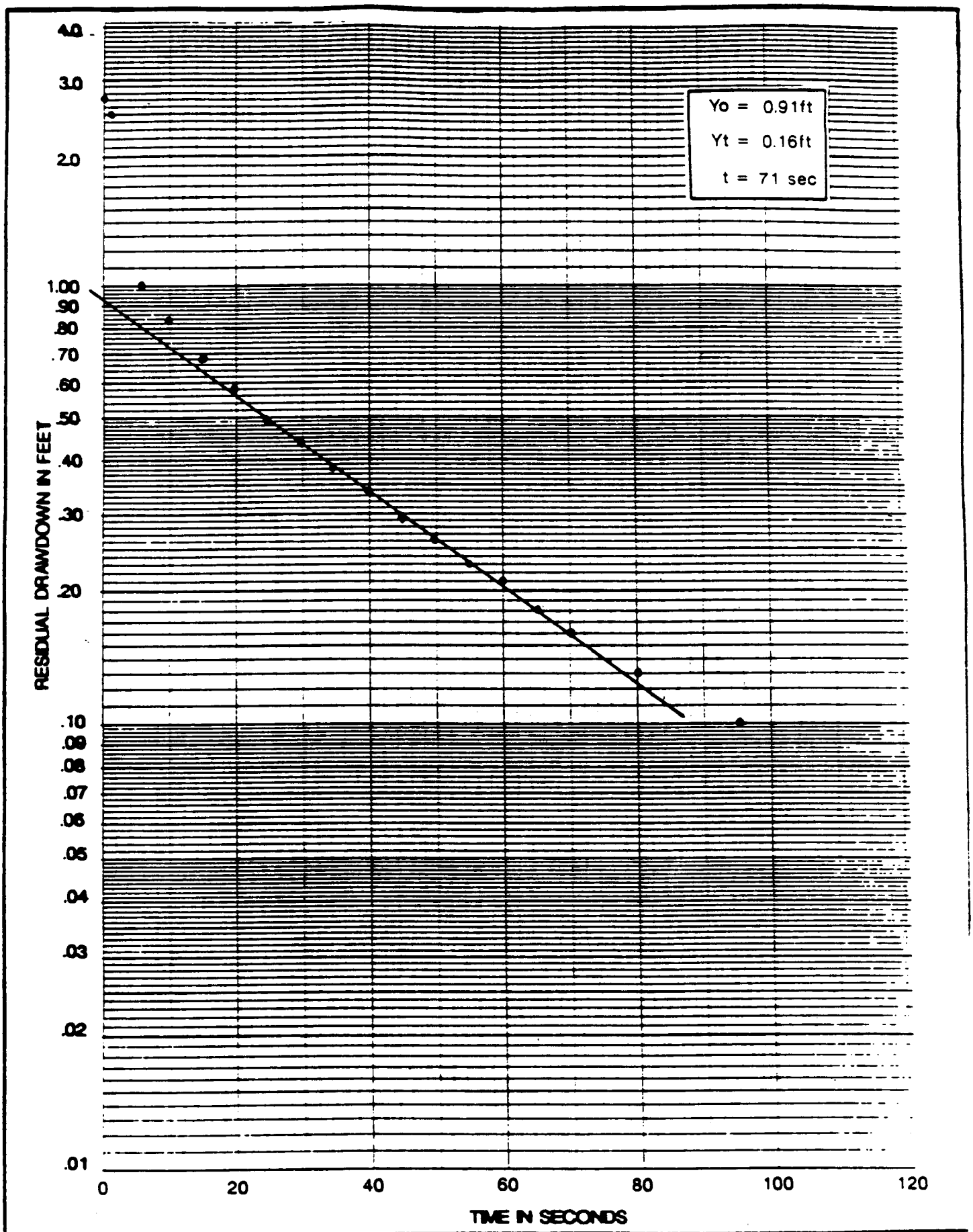


WCC-8S SLUG TEST WITHDRAWAL

Project No.: [redacted]	Date: [redacted]	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.13

[redacted]

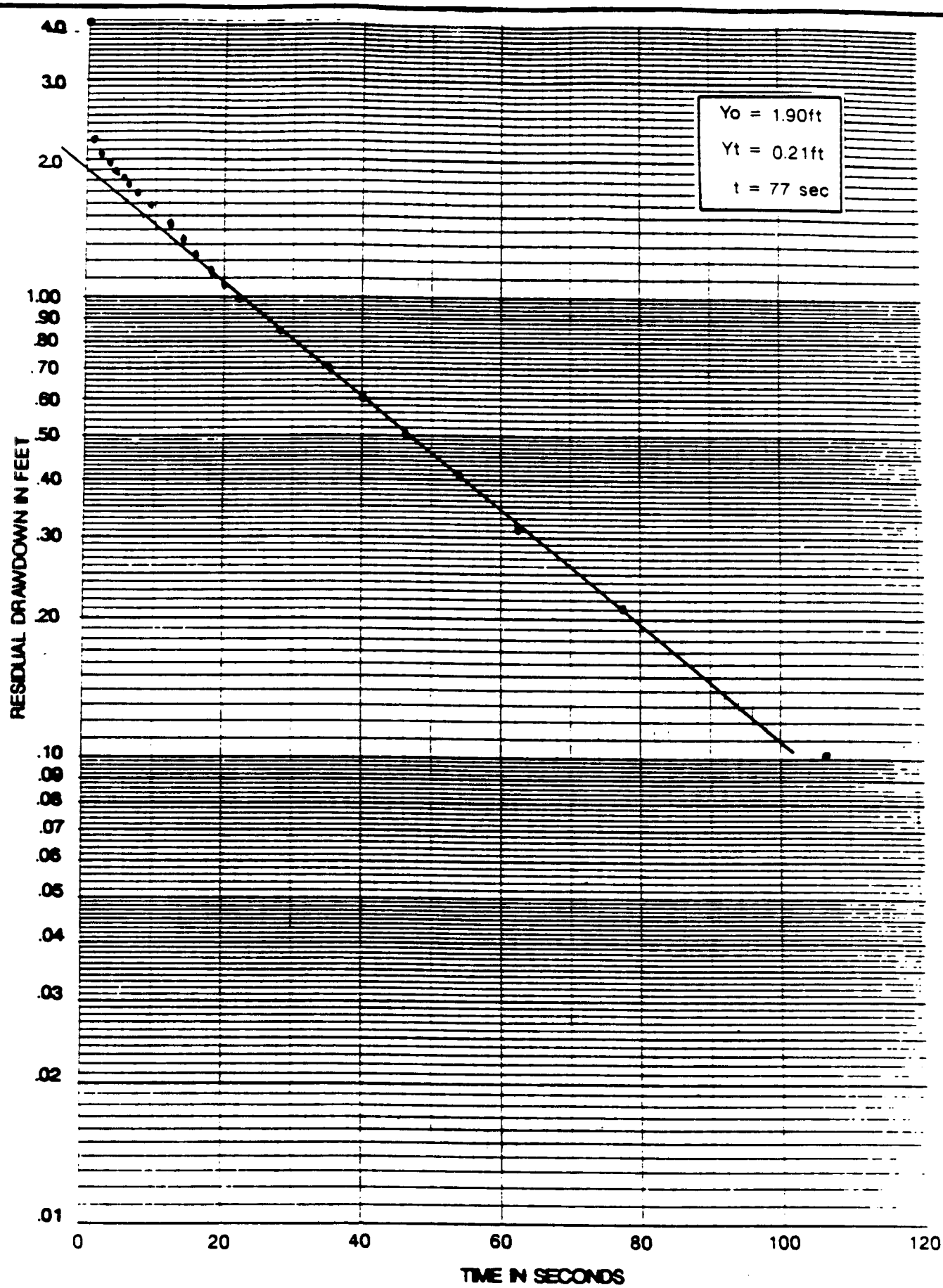
BOE-C6-0071320



WCC-9S SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.14

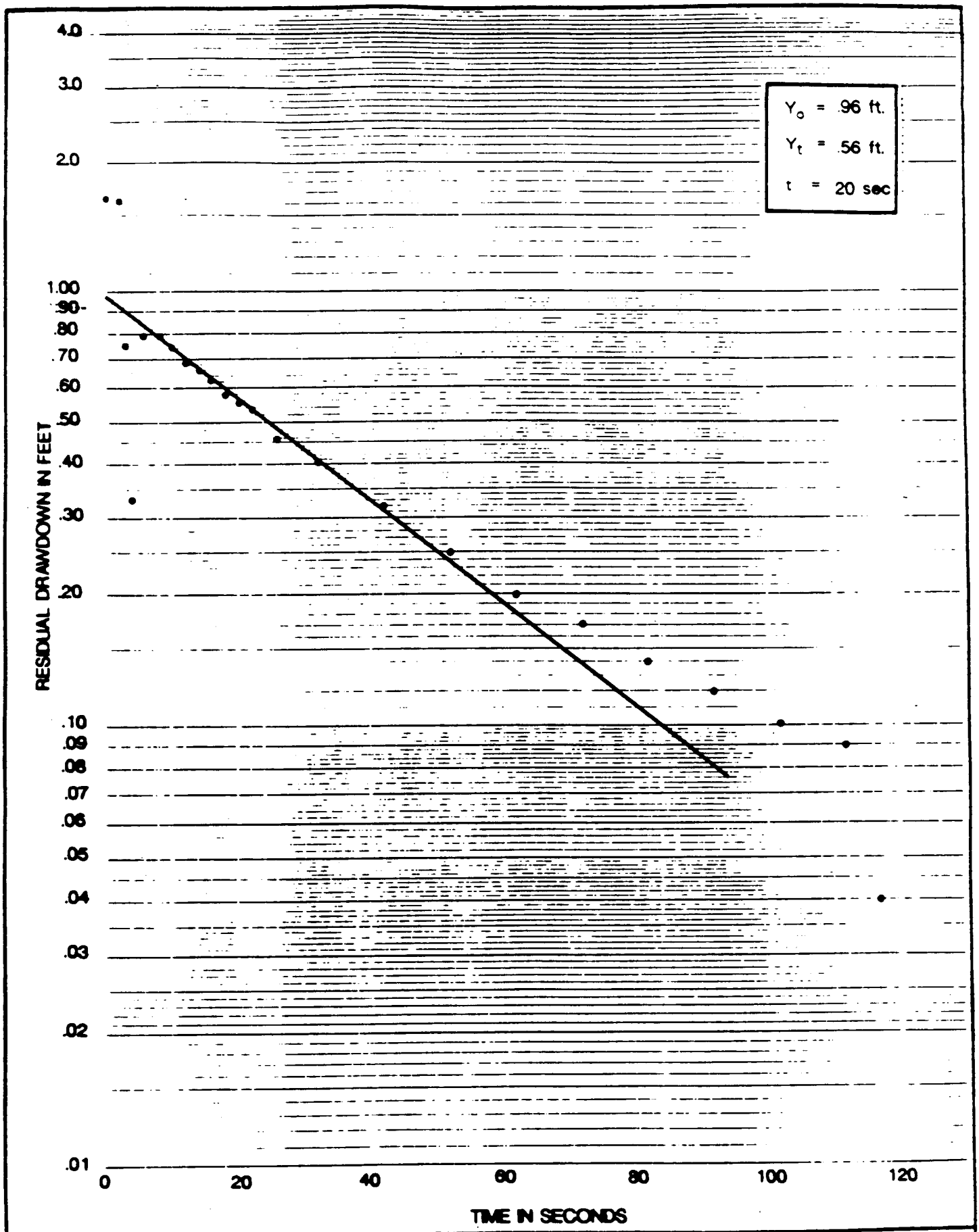
Woodward-Clyde Consultants



WCC-9S SLUG TEST WITHDRAWAL

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.15

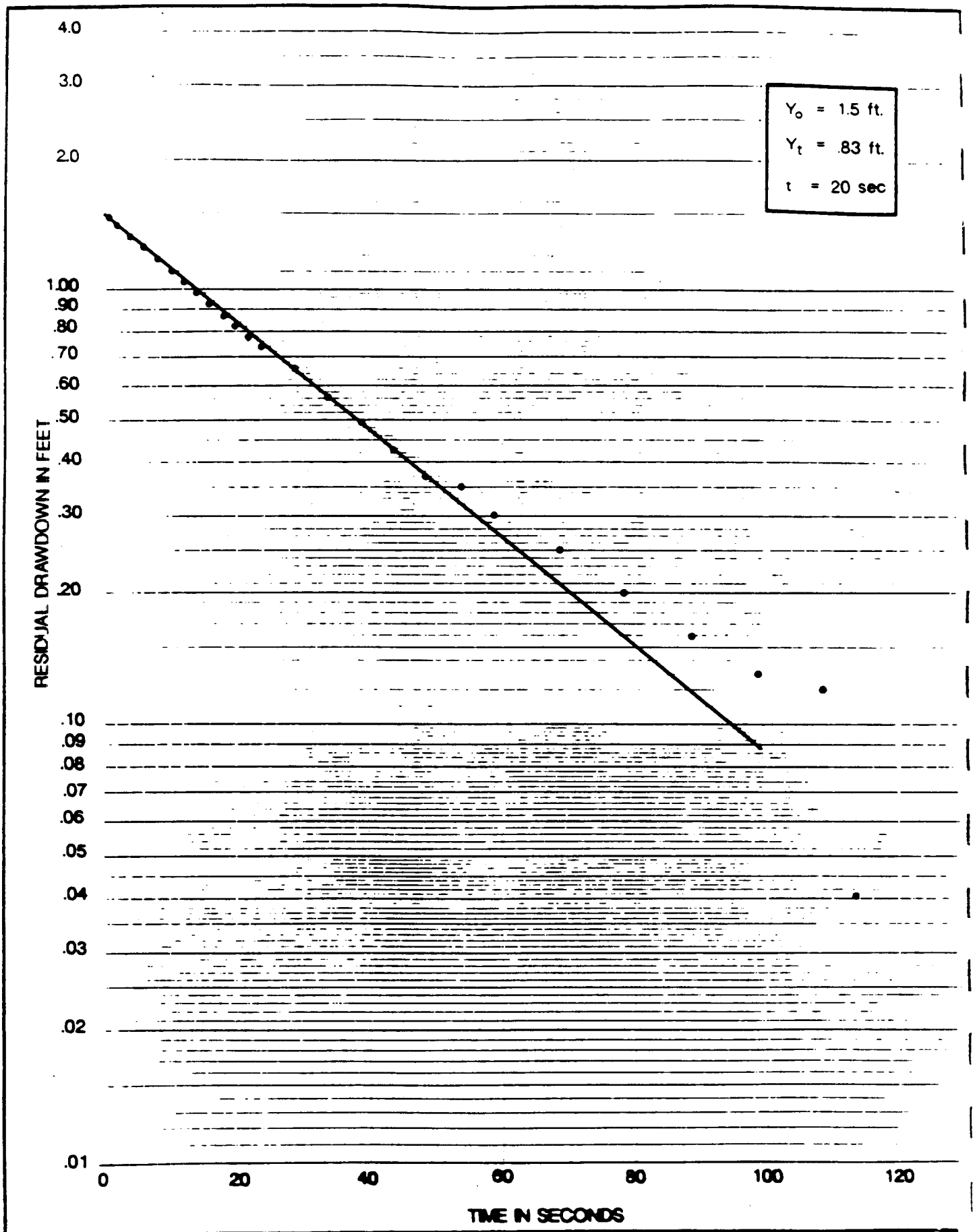
Woodward-Clyde Consultants



WCC-10S SLUG TEST INSERT

Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.16

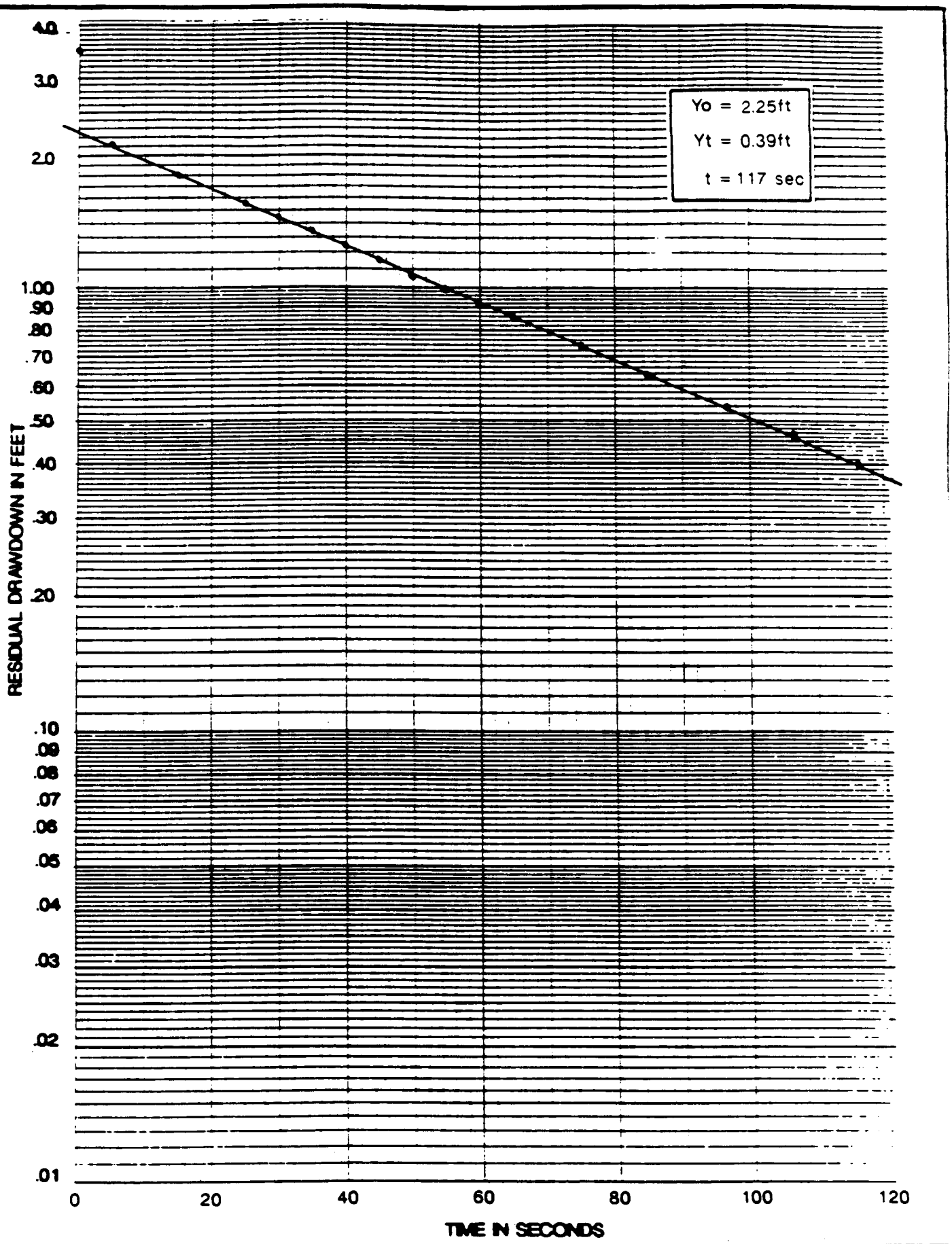
Woodward-Clyde Consultants



WCC-10S SLUG TEST WITHDRAWAL

Project No.: 8941883J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.17.

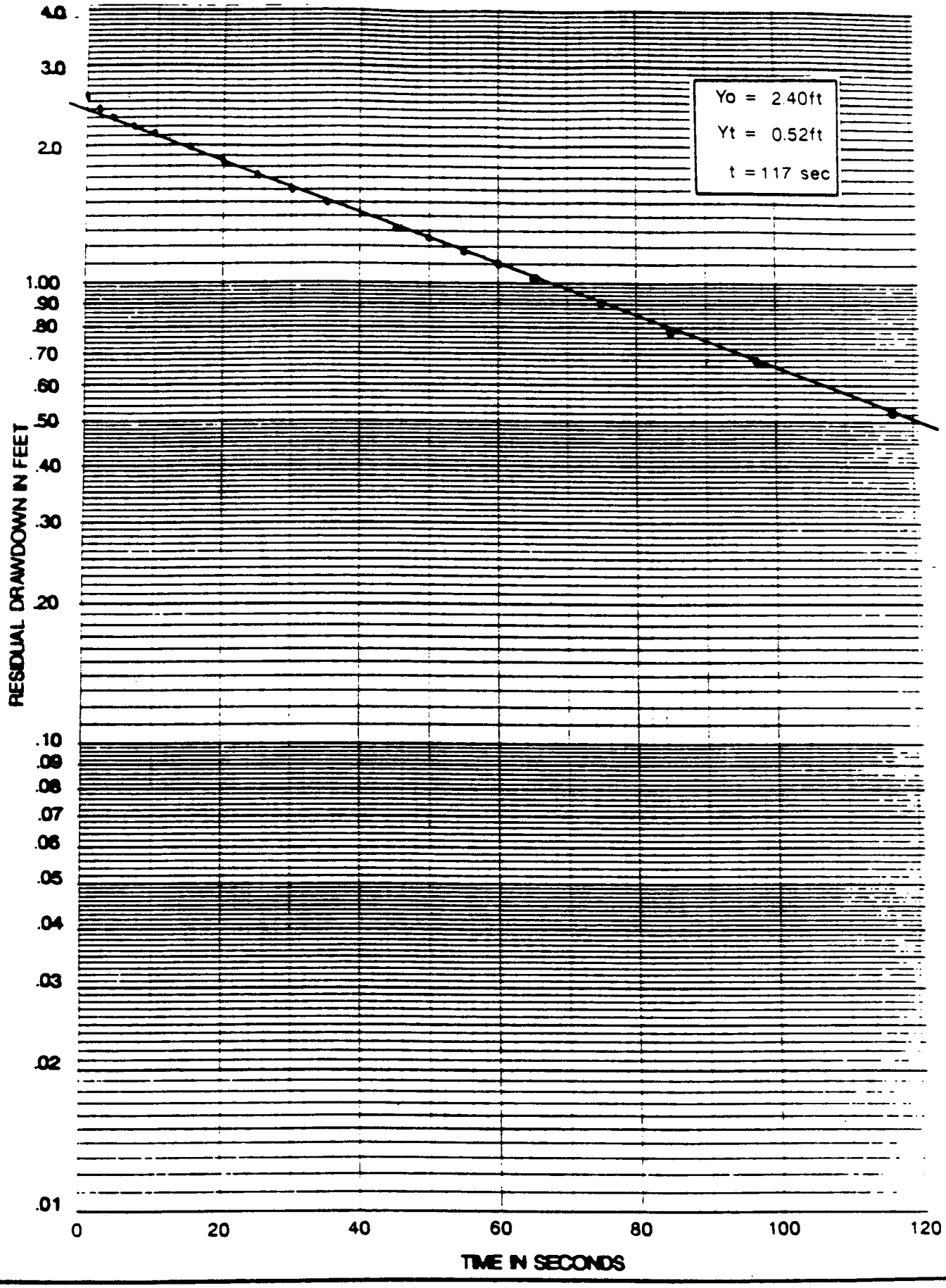
Woodward-Clyde Consultants



WCC-1D SLUG TEST INSERT

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.18

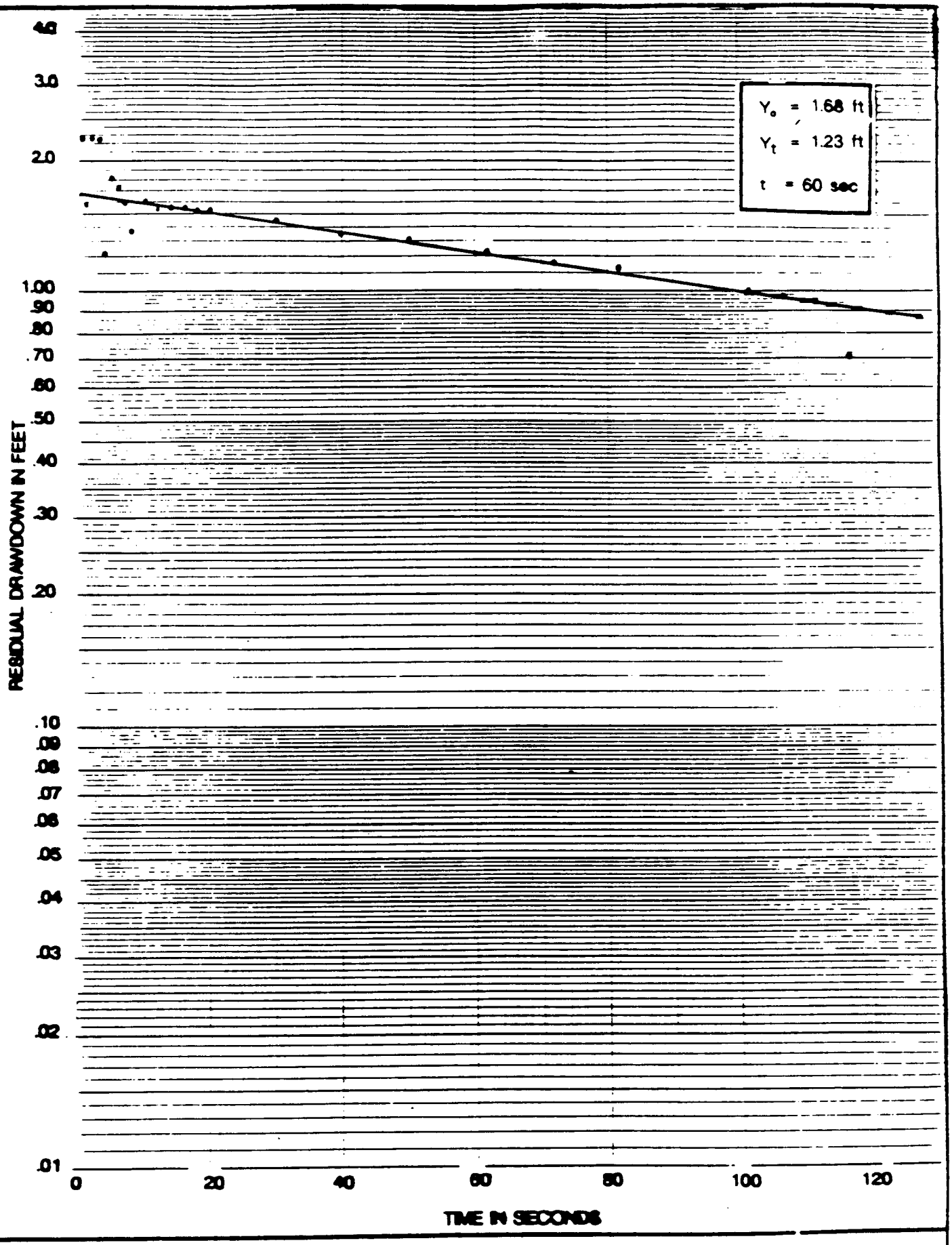
Woodward-Clyde Consultants



WCC-1D SLUG TEST WITHDRAWAL

Project No.: 8941863J	Date: OCT 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.19

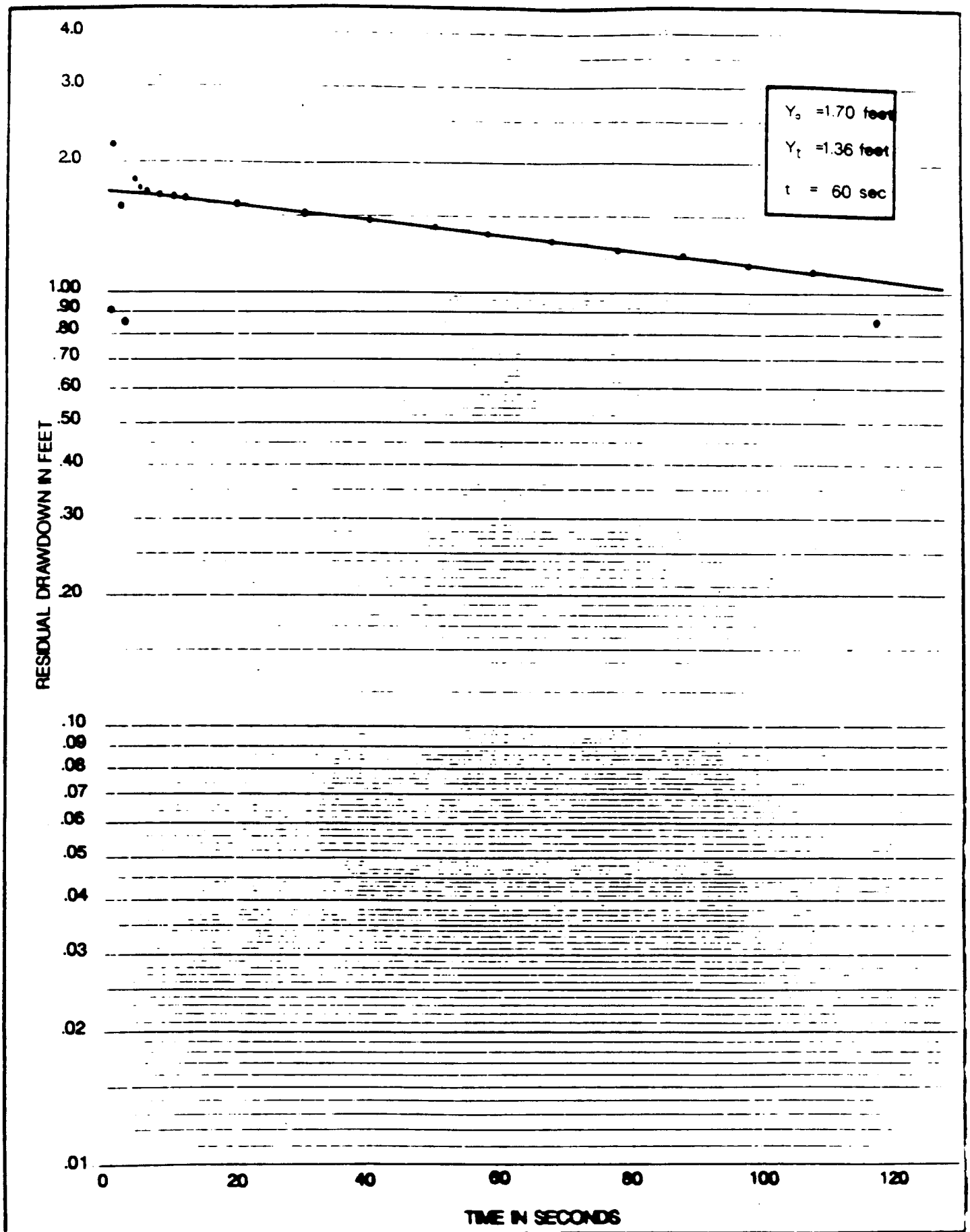
Woodward-Clyde Consultants



WCC-3D SLUG TEST INSERT

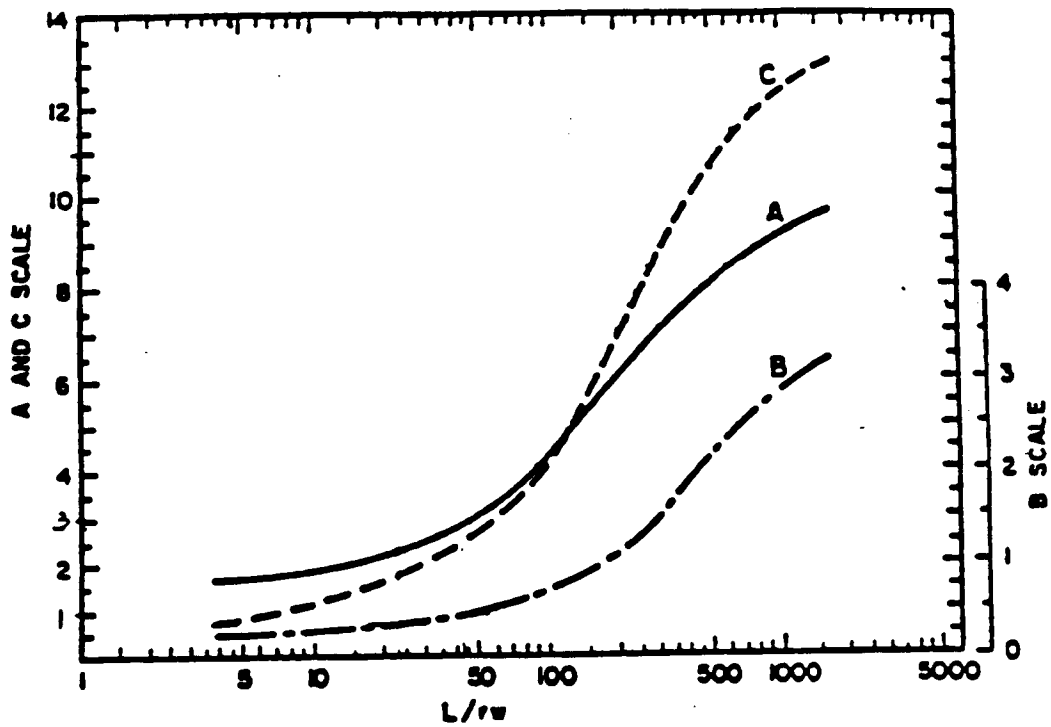
Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.20

Woodward-Clyde Consultants



WCC-3D SLUG TEST WITHDRAWAL

Project No.: [redacted]	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT CO. - TORRANCE	Fig. A.21



Bouwer and Rice A, B and C Coefficient Curves

Project No.: 8941863J	Date: AUGUST 1989	Project: DOUGLAS AIRCRAFT COMPANY	Fig. A.22

Woodward-Clyde Consultants

BOE-C6-0071330

APPENDIX B

BORING LOGS

(2L-ABC/C6GW3-AA)

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							
	Bentonite Pellets							
10	Native Soil							
	Monterey No. 0/30 Sand Filter Pack							
	Screen							
15	Modified California Sampler.							
	Bentonite (Volclay) Grout							
20	Pea Gravel (1/4"–1/2")							
	Continuous Core Sample							
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–TORRANCE
Project No.: 8941863J

KEY TO BORING LOG

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071332

BORING LOCATION	See Location Map	ELEVATION AND DATUM	Approximately 51 Feet above MSL
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Romero	DATE STARTED 6-13-89 / DATE FINISHED 6-13-89
DRILLING EQUIPMENT	CME 75 with 8-inch O.D., H.S.A.	COMPLETION DEPTH (ft) 66.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING –	SCREEN PERFORATION –	DIAMETER OF BORING (in.) 8	DIAMETER OF WELL (IN.) –
TYPE SIZE OF SAND PACK –	TYPE THICKNESS OF SEAL(S)	Backfilled with dry mixture of Sand and Bentonite	
No. OF SAMPLES DIST 3 UNDIST 4	CORE 0	LOGGED BY P. Giesman, H. Reyes	CHECKED BY M. Rozmajoo
WATER DEPTH (ft) FIRST – COMPL –	24 HRS –		

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	3-inch Asphalt concrete									
	Loose, moist, olive brown, fine to medium grained SAND to SILTY SAND (SP-SM).			1	X	7	100	10	0800	
	Very dense, moist, olive brown, medium grained SAND (SP).			2	X	2	120	10	0815	
5										
	Stiff to hard, moist, dark olive gray, CLAY (CH).			3	X	11	1000+	10	0819	
10										
	Medium dense, moist, dark yellowish brown, SILTY fine grained SAND (SM), to SANDY SILT (ML).			4	X	13	1000+	10	0824	
15	Becomes discolored to dark olive gray, with trace of clay.									Strong chemical odor
	Stiff to very stiff, moist, dark yellowish brown to olive brown, SILTY CLAY (CL).			5	X	11	1000+	10	0900	
20										
	Medium stiff to stiff, very moist, olive brown, SANDY SILT (ML).			6	X	7	1000+	10	0910	
25										
	Loose, moist, light gray, CLAYEY fine grained SAND (SC).			7	X	5	1000+	10	0917	Encountered mixture of silica sand and bentonite powder. It is probably the backfill material from adjacent boring.
30										
	Very soft, very moist, olive brown, SILTY CLAY to CLAYEY SILT (CL-ML).			8	X	1	1000+	10	0925	
35										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING B-6

Fig B-2

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Very soft, very moist, olive brown, SILTY CLAY to CLAYEY SILT (CL–ML).									
	Very soft, saturated with chemicals, olive brown, SANDY SILT (ML).									
40	Hard, moist, olive brown, SILTY CLAY (CL).			9	X	30	1000+	10	0935	
	Iron oxide stains and root holes.			10	X	23	1000+	10	0950	
45	Dense, moist, olive brown and yellowish brown mottled, SILTY fine grained SAND (SM), iron oxide staining and trace of clay.			11	X	44	1000+	10	0958	
50	Dense, moist, yellowish brown, fine grained SAND (SP–SM), micaceous.			12	X	33	1000+	10	1013	
55	Hard, very moist, olive to olive brown, SANDY SILT (ML), (SILTSTONE?), micaceous, with iron oxide staining.			13	X	42	1000+	10	1024	
60	Becomes more sandy, grading to SILTY SAND (SM).			14	X	39	1000+	10	1039	
65	Bottom of Boring at 66.5 feet.									
70										
75										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING B–6

Fig. B-3

WOODWARD–CLYDE CONSULTANTS

BORING LOCATION	See Location Map	ELEVATION AND DATUM	Approximately 51 Feet above MSL
DRILLING AGENCY	A & P Drilling, Inc.	DRILLER M. Romero	DATE STARTED 6-13-89 / DATE FINISHED 6-13-89
DRILLING EQUIPMENT	CME 75 with 8-inch O.D., H.S.A.	COMPLETION DEPTH (ft) 66.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	–	SCREEN PERFORATION –	DIAMETER OF BORING (in.) 8 / DIAMETER OF WELL (IN) –
TYPE SIZE OF SAND PACK	–	TYPE/THICKNESS OF SEAL(S)	Backfilled with dry mixture of Sand and Bentonite
No. OF SAMPLES	DIST 0 / UNDIST 14	CORE 0	LOGGED BY P. Giesman, H. Reyes / CHECKED BY M. Rosmaloo
WATER DEPTH (ft)	FIRST – / COMPL –	24 HRS –	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	8-inch Asphalt concrete									
	Very stiff, moist, dark yellowish brown to dark gray, CLAY (CH).			1	X	15	60	20	1142	
	Becomes mottled with iron oxide stains and black stains of decomposed roots.									
5				2	X	23	80	20	1149	
	Hard, moist, dark yellowish brown, SILTY CLAY (CL)									
10				3	X	32	90	20	1155	
15				4	X	39	90	20	1202	
	Hard, moist, dark yellowish brown, SANDY SILT (ML)									
20				5	X	24	110	20	1209	
25				6	X	17	120	20	1215	
30				7	X	27	1000+	20	1224	Strong chemical odor
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).									
35				8	X	24	1000+	20	1231	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING B-7

Fig B-4

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM)									
40	Hard, moist, dark yellowish brown, SILTY CLAY (CL), (SILTY CLAYSTONE?), micaceous, with iron oxide spotting and hairlike root holes			9	X	32	1000+	20	1240	
45	Becomes olive color.			10	X	24	1000+	20	1251	
50	Medium dense, moist, mottled with olive gray and yellowish brown, SILTY fine grained SAND (SM), with trace of clay and iron oxide staining.			11	X	20	1000+	20	1304	
55	Becomes medium grained with abundant shell fragments, strong HCL reaction.			12	X	36	1000+	20	1316	
60	Very stiff to hard, moist, olive brown, SANDY SILT (ML), (SILTSTONE?).			13	X	28	1000+	20	1329	
65	Medium dense, moist, olive gray, SILTY fine grained SAND (SM-ML), very micaceous.			14	X	27			1342	
	Bottom of Boring at 66.5 feet.									
70										
75										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING B-7

Fig B-5

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map	ELEVATION AND DATUM	Approximately 51 Feet above MSL
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Romero	DATE STARTED 6-14-89 / DATE FINISHED 6-14-89
DRILLING EQUIPMENT	CME 75 with 8-inch O.D., H.S.A.	COMPLETION DEPTH (ft) 66.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING –	SCREEN PERFORATION –	DIAMETER OF BORING (in.) 8	DIAMETER OF WELL (IN.) –
TYPE SIZE OF SAND PACK –	TYPE THICKNESS OF SEAL(S)	Backfilled with Dry Mixture of Sand and Bentonite	
No. OF SAMPLES DIST 3	UNDIST 14	CORE 0	LOGGED BY P. Gicesman, H. Reyes / CHECKED BY M. Rozmajzl
WATER DEPTH (ft) FIRST –	COMPL –	24 HRS –	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head Space	Back-Ground	Drilling Rate (Time)	REMARKS
	6-inch Asphalt concrete over 6-inch base material.									
	Very stiff, moist, very dark brown, SANDY CLAY (CL), with root holes			1	X	16	18	12	0745	
5	Becomes hard			2	X	43	47	12	0758	
	Dense, moist, yellowish brown, CLAYEY fine grained SAND (SC).									
	Hard, moist, dark brown, SILTY CLAY (CL), with root holes.									
10				3	X	58	42	12	0806	
	Medium stiff, moist, olive brown, SANDY SILT (ML)									
15				4	X	11	45	12	0815	
	Very stiff, moist, dark brown, SILTY CLAY (CL) with hairlike root holes.									
20				5	X	21	20	12	0820	
	Very stiff, moist, dark brown, SILTY CLAY (CL) with hairlike root holes.									
25				6	X	15	42	12	0826	
	Very stiff to hard, moist, dark olive brown, SILTY CLAY (CL), with calcareous nodules and hairlike root holes.									
30				7	X	26	58	12	0833	
	Very dense, moist, dark olive brown, SILTY fine grained SAND (SM), with large calcareous nodules.									
35				8	X	86	68	12	0841	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING B-8

Fig B-6

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071337

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Very dense, moist, dark olive brown, SILTY fine grained SAND (SM), with large calcareous nodules.									
	Lens of hard, moist, dark olive brown, silty clay.									
40	Silty sand becomes very moist, olive in color			9	X	39	125	12	0848	
	Very stiff to hard, moist, olive, SANDY CLAY (CL), with iron oxide stains and calcareous nodules. (Strong HCL Reaction)									
45				10	X	29	230	12	0857	
	Medium dense, moist, olive gray and yellowish brown mottled, SILTY fine grained SAND (SM) (SP), with iron oxide staining, micaceous.									
50				11	X	24	10[illegible]	12	0912	
	Becomes dense, medium grained with abundant iron oxide, calcareous nodules, and shell fragments cemented.									
55				12	X	35	1000+	12	0925	
	Very dense, moist, yellowish brown, medium grained SAND (SP).									
60				13	X	85	1000+	12	0934	
	Hard, moist, olive, SANDY SILT (ML), (SILTSTONE?), micaceous.									
	Dense, moist, yellowish brown, medium grained SAND (SP)									
65	Dense, moist, olive, SILTY fine grained SAND (SM).			14	X	35	1000+	12	0952	
	Bottom of Boring at 66.5 feet.									
70										
75										

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CONT. LOG OF BORING B-3

Fig B-7

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map	ELEVATION AND DATUM	Approximately 51 Feet above MSL
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Romero	DATE STARTED 6-14-89 / DATE FINISHED 6-14-89
DRILLING EQUIPMENT	CME 75 with 8-inch O.D., H.S.A.	COMPLETION DEPTH (ft) 66.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING –	SCREEN PERFORATION –	DIAMETER OF BORING (in.) 8	DIAMETER OF WELL (IN.) –
TYPE SIZE OF SAND PACK –	TYPE THICKNESS OF SEAL(S)	Backfilled with dry mixture of Sand and Bentonite	
No. OF SAMPLES DIST 0	UNDIST 24	CORE 0	LOGGED BY P. Glaesman, H. Reyes / CHECKED BY M. Rosmalen
WATER DEPTH (ft) FIRST –	COMPL –	24 HRS –	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head Space	Back Ground	Drilling Rate (Time)	REMARKS
	6-inch Asphalt concrete over 9-inch base material									
	Medium stiff, saturated, dark brown, SILTY CLAY (CL)			1	X	6	100	19	1107	
	Becomes very stiff			2	X	21	100	19	1112	
5										
	Becomes hard.			3	X	47	100	20	1120	
10										
	Becomes more silty, very stiff.			4	X	26	100	20	1124	
15										
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).			5	X	30	100	20	1130	
20										
	Stiff to very stiff, moist, olive brown, SANDY SILT (ML), micaceous.			6	X	16	130	20	1137	
25										
	Very stiff, moist, dark olive brown, SILTY CLAY (CL), with iron oxide spotting and root holes.			7	X	25	130	20	1145	
30										
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).			8	X	21	125	20	1153	
35										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
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LOG OF BORING B-9

Fig B-8

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).									
40	Hard, moist, dark olive brown, SILTY CLAY (CL), micaceous.			9	X	68	120	20	1202	
45	Becomes very stiff, olive, with iron oxide spotting and decomposed roots.			10	X	25	130	20	1211	
	Dense, moist, mottled, olive gray and yellowish brown, SILTY fine grained SAND to SAND (SW-SP), with iron oxide staining.									
50				11	X	45	340	20	1224	
	Becomes less silty, grades to dense, moist, yellowish brown, fine to medium grained SAND (SP), micaceous.									Moderate Chemical odor.
55				12	X	42	900	20	1235	
60				13	X	46	490	20	1250	
	Dense, damp to moist, olive gray, SILTY fine grained SAND (SM), very micaceous.									
65	Hard, moist, olive, SANDY SILT (ML), (SILTSTONE?), micaceous.			14	X	30	1000+	20	1303	
	Bottom of Boring at 66.5 feet.									
70										
75										

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CONT. LOG OF BORING B-9

Fig B-9

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	WCC-1	ELEVATION AND DATUM	Top of Casing 50.70 Feet
DRILLING AGENCY	Datum Exploration, Inc. — DRILLER: James	DATE STARTED	3-25-87
DRILLING EQUIPMENT	Mobile Drill B-61, 10-inch O.D., H.S.A.	DATE FINISHED	3-26-87
DIAMETER AND TYPE OF WELL CASING	2-inch Plastic, Flush Threaded	COMPLETION DEPTH (FT)	91
TYPE OF PERFORATION	.02 Slot	NO. OF SAMPLES	FIRST 5
TYPE OF BACKFILL	No. 12 Silica Sand	WATER DEPTH (FT)	FIRST 74.5
TYPE OF SEAL	Bentonite Pellet Plug and Bentonite Grout	LOGGED BY	S. Donaldson
		CHECKED BY	B. Jacobs

DEPTH (FEET)	DESCRIPTION	Lithology	Observation Well	SAMPLES No.	Type	Blow Count	Drilling Rate/Time	REMARKS
	Asphalt						0905	Background OVA reading = 1-2 ppm
	Damp, reddish-brown, SILTY SAND (SP) with clay and gravel.							
	Becomes black							
5	Becomes reddish brown, no gravel.							
	Becomes medium brown.							
10								
	CLAYEY SAND (SC).						0915	
15								
20								
25	Stiff, damp, medium brown, CLAYEY SILT (ML) with some fine sand.							
30	Becomes hard with more clay.						0920	
35								
	Lense of volcanic (?) angular gravel.							

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LOG OF BORING WCC-1S

Fig. B-10

LA/OR-0783-235R

WOODWARD-CLYDE CONSULTANTS

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Observation Well	GRAPHIC LOG: OVA (ppm)	SAMPLES: No.	SAMPLES: Type	SAMPLES: Blow Count	SAMPLES: Drilling Rate/Time	REMARKS
	Lense of volcanic (?) angular gravel (continued).								
40								0830	
	Becomes moist and hard.								
45					1	X	50		
	Very hard, moist, dark brown, SILTY CLAY (CL).								
50									
	Lenses of very hard, carbonate cemented concretions.								
				1	2	X	26		
55								1010	
60	Increasing silt.								
	Medium dense, dry, tan, fine SAND (SP).								
65				7.5	3	X	57		
	Dense, dry, whitish-tan, fine SAND (SP).								
70	Becomes damp and very dense.			2.5	4	X	50/5"		
	Very stiff, damp, dark brown SILT (ML).								
75	Becomes wet.			7.8	5	X	50/5"		Water encountered at 74.5 feet.
	Very dense, wet, brown, fine SAND (SP).								

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Project No.: 41863B

CONT. LOG OF BORING WCC-1S

Fig. B-1

LA/OR-0783-236R

WOODWARD – CLYDE CONSULTANTS

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG: Lithology	GRAPHIC LOG: Observed Iron Wood	GRAPHIC LOG: OVA (ppm)	SAMPLES: No.	SAMPLES: Type	SAMPLES: Blow Count	SAMPLES: Drilling Rate/Time	REMARKS
	Very stiff, wet, dark brown SILT (ML) (continued).								
	Very dense, wet, brown, fine SAND (SP).				12	X	6		
80									
85									
90	Stiff, moist, dark brown, SILTY CLAY (CL).								
	Bottom of Boring at 91 feet.								
95									
100									
105									
110									
115									

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Project No.: 41863B

CONT. LOG OF BORING WCC-1S

Fig. B-12

LA/OR-0783-236R

WOODWARD – CLYDE CONSULTANTS

BORING LOCATION	WCC-2 See Figure 2	ELEVATION AND DATUM	Top of casing @ 50.59 ft.
DRILLING AGENCY	A & R Drilling, Inc. / DRILLER M. Smith	DATE STARTED 10-28-87	DATE FINISHED 10-28-87
DRILLING EQUIPMENT	CME 75, 10-inch H.S.A.	COMPLETION DEPTH (ft) 90.6	ROCK DEPTH (ft) –
TYPE OF WELL CASING	4" Sch. 40 PVC / SCREEN PERFORATION .010 Slot	DIAMETER OF BORING (in.) 10	DIAMETER OF WELL (in.) 4
No. OF SAMPLES	DIST. – / UNDIST. 5 / CORE –	LOGGED BY H. Reyes	CHECKED BY B. Jacobs
WATER DEPTH (ft)	FIRST 73 / COMPL. – / 24 HRS. 71.1		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt							
	Medium stiff, very moist, dark yellowish brown, SANDY CLAY (CL).						1306	Background OVA reading = 5 ppm
	Becomes very dark grayish brown.							
5							1308	
	Color change to yellowish brown. Becomes stiffer less moisture, SANDY CLAY (CL).							
10								
15							1317	
	Continued SANDY CLAY (CL). Less stiff, more moist.							
20							1319	
	Grades to SILTY CLAY (CL). Medium stiff, very moist, olive brown, SILTY CLAY.							
25							1323	
30							1327	
35							1333	

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LOG OF BORING WCC-2S

Fig. B-13

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
	(continued) Stiff, moist, olive brown, SILTY CLAY (CL).							
40								
	Dense, moist, olive brown, fine grained, SILTY SAND (SM), with shells.							
45			1	X	34	5	1342	
50							1357	
55			2	X	60	5	1402	
	Very dense, damp, strong brown, fine grained SAND (SP) to SILTY SAND (SM), iron oxide staining.							
60							1423	
	Becomes SILTY SAND.							
65	Dense, moist, olive, fine grained SILTY SAND (SM), some iron oxide stains.		3	X	42	6	1433	
70							1500	
	Becomes wet.							Water at 73 feet.
75	Very dense, wet, olive brown, fine grained, SILTY SAND (SM).		4	X	68	6	1512	
80							1544	

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CONT. LOG OF BORING WCC-2S

Fig. B-14

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
85 90	(continued) Very dense, wet, olive, fine grained to very fine grained SILTY SAND (SM), micaceous, with some clay interbedding and iron oxide staining.		5	X	50/3"	5	1600	
95 100 105 110 115 120 125	Bottom of Boring at 90.5 feet.							Note: 48 gallons of city water used to offset hydro-static head of flowing sands during well installation.

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CONT. LOG OF BORING WCC-2S

Fig. B-15

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	WCC-3 See Figure 2	ELEVATION AND DATUM	Top of Casing @ 51.19 ft.
DRILLING AGENCY	A & R Drilling, Inc. / DRILLER M. Smith	DATE STARTED	10-26-87 / DATE FINISHED 10-26-87
DRILLING EQUIPMENT	CME 75, 10-inch H.S.A.	COMPLETION DEPTH (ft)	92 / ROCK DEPTH (ft) –
TYPE OF WELL CASING	4" Sch. 40 PVC / SCREEN PERFORATION .010 Slot	DIAMETER OF BORING (in.)	10 / DIAMETER OF WELL (in.) 4
No. OF SAMPLES	DIST. – / UNDIST. 6 / CORE –	LOGGED BY	H. Reyes / CHECKED BY B. Jacobs
WATER DEPTH (ft)	FIRST 73.5 / COMPL. – / 24 HRS. 74.0		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt							
	Damp, very dark grayish brown, fine grained SILTY SAND (SM) with small gravel.						0846	Background OVA reading = 4-6 ppm
	Soft, very moist, dark gray to black SILTY CLAY (CL).							
5	Becomes less moist, dark yellowish brown, stiff.							
10	Continued SILTY CLAY (CL). Becomes more stiff, no detectable odor.							
15							0855	
	Dense, moist, yellowish brown, CLAYEY SAND to SANDY CLAY (SC-CL).							
20							0857	No odor.
	Grades to SILTY CLAY (CL). Stiff, moist, dark yellowish brown SILTY CLAY.							
25							0905	
								No odor.
30								
	Lens of volcanic ash.							
35							0913	

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LOG OF BORING WCC-3S

Fig. B-16

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
	(continued) Stiff, moist, olive brown, SILTY CLAY (CL).							
40							0921	
45	Lens of stiff, moist, olive, SANDY SILT (ML), micaceous with decomposed pieces of roots.		1	X	25	30	0924	Earthy odor.
50							0937	
55	Clay becomes more stiff, interbedded with lenses of dense, moist, yellowish brown, medium grained SILTY SAND (SM) with shells, partially cemented and crystalized calcite.		2	X	30	570	0945	Moderate chemical odor.
60							1005	
	Dense, moist, yellowish brown to olive gray, very fine grained SILTY SAND to SAND (SM-SP), micaceous.							Easier drilling.
65			3	X	46	440	1015	Moderate to strong chemical odor.
	Very stiff, very moist, olive brown, SANDY SILT (ML), micaceous with iron oxide stains.							Very easy drilling.
70			4	X	35	+1000	1035	Strong chemical odor.
	Becomes wet.							▽ Water at 73.5 feet.
75	Very dense, wet, olive brown fine grained SAND (SP) to SILTY SAND (SM).		5	X	59	+1000	1047	Strong chemical odor.
80	Becomes medium grained.		6	X	N.R.	+1000	1112	

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CONT. LOG OF BORING WCC-3S

Fig. B-17

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (t.)	REMARKS
85	(continued) Very dense, saturated, olive brown, fine to medium grained SAND (SP-SM) with some silt.						1205	Moderate to strong chemical odor.
90							1545	
	Bottom of Boring at 92.0 feet.							Note: Used 59 gallons of city water to offset hydrostatic head of flowing sands during well installation.
95								
100								
105								
110								
115								
120								
125								

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CONT. LOG OF BORING WCC-3S

Fig. B-18

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	WCC-4 See Figure 2	ELEVATION AND DATUM	Top of casing @ 49.69 ft.
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER M. Smith	DATE STARTED 10-27-87 / DATE FINISHED 10-27-87
DRILLING EQUIPEMENT	CME 75, 10-inch H.S.A.	COMPLETION DEPTH (ft) 91.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	4" Sch. 40 PVC	SCREEN PERFORATION .010 Slot	DIAMETER OF BORING (in.) 10 / DIAMETER OF WELL (in.) 4
No OF SAMPLES	DIST. – / UNDIST. 8 / CORE –	LOGGED BY H. Reyes	CHECKED BY B. Jacobs
WATER DEPTH (ft)	FIRST 75 / COMPL. – / 24 HRS. 71.6		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Asphalt						1230	Background OVA reading = 4-6 ppm
	Moist, grayish brown, SILTY CLAY with some SAND (CL).							
5	Moist, dark yellowish brown, SILTY CLAY (CL).							No odor.
10								
15								
20								
25								
30								
35	Lense of dark greenish black volcanic(?) angular gravel.							

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LOG OF BORING WCC-4S

Fig. B-19

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
40								
45	Very stiff, organic roots and plant detritus with orangish iron oxide staining.		1	X	18	8	1345	No odor.
50								
55			2	X	23	8	1350	No odor.
60	Occasional fossiliferous gravel.							
65			3	X	43	5	1425	No odor.
	Hard, light olive brown, fine SANDY SILT to SILTY fine SAND (SM).							
70								
75	Becomes wet.		4	X	42	7		▽ Water at 75 feet.
	Hard, damp, light olive brown, SILTY CLAY (CL) with iron oxide staining.							
	Very dense, light olive brown, fine grained SAND (SP) with little silt.							
80	2 inch layer of CLAY (CL).		5	X	45	8	1530	No odor.

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CONT. LOG OF BORING WCC-4S

Fig. B-20

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
85	(continued) Very dense, wet, light olive brown, fine grained SAND (SP) with little silt.							
90	Moist, light olive brown, SILTY CLAY (ML-CL).		6	X	N.R.	8	1700	No odor.
	Bottom of Boring at 91.5 feet.							Note: 45 gallons of city water used to offset hydrostatic head of flowing sands during well installation.
95								
100								
105								
110								
115								
120								
125								

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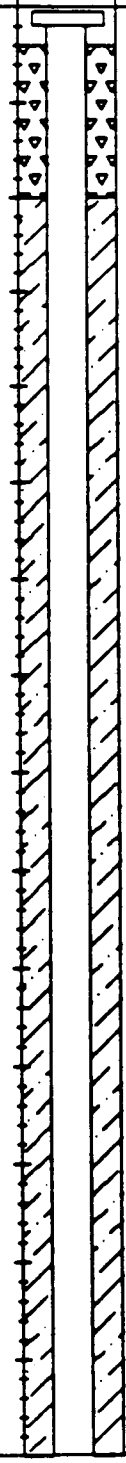
CONT. LOG OF BORING WCC-4S

Fig B-21

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	WCC-5	ELEVATION AND DATUM	48.22 Feet above MSL
DRILLING AGENCY	A & R Drilling, Inc.	DRILLER TEXT	DATE STARTED 11-24-87 / DATE FINISHED 11-24-87
DRILLING EQUIPEMENT	CME 75, 10 - inch H.S.A.	COMPLETION DEPTH (ft)	91 / ROCK DEPTH (ft) -
TYPE OF WELL CASING	4" PVC, SCH. 40	SCREEN PERFORATION	Lone Star #0130 / DIAMETER OF BORING (in.) 10 / DIAMETER OF WELL (in.) 4
No OF SAMPLES	DIST. - / UNDIST. 4 / CORE -	LOGGED BY	B. Jacobs / CHECKED BY H. Reyes
WATER DEPTH (ft)	FIRST 73 / COMPL. 70 / 24 HRS. 70.3 1/2		

DEPTH (feet)	DESCRIPTION	WELL LOG	SAMPLE INFORMATION No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (Time)	REMARKS
	Moist, dark olive brown, CLAYEY SILT (CL-ML) with little sand.						1400	Background OVA reading = 3-4 ppm
5								
	Moist, moderate brown, SILTY CLAY (CL), with some sand.							
10								
15	Becomes more Silty.							
20								
	Becomes dark yellowish brown.							
25								
30								
35								



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LOG OF BORING WCC-5S

Fig. B-22

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
40	Moist, dark yellowish brown, SILTY CLAY (CL). (continued) with some organic roots and iron oxide staining.						1445	
45	Dense, moist, dusky yellow to light olive brown, fine grained, SAND (SP) with little silt.		1	X	34	3		No odor.
50								
55	Interbeds of Silty Sands and Clay.		2	X	37	5	1515	No odor.
60								
65	Becomes very dense.		3	X	70	4	1550	No odor.
70								
	Becomes wet.							▽ Water at 73 feet.
75	Dense, wet, moderate olive brown, fine grained, SILTY SAND (SM-ML).		4	X	35	3		No odor.
80								

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CONT. LOG OF BORING WCC-5S

Fig. B-23/24

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	WELL LOG	No.	Type	Blow Count	O.V.A. (ppm)	Drilling Rate (T.)	REMARKS
85	Dense, wet, moderate olive brown, fine grained SILTY SAND (SM-ML).							No sample collected Augers sanding-in.
90								
	Bottom of Boring at 91 feet.							Note: 55 gallons of city water was used to aid well installation.
95								
100								
105								
110								
115								
120								
125								

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CONT. LOG OF BORING WCC-5S

Fig. B-25

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map	ELEVATION AND DATUM	50.95 Feet above MSL
DRILLING AGENCY	Gregg Drilling and Testing, Inc. / DRILLER D. Swenson	DATE STARTED	9-21-89
		DATE FINISHED	9-22-89
DRILLING EQUIPMENT	Mobile B-61 with 11-inch O.D. H.S.A.	COMPLETION DEPTH (ft)	9[illegible].0
		ROCK DEPTH (ft)	–
TYPE OF WELL CASING	PVC Sch. 40 / SCREEN PERFORATION [illegible] inch	DIAMETER OF BORING (in)	[illegible]
		DIAMETER OF WELL (in)	4
TYPE SIZE OF SAND PACK	Monterey #0/30	TYPE THICKNESS OF SEAL(S)	[illegible] 4") Bentonite Pellets 3 feet/Volclay Grout 51 feet
NO. OF SAMPLES	DIST 3 / UNDIST [illegible]	CORE 3	LOGGED BY H. Reyes
			CHECKED BY M. Rasmussen
WATER DEPTH (ft)	FIRST – / COMPL –	24 HRS –	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	No	Type	Blow Count	OVA (ppm) Head Space	OVA (ppm) Back Ground	Drilling Rate (Time)	REMARKS
	4-inch Asphalt concrete over 6-inch base material								1315	
	Moist, dark yellowish brown, SANDY CLAY (CL)									
	Becomes dark brown.									
5	Becomes hard, dark yellowish brown			1		49	16	16	1326	
10	Becomes SILTY CLAY (CL).									
	Very stiff to hard, moist, olive brown, CLAYEY SILT (MH), micaceous.									
15				2		33	16	16	1339	
20										
25				3		40	16	16	1345	
	Very stiff, moist, olive brown, SILTY CLAY (CL)									
30	Layer of hard, dry, olive gray sandstone									
	Very stiff to hard, olive brown, SANDY SILT (ML), micaceous									
35				4						

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LOG OF BORING WCC-6S

Fig B-26

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071356

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	O.V.A. (ppm) Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Very stiff to hard, moist, olive brown, SANDY SILT (ML), micaceous.			4	X	40	19	15	1350	
40										
	Very dense, moist, olive gray, SILTY fine grained SAND (SM), micaceous.									
45				5	X	63	16	16	1422	
	Some clay.									
	Layer of cemented shell fragments.									
50										
	Very stiff to hard, very moist, olive brown, SANDY SILT (ML), very micaceous, iron oxide stains.									
55				6	X	47	18	16	1432	
60										
	Very dense, moist, olive brown, SILTY fine grained SAND (SM), very micaceous.									
65				7	X	89	19	16	1443	
70										
75	Becomes saturated, medium grained SAND to SILTY SAND (SP-SM), with strong odor. Lense of sandy silt.			8	X	166	1000+	16	1505	Strong odor

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Project No.: 8941863J

CONT. LOG OF BORING WC06S

Fig B-27

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) very dense, saturated, olive to olive gray, silty fine grained SAND (SM), with some odor.									
80				9		185	720	16	1520	Odor
85				10		170	25	8	1555	
90				11		91	46	8	1612	
	Bottom of Boring at 91 feet.									
95										
100										
105										
110										
115										

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Project No.: 8941863J

CONT. LOG OF BORING WCC-6S

Fig B-2

WOODWARD-CLYDE CONSULTA

BORING LOCATION	See Location Map	ELEVATION AND DATUM	48.29 feet MSL
DRILLING AGENCY	A & R Driling, Inc.	DRILLER M. Romero	DATE STARTED 6-8-89 / DATE FINISHED 6-8-89
DRILLING EQUIPMENT	CME 75 with 10-inch O.D., H.S.A.	COMPLETION DEPTH (ft) 90.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	PVC Sch. 40	SCREEN PERFORATION 0.01-inch	DIAMETER OF BORING (in) 10 / DIAMETER OF WELL (IN) 4
TYPE/SIZE OF SAND PACK	Lonestar No. 0/30	TYPE/THICKNESS OF SEAL(S)	Bentonite Pellets 5 ft./Voiclay grout 49.0 ft
No OF SAMPLES	DIST. 1 / UNDIST. 0	CORE 0	LOGGED BY P. Giesman, H. Reyes / CHECKED BY M. Razmajoo
WATER DEPTH (ft)	FIRST – / COMPL. –	24 HRS –	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	6-inch Asphalt concrete, over 8-inch base material.									
	Hard, moist, black, SANDY CLAY (CL). Becomes dark yellowish brown.			1	X	31	1	10	0913	
5				2	X	45	1	10	0940	
10				3	X	36	1	10	0951	
	Medim dense, moist, olive brown, SILTY fine grained SAND (SM).			4	X	14	3	10	1002	
15										
20	Becomes dark yellowish brown, with trace of clay, some decomposed roots.			5	X	25	2	10	1009	
	Hard, moist, dark olive brown, fine grained SANDY CLAY (CL), with root holes.			6	X	31	2	10	1017	
25										
	Dense, moist, olive brown, SILTY fine grained SAND (SM).			7	X	41	2	10	1058	
30										
35	With root holes and small nodules of calcium carbonate (HCL Reaction).			8	X	32	2	10	1105	

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Project No.: 8941863J

LOG OF BORING WCC-[illegible]S

Fig B-29

WOODWARD-CLYDE CONSULTAN

BOE-C6-0071359

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Dense, moist, olive brown, SILTY fine grained SAND (SM), with root holes and CaCo, nodules									
	Medium dense, moist, dark brown to olive brown, medium grained SAND (SP)			9	X	25	3	10	1112	
40										
	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).			10	X	44	2	12	1123	
45										
	Zone of hard, damp, light brown, calcareous material (sand and shell fragments)									
50	Very stiff, moist, olive, CLAY (CL), mixed with shell fragments and calcareous nodules (appears to be gouge zone).			11	X	19	3	10	1134	
	Dense, moist, olive, SILTY fine grained SAND (SM).									
55	Hard, moist, olive, SANDY CLAY (CL), with some iron oxide staining.			12	X	35	2	10	1148	
	Dense, moist, olive brown, SILTY fine grained SAND to SAND (SM-SP).									
60				13	X	38	1	10	1201	
	Dense, moist, olive gray, fine grained SAND (SP).									
65				14	X	43	1	10	1214	
	Dense, very moist, olive, SILTY fine grained SAND (SM), micaceous.			15	X	44	3	10	1228	
70										
	Becomes saturated.									
75				16	X	44	9	10	1300	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-7S

Fig. B-3

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071360

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Dense, saturated, olive, silty fine grained SAND (SM), micaceous									Added 15 gallons of tap water to prevent heaving sand coming inside the augers
	Sand becomes fine to medium grained.			17	X	35	13	9	1335	
80										
	Becomes very dense, medium grained, with few coarse grains, less silt, few shell fragments			18	X	69	-	9	1355	
85										
	Becomes dense, medium to coarse grained, more silt, no shell fragments.			19	X	37			1415	
90										
	Bottom of Boring at 90.5 feet. Upon completion of drilling and sampling added approximately 60 gallons of tap water to prevent heaving sand coming inside the augers.									
95									1641	
100										
105										
110										
115										

Project: DOUGLAS AIRCRAFT TORRANCE COMPANY
Project No.: 8941863J

CONT. LOG OF BORING

B-3

WOODWARD-CLYDE

BOE-C6-0071361

BORING LOCATION	See Location Map	ELEVATION AND DATUM	50.56 feet MSL
DRILLING AGENCY	A & R Driling, Inc. / DRILLER M. Romero	DATE STARTED	6-12-89 / DATE FINISHED 6-12-89
DRILLING EQUIPMENT	CME 75 with 8 and 10-inch O.D., H.S.A.	COMPLETION DEPTH (ft)	90.0 / ROCK DEPTH (ft) –
TYPE OF WELL CASING	Sch. 40 PVC / SCREEN PERFORATION 0.01-inch	DIAMETER OF BORING (in.)	10 / DIAMETER OF WELL (IN) 4
TYPE/SIZE OF SAND PACK	Lonestar No. 0/30	TYPE/THICKNESS OF SEAL(S)	Bentonite Pellets 5 ft./Volclay grout 49.5 ft
No. OF SAMPLES	DIST. 0 / UNDIST. 17	CORE 0	LOGGED BY P. Glaesman, H. Reyes / CHECKED BY M. Razmadze
WATER DEPTH (ft)	FIRST – / COMPL. –	24 HRS. –	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	8-inch Asphalt concrete.								0750	
	Base material, medium dense, moist, yellowish brown, CLAYEY SAND (SC), decomposed granite.			1	X	12	0	11	0800	
	Stiff, very moist, very dark gray, SANDY CLAY (CL).									
5	Hard, moist, dark yellowish brown, SANDY CLAY to CLAYEY fine grained SAND (CL-SC).			2	X	55	13	11	0810	
	Hard, moist, olive brown, SILTY CLAY (CL).									
10				3	X	82	30	11	0819	
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM).									
15				4	X	20	41	11	0823	
	Very stiff to hard, moist, olive brown, SILTY CLAY (CL), with $CaCo_3$ veinlets.									
20				5	X	26	46	11	0830	
25	Dense, moist, olive, SILTY fine grained SAND (SM-ML), with some iron oxide staining and hairlike root holes.			6	X	33	24	11	0839	
	Hard, moist, dark olive brown, SANDY CLAY (CL), with caliche veinlets.									
30				7	X	32	21	11	0846	
	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).									
35	Becomes more silty, grades to (SM).			8	X	31	43	10	0855	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING WCC-3S

Fig. B-

WOODWARD-CLYDE CONSUL

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Dense, moist, olive brown, SILTY fine grained SAND (SM).									
40	Stiff to very stiff, moist, olive brown, SANDY SILT (ML)			9	X	24	43	11	0904	
	Dense, moist, olive brown, SILTY fine grained SAND (SM), with abundant calcareous nodules.									
45	Hard, moist, olive, SILTY CLAY (CL), with iron oxide staining and calcareous nodules.			10	X	31	46	10	0917	
	Medium dense, moist to very moist, olive gray and yellowish brown, mottled, CLAYEY grained SAND (SC).									
50	Dense, moist, olive brown, SILTY fine grained SAND (SM), with abundant shell fragments which are cemented together forming coquina.			11	X	13	48	10	0925	
55				12	X	43	72	10	0938	
60	Very stiff to hard, moist, olive, SANDY SILT (ML), micaceous, with iron oxide staining.			13	X	26	70	10	0950	
	Very dense, moist, light olive brown, SILTY fine grained SAND (SM), micaceous.									
65				14	X	83	100	10	1003	
70	Becomes very moist to saturated.			15	X	71	100	10	1015	
75	Hard, saturated, olive, SANDY SILT (ML), micaceous.			16	X	38	100	10	1028	Becomes wet at 75 feet.

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Project No.: 8941863J

CONT. LOG OF BORING WCC-BS

Fig B-33

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Hard, saturated, olive, SANDY SILT (ML), micaceous.									
80				17	X	21	32	10	1042	
	Medium dense, saturated, light gray, SILTY fine to medium grained SAND (SM-SP).									Unable to obtain sample due to existance of 8 feet of heaving sand inside the auger. Added gal. of water prevent heaving sand coming into augers.
85				18	X	NR	NR	10	1102	
90	Bottom of Boring at 90 feet.									
	Notes: 1. Boring was initially drilled with 8-inch outside diameter and samples were taken. Upon completion of sampling, boring was enlarged with 10-inch outside diameter and well was installed. 2. Added 40 gallons of water prior to installation of well casing.									
95										
100										
105										
110										
115										

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Project No.: 8941863J

CONT. LOG OF BORING WCC-8S

Fig B-3

WOODWARD-CLYDE CONSULTA

BOE-C6-0071364

BORING LOCATION	See Location Map	ELEVATION AND DATUM	47.01 Feet above MSL
DRILLING AGENCY	Gregg Drilling and Testing, Inc. DRILLER C. Swenson	DATE STARTED 9-20-89	DATE FINISHED 9-21-89
DRILLING EQUIPMENT	Mobile B-61 with 11-inch, O.D., H.S.A.	COMPLETION DEPTH (ft) 91.5	ROCK DEPTH (ft) –
TYPE OF WELL CASING	PVC Sch. 40 SCREEN PERFORATION 0.010 inch	DIAMETER OF BORING (in.) 11	DIAMETER OF WELL (IN.) 4
TYPE SIZE OF SAND PACK	Monterey #0 30 TYPE THICKNESS OF SEAL(S)	1/4" Bentonite Pellets 2/4" Volclay Grout 51.5	
No. OF SAMPLES	DIST – UNDIST 18 CORE –	LOGGED BY H. Reyes	CHECKED BY M. Rozmalec
WATER DEPTH (ft)	FIRST – COMPL – 24 HRS –		

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head Space	O.V.A. (ppm) Back Ground	Drilling Rate (Time)	REMARKS
	4-inch Asphalt concrete over 6-inch base material								1036	
	Very stiff to hard, moist, dark yellowish brown SILTY CLAY (CL), with fine grained sand, micaceous									
5				1	X	45	6	6	1043	
10				2	X	31	–	6	1051	
	Stiff, moist, dark yellowish brown, CLAYEY SILT (MH), micaceous.									
15				3	X	15	7	6	1058	
	Becomes very stiff to hard.									
20				4	X	34	7	6	1102	
	Very stiff to hard, moist, dark brown to olive brown, SILTY CLAY (CL).									
25				5	X	43	6.6	6	1110	
	Very dense, moist, olive brown, SILTY fine grained SAND (SM), with some clay veinlets.									
30				6	X	80	6.9	6	1117	
	Very stiff to hard, moist, dark olive brown, CLAYEY SILT (MH).									
35				7	X	9	6	6	1125	

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Project No.: 8941863J

LOG OF BORING WCC-9S

Fig B-35

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071365

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Very stiff to hard, moist, dark olive brown, SILTY CLAY (MH)									
40				8	X	48	6.8	6	1132	
	Hard, moist, dark olive brown, SILTY CLAY (CL), with stringers of black mineral (pyrolusite?)									
45				9	X	65	6.5	6	1140	
	Contains abundant shell fragments.									
	Very dense, damp, light yellowish brown to olive brown, SILTY fine to medium grained SAND (SM).									
50				10	X	89	8.7	6	1151	
55	Very stiff to hard, moist to very moist, olive, SILTY CLAY (CL), with iron oxide staining.			11	X	36	6.7	6	1158	
60	Lens of dense, damp, yellowish brown, fine grained SAND (SP).			12	X	91	6.5	6	1206	
	Very dense, very moist, dark brown, SILTY fine grained SAND (SM), micaceous.									
65				13	X	89	6	6	1214	
70	Hard, saturated, olive, SANDY SILT (ML), micaceous.			14	X	83	6	6	1222	
75	Medium dense, saturated, olive brown, medium grained SAND (SP-SM), micaceous.			15	X	26	6	6	1255	

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Project No.: 8941863J

CONT. LOG OF BORING [illegible]

B-

WOODWARD-CLYDE [illegible]

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(Continued) Medium dense to very dense, saturated, olive brown, fine to medium grained SAND (SP-SM), micaceous.									
80				16	X	100	6.5	5.5	1317	
85				17	X	90	6.2	5.5	1340	
	Hard, saturated, olive, SANDY SILT (ML).									
90				18	X	75	5.5	5.5	1358	
	Bottom of Boring at 91.5 feet.									
95										
100										
105										
110										
115										

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8941863J

CONT. LOG OF BORING WCC-9S

Fig. B-37

WOODWARD-CLYDE CONSULTANTS

BORING LOCATION	See Location Map	ELEVATION AND DATUM	51.12 feet MSL
DRILLING AGENCY	A & R Driling, Inc.	DRILLER M. Romero	DATE STARTED 6-7-89 / DATE FINISHED 6-7-89
DRILLING EQUIPMENT	CME 75 with 8-inch O.D., H.S.A.	COMPLETION DEPTH (ft) 90.8	ROCK DEPTH (ft) –
TYPE OF WELL CASING	PVC Sch. 40	SCREEN PERFORATION 0.01-inch	DIAMETER OF BORING (in.) 10 / DIAMETER OF WELL (IN) 4
TYPE/SIZE OF SAND PACK	Lonestar No. 0/30	TYPE/THICKNESS OF SEAL(S)	Bentonite Pellets 5 ft./Voidcy grout 49 ft
No. OF SAMPLES	DIST. 0 / UNDIST. 18	CORE 0	LOGGED BY P. Glaesman, H. Reyes / CHECKED BY M. Razmajoo
WATER DEPTH (ft)	FIRST – / COMPL. –	24 HRS –	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	3 1/2-inch Asphalt concrete, over 9-inch base material.						1	6	0954	
	Soft, very moist to saturated, black, SANDY CLAY (CL). Becomes very stiff, moist, dark yellowish brown									
5				1	X	24	1	7	1000	
	Medium dense, moist, olive brown, SILTY fine grained SAND (SM), with trace of clay.									
10				2	X	13	1	7	1007	
	No clay.									
15				3	X	25	2	7	1013	
20				4	X	21	0	6	1017	
	Very stiff to hard, moist, dark yellowish brown, SANDY CLAY (CL).									
25	Contains large nodules of calcium carbonate (HCL Reaction).			5	X	61	0	6	1024	
	Dense, moist, olive brown, SILTY fine grained SAND (SM).									
30				6	X	36	1	6	1031	
	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).									
35				7	X	32	2	6	1038	

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING WCC-1CS

Fig B-38

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071368

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Dense, moist, olive brown, fine grained SAND to SILTY SAND (SP-SM).									
	Dense to very dense, damp, pale brown, fine grained SAND (SP).									
40				8	X	46	1	6	1045	
45				9	X	55	2	6	1054	
	Becomes olive brown.									
50				10	X	43	2	6	1106	
55				11	X	32	1	4	1115	
	Dense, moist, olive brown, GRAVELLY medium grained SAND (SW), gravel 1/4"-1/2" diameter.									
	Very dense, moist, dark olive, CLAYEY fine grained SAND (SC).									
60	Very dense, moist, olive, SILTY fine grained SAND (SM).			12	X	90	1	4	1136	
65				13	X	74	3	4	1141	
70				14	X	51	NR	4	1203	
	Becomes wet, olive brown.									
75				15	X	125	10	4	1215	

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Project No.: 8941863J

CONT. LOG OF BORING WCC-1CS

Fig B-39

WOODWARD-CLYDE CONSULTAN

BOE-C6-0071369

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Very dense, saturated, olive brown, SILTY fine grained SAND (SM).									
	Becomes olive, micaceous			16	X	104	6	4	1250	
80										
85	Becomes medium grained with shell fragments.			17	X	42	6	4	1305	Added 25 gal water to prevent surging sand coming inside the augers
90				18	X	30/3"	6	3	NR	
	Bottom of Boring at 90.8 feet.									
95										
	Note: Added 40 gallons of water prior to installation of well casing.									
100										
105										
110										
115										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-105

Fig 3-4

WOODWARD-CLYDE CONSULTA

BORING LOCATION	See Location Map	ELEVATION AND DATUM	50.45 Feet MSL
DRILLING AGENCY	Beylik Drilling, Inc.	DRILLER D. Jones	DATE STARTED 6-28-89 / DATE FINISHED 6-30-89
DRILLING EQUIPMENT	Ingersal Rand, MUD Rotary	COMPLETION DEPTH (ft) 140	ROCK DEPTH (ft) –
TYPE OF WELL CASING	PVC Sch. 40	SCREEN PERFORATION 0.01 inch	DIAMETER OF BORING (in.) 10 / DIAMETER OF WELL (IN.) 4
TYPE/SIZE OF SAND PACK	Lonestar No. 0/30	TYPE/THICKNESS OF SEAL(S)	Bentonite Pellets 5 ft./Volclay grout [illegible] ft
No. OF SAMPLES	DIST. 4 / UNDIST. 0	CORE 0	LOGGED BY H. Reyes, P. Glaesman / CHECKED BY M. Razmdjoo
WATER DEPTH (ft)	FIRST	COMPL.	24 HRS.

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	6-inch Asphalt concrete over 6-inch base material.								1235	
	Dark yellowish brown, CLAYEY fine grained SAND (SC), with small diameter gravel.									
5									1303	
	Dark yellowish brown, SILTY CLAY (CL), with fine grained sand.									
10										
15									1308	
20										
25									1313	Stopped drilling to repair drill rig.
									1400	Resumed drilling
30										
	Dark yellowish brown, SILTY fine grained SAND (SM).									
35										

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Project No.: 8840863J

LOG OF BORING WCC-1D

Fig B-41

WOODWARD-CLYDE CONSULTA

BOE-C6-0071371

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Dark yellowish brown, SILTY fine grained SAND (SM).									
40									1416	
45	Dark yellowish brown, SILTY CLAY (CL).									
	Dark yellowish brown, SILTY fine grained SAND (SM).									Loosing a lot of drilling MUD.
50									1427	
55	Olive brown, medium ghrained SAND (SP-SM), with small gravel and shell fragments.									
60									1500	
65	Dark yellowish brown, SILTY CLAY (CL), micaceous.									
	Yellowish brown, fine grained SAND (SP-SM), with small diam. gravel and shell fragments.									
70									1517	
75	Becomes olive brown.									

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-1D

Fig. B-4

WOODWARD-CLYDE CONSULTA

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Olive brown, fine grained SAND (SP-SM), with shell fragments.									
80									1521	
	Becomes medium grained.									Drilling mud. Loss reduced.
85										
90									1527	
95	Abundant shell fragments.									
100									1530	
105	Bluish gray and light yellowish brown, SILTY CLAY (CL).									
110									1535	
	Olive brown, fine to medium grained SAND (SP-SM).									
115										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-1D

Fig B-43

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	Olive brown, fine to medium grained SAND (SP-SM).									
120	Hard, olive, SILT (ML), micaceous (SILTSTONE?).								1604	
	Olive brown, medium grained SAND (SP).									50% Core Recovery
	Moist, olive, SILT (ML), micaceous.			1						
125	Olive, SILTY fine grained SAND (SM).								1615	
	Dark yellowish brown, medium grained SAND (SP).			2						60% Core Recovery
130									1644	
				3						20% Core Recovery
135									1701	
	Dark yellowish brown, and bluish gray, SILTY CLAY (CL).			4						20% Core Recovery
140									1725	
	Bottomof Boring at 140 feet.									
145	Initial drilling and sampling was completed on 28 June 1989. Boring was enlarged and well was constructed on 29 and 30 June 1989.									
150										
155										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-1D

Fig B-44

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071374

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: —

PAGE 3 OF 3

DATE 8/23/89

PROJECT NAME: Douglas Aircraft Co. (C6)

PROJECT NO.: 8941863.1 - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-1D-2A	WCC-1D	WATER	BOILER	40 ml VOA	ICE	NONE	
WCC-1D-2B							
WCC-1D-2C				4 oz. glass			
WCC-1D-2R				40 ml VOA			
WCC-1D-2S							
WCC-3D-2A	WCC-3D						
WCC-3D-2B							
WCC-3D-2C				4 oz. glass			
WCC-3D-2R				40 ml VOA			
WCC-3D-2S							

Total Number of Samples Shipped:

Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 8/24/89
Printed Name: Peter Glaesman	Printed Name: Bill Gray	Time: [illegible]
Company: WCC	Company: A-1	
Reason: Delivery to WCQS		
Signature: [signature]	Signature: Mary Cederwall	Date: 8/24/89
Printed Name: Ron K-FF	Printed Name: Cederwall	Time: 11:06 a.m.
Company: A-1	Company: WCQS	
Reason:		
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

Special Shipment / Handling / Storage Requirements:

W13538

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

LA/OR-0183-421

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: —

PAGE 1 OF 1

DATE 10/16/89

PROJECT NAME: Douglas Aircraft Co.

PROJECT NO.: 89418603

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
WCC-95-1A	WCC-95	WATER	BAILED	4 ml VOA	ICE	NONE	
WCC-95-1B							
WCC-95-1R							
WCC-95-1S							
WCC-65-1A	WCC-65						
WCC-65-1B							
WCC-65-1R							
WCC-65-1S							
WCC-125-1A	WCC-125						
WCC-125-1B							
WCC-125-1R							
WCC-125-1S							

Total Number of Samples Shipped: 12 | Sampler's Signature: [signature]

Relinquished By	Received By	Date / Time
Signature: [signature] Printed Name: Peter Glaesman Company: WCC Reason: For delivery to WCAS	Signature: [illegible] Printed Name: [illegible] Company: [illegible]	Date: 1/1/7 Time: [illegible]
Relinquished By: [illegible] Signature: [illegible] Printed Name: [illegible] Company: [illegible] Reason: [illegible]	Received By: Frank Taylor Signature: [signature] Printed Name: [signature] Company: A-1 Messenger	Date: / / Time:
Relinquished By: [signature] Signature: [signature] Printed Name: Company: Reason:	Received By: Bob Olson Signature: Bob Olson Printed Name: Bob Olson Company: WCAS 19882	Date: 10/9/89 Time: 12:38
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: / / Time:

Special Shipment / Handling / Storage Requirements:

CONTACT: Peter Glaesman or Alistaire Calbider (714) 835-6886

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

LA/OR-0183-421

BORING LOCATION	See Location Map	ELEVATION AND DATUM	51.18 feet MSL
DRILLING AGENCY	Beylik Drilling, Inc.	DRILLER D. Jones	DATE STARTED 6-23-89 / DATE FINISHED 6-27-89
DRILLING EQUIPMENT	Ingersal Rand, Mud Rotary	COMPLETION DEPTH (ft) 140	ROCK DEPTH (ft) –
TYPE OF WELL CASING	PVC Sch. 40	SCREEN PERFORATION 0.01 inch	DIAMETER OF BORING (in.) 10 / DIAMETER OF WELL (IN.) 4
TYPE/SIZE OF SAND PACK	Lonestar # 0/30	TYPE/THICKNESS OF SEAL(S)	Bentonite Pellets 5 ft./Volclay grout 106 ft.
No. OF SAMPLES	DIST. 4 / UNDIST. 0	CORE 0	LOGGED BY H. Reyes, P. Glaesman / CHECKED BY M. Razmajoo
WATER DEPTH (ft)	FIRST / COMPL.	24 HRS	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	6-inch asphalt concrete cover. 6-inch Base material. Dark yellowish brown, SILTY fine grained SAND (SM).								1326	
5										
10	With some clay.								1347	
15										
20									1352	
25	Becomes olive brown, fine to medium SILTY grained SAND (SM).									
30									1358	
	Becomes clayey with some calcareous nodules.									
35										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

LOG OF BORING WCC-3D

Fig B-45

WOODWARD-CLYDE CONSULTANTS

BOE-C6-0071377

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Olive brown, SILTY fine to medium grained SAND (SM), with trace of clay, some calcareous nodules.									
40									1415	Stopped drilling on 6-23-89 to repair drilling.
	Olive brown, SILTY CLAY (CL), with coarse grained sand								1322	Resumed drilling on 6-26-89
45										
50									1329	
	Olive brown, SILTY fine grained SAND (SM), with some coarse grained sand and abundant shell fragments.									
55										
60									1402	
65										
70	More coarse grained sand.								1409	
	Olive brown, medium grained SAND (SP).									
75										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-3D

Fig B-46

WOODWARD-CLYDE CONSULTA

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Olive brown, fine to medium grained SAND (SP), with abundant shell fragments.									
80									1415	
	Lens of dark yellowish brown, coarse grained SAND (SP), slight chemical odor drilling mud foamed up.									
85										
90									1421	
	Lens of dark yellowish brown coarse grained SAND (SP).									
95										
100									1428	
	Becomes grayish brown.									
105										
110	Dark yellowish brown, SILTY CLAY (CL).								1436	
115										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-3D

Fig B-47

WOODWARD-CLYDE CONSULTANTS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Dark yellowish brown, SILTY CLAY (CL)									
120	Olive brown, SILTY fine grained SAND (SM)									40% Core Recover
	Olive brown, SANDY SILT (ML), micaceous.									
125	Olive brown, SILTY fine to medium grained SAND (SM)								1510	47% Core Recover
	Olive brown CLAY (CH).								1525	
	Olive brown, medium grained SAND (SP)									67% Core Recover
									1537	
130									1545	180% Core Recov
	Hard, reddish brown, SANDSTONE.									
	Hard, light yellowish brown to bluish gray, SILTY CLAYSTONE.									
135										
140	Bottom of Boring at 140 feet.									
145	Initial drilling and sampling was completed on 23 and 26 June 1989. Boring was enlarged and well was constructed on 27 June 1989.									
150										
155										

Project: DOUGLAS AIRCRAFT COMPANY TORRANCE
Project No.: 8941863J

CONT. LOG OF BORING WCC-3D

B-

WOODWARD-CLYDE CONSUL

APPENDIX C

ANALYTICAL RESULTS

June 28, 1989

WEST COAST ANALYTICAL SERVICE, INC.

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

Attn: Dr. Alistaire Callender

JOB NO. 12944

A

LABORATORY REPORT

Samples Received: Fifty-five (55) soils
Date Received: 6-13-89
Date Released for Analysis: 6-20-89
Purchase Order No: Proj#: 8941863J-Task 1/Douglas Aircraft Co.

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Thirteen (13) soils	Halogenated and Aromatic Volatile Organics by EPA 8010/8020	Data Sheets

Shelley Stuart
Shelley Stuart
Senior Chemist

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

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

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 25-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-3-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.005
Bromomethane	ND	0.005
Vinyl Chloride	ND	0.003
Chloroethane	ND	0.005
Methylene Chloride	0.053	0.025
1,1-Dichloroethylene	ND	0.003
1,1-Dichloroethane	0.011	0.002
trans-1,2-Dichloroethylene	ND	0.002
Trichlorofluoromethane	ND	0.002
Chloroform	ND	0.002
1,2-Dichloroethane	ND	0.002
1,1,1-Trichloroethane	0.016	0.002
Carbon Tetrachloride	ND	0.002
Bromodichloromethane	ND	0.002
1,1,2,2-Tetrachloroethane	ND	0.002
1,2-Dichloropropane	ND	0.002
trans-1,3-Dichloropropylene	ND	0.002
Trichloroethylene	ND	0.002
Dibromochloromethane	ND	0.002
1,1,2-Trichloroethane	ND	0.002
Benzene	ND	0.001
cis-1,3-Dichloropropylene	ND	0.002
2-Chloroethyl Vinyl Ether	ND	0.004
Bromoform	ND	0.003
Tetrachloroethylene	ND	0.002
Toluene	0.064	0.001
Chlorobenzene	ND	0.004
Ethylbenzene	0.001	0.001
Total Xylenes	0.009	0.001
1,3-Dichlorobenzene	ND	0.001
1,4-Dichlorobenzene	ND	0.001
1,2-Dichlorobenzene	ND	0.001

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-5-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 50

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	2.5
Bromomethane	ND	2.5
Vinyl Chloride	ND	1.5
Chloroethane	ND	2.5
Methylene Chloride	ND	13
1,1-Dichloroethylene	ND	1.5
1,1-Dichloroethane	ND	1
trans-1,2-Dichloroethylene	ND	0.8
Trichlorofluoromethane	ND	1
Chloroform	ND	0.8
1,2-Dichloroethane	ND	1
1,1,1-Trichloroethane	12	0.8
Carbon Tetrachloride	ND	0.8
Bromodichloromethane	ND	0.8
1,1,2,2-Tetrachloroethane	ND	0.8
1,2-Dichloropropane	ND	0.8
trans-1,3-Dichloropropylene	ND	0.8
Trichloroethylene	45	0.8
Dibromochloromethane	ND	0.8
1,1,2-Trichloroethane	ND	0.8
Benzene	ND	0.5
cis-1,3-Dichloropropylene	ND	0.8
2-Chloroethyl Vinyl Ether	ND	2
Bromoform	ND	1.3
Tetrachloroethylene	ND	0.8
Toluene	1900	0.5
Chlorobenzene	ND	1.6
Ethylbenzene	51	0.5
Total Xylenes	390	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-7-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 5000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	25
Bromomethane	ND	25
Vinyl Chloride	ND	15
Chloroethane	ND	25
Methylene Chloride	ND	125
1,1-Dichloroethylene	ND	15
1,1-Dichloroethane	ND	10
trans-1,2-Dichloroethylene	ND	7.5
Trichlorofluoromethane	ND	10
Chloroform	ND	7.5
1,2-Dichloroethane	ND	10
1,1,1-Trichloroethane	ND	7.5
Carbon Tetrachloride	ND	7.5
Bromodichloromethane	ND	7.5
1,1,2,2-Tetrachloroethane	ND	7.5
1,2-Dichloropropane	ND	7.5
trans-1,3-Dichloropropylene	ND	7.5
Trichloroethylene	ND	7.5
Dibromochloromethane	ND	7.5
1,1,2-Trichloroethane	ND	7.5
Benzene	ND	5
cis-1,3-Dichloropropylene	ND	7.5
2-Chloroethyl Vinyl Ether	ND	20
Bromoform	ND	12.5
Tetrachloroethylene	ND	7.5
Toluene	48	5
Chlorobenzene	ND	25
Ethylbenzene	ND	5
Total Xylenes	21	5
1,3-Dichlorobenzene	ND	5
1,4-Dichlorobenzene	ND	5
1,2-Dichlorobenzene	ND	5

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-7-4
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	ND	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	19	1
Chlorobenzene	ND	5
Ethylbenzene	ND	1
Total Xylenes	6	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-9-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	5
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	59	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	23	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	320	1
Chlorobenzene	ND	5
Ethylbenzene	2.9	1
Total Xylenes	21	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-11-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	0.06	0.03
1,1-Dichloroethane	0.09	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.53	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	0.035	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.31	0.01
Chlorobenzene	ND	0.04
Ethylbenzene	ND	0.01
Total Xylenes	0.03	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 23-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-6-13-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	7.7	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	9.9	1
Chlorobenzene	ND	4
Ethylbenzene	ND	1
Total Xylenes	2.9	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 25-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-7-7-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 40

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.2
Bromomethane	ND	0.2
Vinyl Chloride	ND	0.2
Chloroethane	ND	0.2
Methylene Chloride	ND	1
1,1-Dichloroethylene	ND	0.12
1,1-Dichloroethane	ND	0.08
trans-1,2-Dichloroethylene	ND	0.06
Trichlorofluoromethane	ND	0.08
Chloroform	ND	0.06
1,2-Dichloroethane	ND	0.08
1,1,1-Trichloroethane	0.15	0.06
Carbon Tetrachloride	ND	0.06
Bromodichloromethane	ND	0.06
1,1,2,2-Tetrachloroethane	ND	0.06
1,2-Dichloropropane	ND	0.06
trans-1,3-Dichloropropylene	ND	0.06
Trichloroethylene	0.09	0.06
Dibromochloromethane	ND	0.06
1,1,2-Trichloroethane	ND	0.06
Benzene	ND	0.04
cis-1,3-Dichloropropylene	ND	0.06
2-Chloroethyl Vinyl Ether	ND	0.2
Bromoform	ND	0.1
Tetrachloroethylene	ND	0.06
Toluene	1.7	0.04
Chlorobenzene	ND	0.33
Ethylbenzene	ND	0.04
Total Xylenes	0.09	0.04
1,3-Dichlorobenzene	ND	0.08
1,4-Dichlorobenzene	ND	0.08
1,2-Dichlorobenzene	ND	0.08

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 25-June-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-7-8-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	ND	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	ND	1
Chlorobenzene	ND	5
Ethylbenzene	ND	1
Total Xylenes	1	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 25-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-7-9-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	10	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	40	1
Chlorobenzene	ND	1.1
Ethylbenzene	ND	1
Total Xylenes	1	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 25-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-7-9-4
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	ND	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	12	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	ND	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	25	1
Chlorobenzene	ND	8.3
Ethylbenzene	ND	1
Total Xylenes	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 25-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-7-11-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 1000

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	5
Bromomethane	ND	5
Vinyl Chloride	ND	3
Chloroethane	ND	5
Methylene Chloride	ND	25
1,1-Dichloroethylene	57	3
1,1-Dichloroethane	ND	2
trans-1,2-Dichloroethylene	ND	1.5
Trichlorofluoromethane	ND	2
Chloroform	ND	1.5
1,2-Dichloroethane	ND	2
1,1,1-Trichloroethane	880	1.5
Carbon Tetrachloride	ND	1.5
Bromodichloromethane	ND	1.5
1,1,2,2-Tetrachloroethane	ND	1.5
1,2-Dichloropropane	ND	1.5
trans-1,3-Dichloropropylene	ND	1.5
Trichloroethylene	ND	1.5
Dibromochloromethane	ND	1.5
1,1,2-Trichloroethane	4	1.5
Benzene	ND	1
cis-1,3-Dichloropropylene	ND	1.5
2-Chloroethyl Vinyl Ether	ND	4
Bromoform	ND	2.5
Tetrachloroethylene	ND	1.5
Toluene	41	1
Chlorobenzene	ND	8.3
Ethylbenzene	ND	1
Total Xylenes	1.7	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12944
Date Analyzed: 26-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-7-13-3
Matrix: Soil
Samp Amt: 1 gm
Dil Fact: 50

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	250
Bromomethane	ND	250
Vinyl Chloride	ND	150
Chloroethane	ND	250
Methylene Chloride	20000	1250
1,1-Dichloroethylene	600	150
1,1-Dichloroethane	ND	100
trans-1,2-Dichloroethylene	ND	75
Trichlorofluoromethane	ND	100
Chloroform	ND	75
1,2-Dichloroethane	ND	100
1,1,1-Trichloroethane	59000	75
Carbon Tetrachloride	ND	75
Bromodichloromethane	ND	75
1,1,2,2-Tetrachloroethane	ND	75
1,2-Dichloropropane	ND	75
trans-1,3-Dichloropropylene	ND	75
Trichloroethylene	ND	75
Dibromochloromethane	ND	75
1,1,2-Trichloroethane	ND	75
Benzene	ND	50
cis-1,3-Dichloropropylene	ND	75
2-Chloroethyl Vinyl Ether	ND	200
Bromoform	ND	125
Tetrachloroethylene	140	75
Toluene	450	50
Chlorobenzene	ND	300
Ethylbenzene	ND	50
Total Xylenes	ND	50
1,3-Dichlorobenzene	ND	100
1,4-Dichlorobenzene	ND	100
1,2-Dichlorobenzene	ND	100

ND-Not Detected. The limit of detection is reported above.

WCAS

Woodward-Clyde Consultants

SHIPMENT NO.: 4

PAGE 2 OF 3

DATE 6/13/89

CHAIN OF CUSTODY RECORD

PROJECT NAME: DOUGLAS AIRCRAFT COMPANY

PROJECT NO.: 8941863J- TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
B-6-11-4	B-6	SOIL	MOD. CALIF.	BRASS TUBES	ICE	NONE	CONTACT ALISTAIR CALLENDER (714) 835 6886
B-6-12-3							
B-6-12-4							
B-6-13-3							
B-6-13-4							
B-6-14-3							
B-6-14-4							
B-7-1-3	B-7						
B-7-1-4							
B-7-2-3							
B-7-2-4							
B-7-3-3							
B-7-3-4							
B-7-4-3							
B-7-4-4							
B-7-5-3							
B-7-5-4							
B-7-6-3							
B-7-6-4							
B-7-7-3							

Total Number of Samples Shipped: 55

Sampler's Signature: [signature]

Relinquished By	Received By	Date	Time
Signature: [signature] Printed Name: Peter Glaesman Company: WCC Reason: for delivery to WCAS	Signature: [signature] Printed Name: Bill Gray Company: A-1	6/13/89	4:45
Relinquished By: Signature: [signature] Printed Name: Bill Gray Company: A-1 Reason:	Received By: Signature: April Richards Printed Name: Company: WCAS 012944	6/13/89	5:35
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	/ /	
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	/ /	

Special Shipment / Handling / Storage Requirements:

[illegible] constitute authorization to proceed with analysis

BOE-C6-0071397

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 4

PAGE 1 OF 3

DATE 6/13/89

PROJECT NAME: DOUGLAS AIRCRAFT COMPANY

PROJECT NO.: 8941863 J - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
B-6-1-3	B-6	SOIL	MOD. COLIF.	BRASS TUBE	ICE	NONE	COMPOSITE: Aliphatic Carbonyls
B-6-1-4							
B-6-2-3							
B-6-2-4							
B-6-3-3							
B-6-3-4							
B-6-4-3							
B-6-4-4							
B-6-5-3							
B-6-5-4							
B-6-6-3							
B-6-6-4							
B-6-7-3							
B-6-7-4							
B-6-8-4							
B-6-9-3							
B-6-9-4							
B-6-10-3							
B-6-10-4							
B-6-11-3							

Total Number of Samples Shipped: 55 | Sampler's Signature: [signature]

Relinquished By	Received By	Date / Time
Signature: [signature] Printed Name: Peter Glassman Company: Woodward Clyde Consult Reason: Sample delivery to WCAS	Signature: Bill Gray Printed Name: Bill Gray Company: A-1	Date: 6/13/89 Time: 4:45
Signature: Bill Gray Printed Name: Bill Gray Company: A-1 Reason:	Signature: April Richards Printed Name: Company: WCAS 012944	Date: 6/13/89 Time: 5:35
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

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 4

PAGE 3 OF 3

DATE 6/13/89

PROJECT NAME: DOUGLAS AIRCRAFT COMPANY

PROJECT NO.: 89A1863J - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
B-7-7-4	B-7	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT:
B-7-8-3	↓	↓	CALIF.	↓	↓	↓	Allstate
B-7-8-4	↓	↓	↓	↓	↓	↓	Carender
B-7-9-3	↓	↓	↓	↓	↓	↓	(714) 835-6886
B-7-9-4	↓	↓	↓	↓	↓	↓	
B-7-10-3	↓	↓	↓	↓	↓	↓	
B-7-10-4	↓	↓	↓	↓	↓	↓	
B-7-11-3	↓	↓	↓	↓	↓	↓	
B-7-11-4	↓	↓	↓	↓	↓	↓	
B-7-12-3	↓	↓	↓	↓	↓	↓	
B-7-12-4	↓	↓	↓	↓	↓	↓	
B-7-13-3	↓	↓	↓	↓	↓	↓	
B-7-13-4	↓	↓	↓	↓	↓	↓	
B-7-14-3	↓	↓	↓	↓	↓	↓	
B-7-14-4	↓	↓	↓	↓	↓	↓	

Total Number of Samples Shipped: 55 | Sampler's Signature: [signature]

Relinquished By	Received By	Date / Time
Signature: [signature] Printed Name: Peter Glassman Company: WCE Reason: for delivery to WCAS	Signature: [signature] Printed Name: Bill Gray Company: A-1	Date: 6/13/89 Time: 9:45
Relinquished By: Signature: [signature] Printed Name: Bill Gray Company: A-1 Reason:	Received By: Signature: April Richards Printed Name: Company: WCAS #12944	Date: 6/13/89 Time: 9:35
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-C6-0071399

RECEIVED

JUL 0 6 [redacted]

WCC-SANT[redacted]

June 30, 1989

WEST COAST ANALYTICAL SERVICE, INC.

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

Attn: Dr. Alistaire Callender

JOB NO. 12962

A

LABORATORY REPORT

Samples Received: Fifty-six (56) soils
Date Received: 6-15-89
Date Released for Analysis: 6-20-89
Purchase Order No: Proj#: 8941863J/Task 1-Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Eight (8) soils	Halogenated and Aromatic Volatile Organics by EPA 8010/8020	Data Sheets

Shelley Stuart
Shelley Stuart
Senior Chemist

B Michael Hovance for
D.J. Northington, Ph.D.
Technical Director

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

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-10-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	ND	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.27	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-11-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	ND	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.04	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-12-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.12	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.06	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-13-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	0.04	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.44	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	1.0	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-8-14-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.05	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	25	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-9-9-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	0.03	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.02	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	0.08	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.1	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

Client: WOODWARD CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-JUNE-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-9-11-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	ND	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	0.02	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.11	0.01
Chlorobenzene	ND	0.01
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

WCAS

Client: WOODWARD-CLYDE CONSULTANTS
Job No: 12962
Date Analyzed: 28-Jun-89
Analysis: EPA 601/602 (8010/8020)

Sample: B-9-12-3
Matrix: Soil
Samp Amt: 0.1 gm
Dil Fact: 1

Compound	Concentration mg/Kg	Detection Limits
Chloromethane	ND	0.05
Bromomethane	ND	0.05
Vinyl Chloride	ND	0.03
Chloroethane	ND	0.05
Methylene Chloride	ND	0.25
1,1-Dichloroethylene	ND	0.03
1,1-Dichloroethane	ND	0.02
trans-1,2-Dichloroethylene	ND	0.02
Trichlorofluoromethane	ND	0.02
Chloroform	ND	0.02
1,2-Dichloroethane	ND	0.02
1,1,1-Trichloroethane	0.03	0.02
Carbon Tetrachloride	ND	0.02
Bromodichloromethane	ND	0.02
1,1,2,2-Tetrachloroethane	ND	0.02
1,2-Dichloropropane	ND	0.02
trans-1,3-Dichloropropylene	ND	0.02
Trichloroethylene	ND	0.02
Dibromochloromethane	ND	0.02
1,1,2-Trichloroethane	ND	0.02
Benzene	ND	0.01
cis-1,3-Dichloropropylene	ND	0.02
2-Chloroethyl Vinyl Ether	ND	0.04
Bromoform	ND	0.03
Tetrachloroethylene	ND	0.02
Toluene	0.06	0.01
Chlorobenzene	ND	0.07
Ethylbenzene	ND	0.01
Total Xylenes	ND	0.01
1,3-Dichlorobenzene	ND	0.01
1,4-Dichlorobenzene	ND	0.01
1,2-Dichlorobenzene	ND	0.01

ND-Not Detected. The limit of detection is reported above.

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 5

PAGE 1 OF 3

DATE 6/14/89

PROJECT NAME: DOUGLAS AIRCRAFT CO.

PROJECT NO.: 3941863J - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
B-8-1-3	B-8	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT:
B-8-1-4	↓	↓	SOLIF.	↓	↓	↓	Alistair Collector
B-8-2-3	↓	↓	↓	↓	↓	↓	(714) 835-6886
B-8-2-4	↓	↓	↓	↓	↓	↓	
B-8-3-3	↓	↓	↓	↓	↓	↓	
B-8-3-4	↓	↓	↓	↓	↓	↓	
B-8-4-3	↓	↓	↓	↓	↓	↓	
B-8-4-4	↓	↓	↓	↓	↓	↓	
B-8-5-3	↓	↓	↓	↓	↓	↓	
B-8-5-4	↓	↓	↓	↓	↓	↓	
B-8-6-3	↓	↓	↓	↓	↓	↓	
B-8-6-4	↓	↓	↓	↓	↓	↓	
B-8-7-3	↓	↓	↓	↓	↓	↓	
B-8-7-4	↓	↓	↓	↓	↓	↓	
B-8-8-3	↓	↓	↓	↓	↓	↓	
B-8-8-4	↓	↓	↓	↓	↓	↓	
B-8-9-3	↓	↓	↓	↓	↓	↓	
B-8-9-4	↓	↓	↓	↓	↓	↓	
B-8-10-3	↓	↓	↓	↓	↓	↓	
B-8-10-4	↓	↓	↓	↓	↓	↓	

Total Number of Samples Shipped: 56

Sampler's Signature: [signature]

Relinquished By	Received By	Date / Time
Signature: [signature] Printed Name: Peter Glaisman Company: WCC Reason: for delivery to WCAS	Signature: [signature] Printed Name: Larry P. Sipes Company: A-1	Date: 6/15/89 Time: 9:50
Signature: [signature] Printed Name: Larry P. Sipes Company: A-1 Reason:	Signature: April Richards Printed Name: Company: WCAS 012962	Date: 6/15/89 Time: 12:30
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-C6-0071409

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 5

PAGE 2 OF 3

DATE 6/14/89

PROJECT NAME: DOUGLAS AIRCRAFT CO.

PROJECT NO.: 89 41863 J - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
B-8-11-3	B-8	SOIL	MOD.	BRASS TUBE	ICE	NONE	CONTACT:
B-8-11-4			CALIF.				Alstaire
B-8-12-3							Calibrates
B-8-12-4							(714) 835-6281
B-8-13-3							
B-8-13-4							
B-8-14-3							
B-8-14-4							
B-9-1-3	B-9						
B-9-1-4							
B-9-2-3							
B-9-2-4							
B-9-3-3							
B-9-3-4							
B-9-4-3							
B-9-4-4							
B-9-5-3							
B-9-5-4							
B-9-6-3							
B-9-6-4							

Total Number of Samples Shipped: 56 Sampler's Signature: [signature]

Relinquished By: Signature [signature] Printed Name Peter Glaser Company WCC Reason for delivery to WCAS	Received By: Signature [signature] Printed Name Larry P. Sipes Company A-1	Date 6/15/89 Time 9:50
Relinquished By: Signature [signature] Printed Name Larry P. Sipes Company A-1 Reason	Received By: Signature April Richards Printed Name Company WCAS #12962	Date 6/15/89 Time 12:30 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

Special Shipment / Handling / Storage Requirements:

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

LA/OR-0183-421

BOE-C6-0071410

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 5

PAGE 3 OF 3

DATE 6/14/89

PROJECT NAME: DOUGLAS AIRCRAFT CO.

PROJECT NO.: 8941853 J-TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
B-9-7-3	B-9	SOIL	MOD	BRASS TUBE	ICE	NONE	CONTACT:
B-9-7-4	↓	↓	CALIF.	↓	↓	↓	Alistaire
B-9-8-3			↓				Gallardo
B-9-8-4							(714) 835-5556
B-9-9-3							
B-9-9-4							
B-9-10-3							
B-9-10-4							
B-9-11-3							
B-9-11-4							
B-9-12-3							
B-9-12-4							
B-9-13-3							
B-9-13-4							
B-9-14-3							
B-9-14-4	↓	↓	↓	↓	↓	↓	

Total Number of Samples Shipped: 56 | Sampler's Signature: [signature]

Relinquished By:
Signature [signature]
Printed Name Peter Glassman
Company WCC
Reason for delivery to WCAS

Received By:
Signature [signature]
Printed Name Larry P. Sipes
Company A-1

Date 6/15/89
Time 9:50

Relinquished By:
Signature [signature]
Printed Name Larry P. Sipes
Company A-1
Reason

Received By:
Signature April Richards
Printed Name
Company WCAS W12962

Date 6/15/89
Time 12:30 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

Special Shipment / Handling / Storage Requirements:

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

LA/OR-0183-421

BOE-C6-0071411

July 27, 1989

WEST COAST ANALYTICAL SERVICE, INC.

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

Attn: Dr. Alistaire Callender

JOB NO. 13191 A

LABORATORY REPORT

Samples Received: Nine (9) liquids in quadruplicate and one (1) liquid in duplicate
Date Received: 7-13-89
Date Released for Analysis: 7-17-89
Purchase Order No: Proj#: 8941863J-Task 1/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Fifteen (15) liquids	Volatile Organics by EPA 624	Data Sheets

Michael Shelton
Senior Chemist

B. Michael Hovanec
Senior Staff Chemist

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

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: D.I.-A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/24/89
DATE ANALYZED: 07/24/89

RUN NUMBER: 13191V1
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: D.I.-A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V10
SAMPLE AMOUNT: 250UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	100.
71-43-2	BENZENE	ND	20.
75-27-4	BROMODICHLOROMETHANE	ND	20.
75-25-2	BROMOFORM	ND	20.
74-83-9	BROMOMETHANE	ND	100.
78-93-3	2-BUTANONE (MEK)	ND	100.
75-15-0	CARBON DISULFIDE	ND	20.
56-23-5	CARBON TETRACHLORIDE	ND	20.
108-90-7	CHLOROBENZENE	ND	20.
75-00-3	CHLOROETHANE	ND	100.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	200.
67-66-3	CHLOROFORM	ND	20.
74-87-3	CHLOROMETHANE	ND	100.
108-41-8	CHLOROTOLUENE	ND	20.
124-48-1	DIBROMOCHLOROMETHANE	ND	20.
95-50-1	1,2-DICHLOROBENZENE	ND	20.
541-73-1	1,3-DICHLOROBENZENE	ND	20.
106-46-7	1,4-DICHLOROBENZENE	ND	20.
75-34-3	1,1-DICHLOROETHANE	ND	20.
107-06-2	1,2-DICHLOROETHANE	ND	20.
75-35-4	1,1-DICHLOROETHYLENE	900.	20.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	20.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	20.
78-87-5	1,2-DICHLOROPROPANE	ND	20.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	20.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	20.
100-41-4	ETHYLBENZENE	ND	20.
106-93-4	ETHYLENE DIBROMIDE	ND	20.
76-13-1	FREON-TF	ND	20.
119-78-6	2-HEXANONE	ND	100.
75-09-2	METHYLENE CHLORIDE	ND	100.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	100.
100-42-5	STYRENE	ND	20.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	20.
127-18-4	TETRACHLOROETHYLENE	ND	20.
109-99-9	TETRAHYDROFURAN	ND	100.
108-88-3	TOLUENE	ND	20.
71-55-6	1,1,1-TRICHLOROETHANE	67.	20.
79-00-5	1,1,2-TRICHLOROETHANE	ND	20.
79-01-6	TRICHLOROETHYLENE	2400.	20.
75-69-4	TRICHLOROFLUOROMETHANE	ND	20.
108-05-4	VINYL ACETATE	ND	100.
75-01-4	VINYL CHLORIDE	ND	100.
95-47-6	TOTAL XYLENES	ND	20.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1R

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V13
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-1S-1R

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-2S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/20/89
DATE ANALYZED: 07/20/89

RUN NUMBER: 13191V1
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	5.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-2S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-3S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V50
SAMPLE AMOUNT: 10UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	3000.
71-43-2	BENZENE	ND	500.
75-27-4	BROMODICHLOROMETHANE	ND	500.
75-25-2	BROMOFORM	ND	500.
74-83-9	BROMOMETHANE	ND	3000.
78-93-3	2-BUTANONE (MEK)	ND	3000.
75-15-0	CARBON DISULFIDE	ND	500.
56-23-5	CARBON TETRACHLORIDE	ND	500.
108-90-7	CHLOROBENZENE	ND	500.
75-00-3	CHLOROETHANE	ND	3000.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	5000.
67-66-3	CHLOROFORM	ND	500.
74-87-3	CHLOROMETHANE	ND	3000.
108-41-8	CHLOROTOLUENE	ND	500.
124-48-1	DIBROMOCHLOROMETHANE	ND	500.
95-50-1	1,2-DICHLOROBENZENE	ND	500.
541-73-1	1,3-DICHLOROBENZENE	ND	500.
106-46-7	1,4-DICHLOROBENZENE	ND	500.
75-34-3	1,1-DICHLOROETHANE	ND	500.
107-06-2	1,2-DICHLOROETHANE	ND	500.
75-35-4	1,1-DICHLOROETHYLENE	18000.	500.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	500.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	660.	500.
78-87-5	1,2-DICHLOROPROPANE	ND	500.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	500.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	500.
100-41-4	ETHYLBENZENE	ND	500.
106-93-4	ETHYLENE DIBROMIDE	ND	500.
76-13-1	FREON-TF	ND	500.
119-78-6	2-HEXANONE	ND	3000.
75-09-2	METHYLENE CHLORIDE	ND	3000.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	3000.
100-42-5	STYRENE	ND	500.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	500.
127-18-4	TETRACHLOROETHYLENE	ND	500.
109-99-9	TETRAHYDROFURAN	ND	3000.
108-88-3	TOLUENE	32000.	500.
71-55-6	1,1,1-TRICHLOROETHANE	56000.	500.
79-00-5	1,1,2-TRICHLOROETHANE	550.	500.
79-01-6	TRICHLOROETHYLENE	7700.	500.
75-69-4	TRICHLOROFLUOROMETHANE	ND	500.
108-05-4	VINYL ACETATE	ND	3000.
75-01-4	VINYL CHLORIDE	ND	3000.
95-47-6	TOTAL XYLENES	ND	500.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-3S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-4S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V60
SAMPLE AMOUNT: 2ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	20.
71-43-2	BENZENE	ND	3.
75-27-4	BROMODICHLOROMETHANE	ND	3.
75-25-2	BROMOFORM	ND	3.
74-83-9	BROMOMETHANE	ND	20.
78-93-3	2-BUTANONE (MEK)	ND	20.
75-15-0	CARBON DISULFIDE	ND	3.
56-23-5	CARBON TETRACHLORIDE	ND	3.
108-90-7	CHLOROBENZENE	ND	3.
75-00-3	CHLOROETHANE	ND	20.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	30.
67-66-3	CHLOROFORM	ND	3.
74-87-3	CHLOROMETHANE	ND	20.
108-41-8	CHLOROTOLUENE	ND	3.
124-48-1	DIBROMOCHLOROMETHANE	ND	3.
95-50-1	1,2-DICHLOROBENZENE	ND	3.
541-73-1	1,3-DICHLOROBENZENE	ND	3.
106-46-7	1,4-DICHLOROBENZENE	ND	3.
75-34-3	1,1-DICHLOROETHANE	ND	3.
107-06-2	1,2-DICHLOROETHANE	ND	3.
75-35-4	1,1-DICHLOROETHYLENE	170.	3.
156-59-4	CIS-1,2-DICHLOROETHYLENE	10.	3.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	3.
78-87-5	1,2-DICHLOROPROPANE	ND	3.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	3.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	3.
100-41-4	ETHYLBENZENE	ND	3.
106-93-4	ETHYLENE DIBROMIDE	ND	3.
76-13-1	FREON-TF	ND	3.
119-78-6	2-HEXANONE	ND	20.
75-09-2	METHYLENE CHLORIDE	ND	20.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	20.
100-42-5	STYRENE	ND	3.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	3.
127-18-4	TETRACHLOROETHYLENE	ND	3.
109-99-9	TETRAHYDROFURAN	ND	20.
108-88-3	TOLUENE	ND	3.
71-55-6	1,1,1-TRICHLOROETHANE	11.	3.
79-00-5	1,1,2-TRICHLOROETHANE	ND	3.
79-01-6	TRICHLOROETHYLENE	270.	3.
75-69-4	TRICHLOROFLUOROMETHANE	ND	3.
108-05-4	VINYL ACETATE	ND	20.
75-01-4	VINYL CHLORIDE	ND	20.
95-47-6	TOTAL XYLENES	ND	3.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-4S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V51
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	3.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	6.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	13.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1B

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V52
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	3.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	6.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	12.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-5S-1B

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-7S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V61
SAMPLE AMOUNT: 500UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	50.
71-43-2	BENZENE	ND	10.
75-27-4	BROMODICHLOROMETHANE	ND	10.
75-25-2	BROMOFORM	ND	10.
74-83-9	BROMOMETHANE	ND	50.
78-93-3	2-BUTANONE (MEK)	ND	50.
75-15-0	CARBON DISULFIDE	ND	10.
56-23-5	CARBON TETRACHLORIDE	ND	10.
108-90-7	CHLOROBENZENE	ND	10.
75-00-3	CHLOROETHANE	ND	50.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	100.
67-66-3	CHLOROFORM	ND	10.
74-87-3	CHLOROMETHANE	ND	50.
108-41-8	CHLOROTOLUENE	ND	10.
124-48-1	DIBROMOCHLOROMETHANE	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.
75-34-3	1,1-DICHLOROETHANE	ND	10.
107-06-2	1,2-DICHLOROETHANE	ND	10.
75-35-4	1,1-DICHLOROETHYLENE	850.	10.
156-59-4	CIS-1,2-DICHLOROETHYLENE	26.	10.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	11.	10.
78-87-5	1,2-DICHLOROPROPANE	ND	10.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	10.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	10.
100-41-4	ETHYLBENZENE	ND	10.
106-93-4	ETHYLENE DIBROMIDE	ND	10.
76-13-1	FREON-TF	ND	10.
119-78-6	2-HEXANONE	ND	50.
75-09-2	METHYLENE CHLORIDE	ND	50.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	50.
100-42-5	STYRENE	ND	10.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	10.
127-18-4	TETRACHLOROETHYLENE	ND	10.
109-99-9	TETRAHYDROFURAN	ND	50.
108-88-3	TOLUENE	ND	10.
71-55-6	1,1,1-TRICHLOROETHANE	110.	10.
79-00-5	1,1,2-TRICHLOROETHANE	ND	10.
79-01-6	TRICHLOROETHYLENE	1300.	10.
75-69-4	TRICHLOROFLUOROMETHANE	ND	10.
108-05-4	VINYL ACETATE	ND	50.
75-01-4	VINYL CHLORIDE	ND	50.
95-47-6	TOTAL XYLENES	ND	10.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-7S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V58
SAMPLE AMOUNT: 1ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	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.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	430.	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	7.	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	9.	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	160.	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	240.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1R

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/25/89

RUN NUMBER: 13191V54
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-8S-1R

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13193V4
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	3.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	2.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	86.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1B

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V5
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	3.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	1.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	87.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE SAMPLE: WCC-10S-1B
WCAS JOB #: 13191

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1R

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/21/89
DATE ANALYZED: 07/21/89

RUN NUMBER: 13191V6
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-10S-1R

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-11S-1A

DATE RECEIVED: 07/13/89
DATE EXTRACTED: 07/25/89
DATE ANALYZED: 07/26/89

RUN NUMBER: 13191V63
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYLETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13191

SAMPLE: WCC-11S-1A

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: _____

PAGE 1 OF 1

DATE 7/25/89

PROJECT NAME: Dwyer Alcoa Co.

PROJECT NO.: 8941363J - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-1D-1A	WCC-1D	WATER	BAILED	40 ml VOA	ICE	NONE	
WCC-1D-1B	↓	↓	↓	↓	↓	↓	
WCC-1D-1R	↓	↓	↓	↓	↓	↓	
WCC-1D-1S	↓	↓	↓	↓	↓	↓	
WCC-3D-1A	WCC-3D	↓	↓	↓	↓	↓	
WCC-3D-1B	↓	↓	↓	↓	↓	↓	
WCC-3D-1R	↓	↓	↓	↓	↓	↓	
WCC-3D-1S	↓	↓	↓	↓	↓	↓	
WCC-12D-1A	WCC-12D	↓	↓	↓	↓	↓	
WCC-12D-1B	↓	↓	↓	↓	↓	↓	
WCC-12D-1R	↓	↓	↓	↓	↓	↓	
WCC-12D-1S	↓	↓	↓	↓	↓	↓	

Total Number of Samples Shipped: 12 | Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 7/ /
Printed Name: Peter Glaesman	Printed Name: [illegible] Callender	Time:
Company: WCC	Company: [illegible]	
Reason: for delivery to WCAS		

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 7/[illegible]
Printed Name: Alistaire Callender	Printed Name: [illegible]	Time: [illegible]
Company: Woodward-Clyde Cons	Company: 4-1	
Reason: [illegible] WCAS		

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: Bob Olson	Date: 7/26/89
Printed Name: [illegible]	Printed Name: Bob Olson	Time: 11:40
Company:	Company: WCAS	
Reason:		

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

Special Shipment / Handling / Storage Requirements:

CONTACT: Alistaire Callender or Peter Glaesman 714 835 6856

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

LA/OR-0183-421

BOE-C6-0071443

September 8, 1989

WEST COAST ANALYTICAL SERVICE, INC.
ANALYTICAL CHEMISTS

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

Attn: Peter Glaesman

JOB NO. 13533 A

LABORATORY REPORT

Samples Received: Fifty-five (55) liquids
Date Received: 8-24-89
Purchase Order No: Proj#: 8941863J Task 1/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Thirteen (13) liquids	Volatile Organics by EPA 624	Data Sheets

Michael Shelton
Senior Chemist

B. Michael Hovanec
Senior Staff Chemist

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

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-1D-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V16
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	1.	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	2.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-1D-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-1S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V17
SAMPLE AMOUNT: 150UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	200.
71-43-2	BENZENE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	30.
75-25-2	BROMOFORM	ND	30.
74-83-9	BROMOMETHANE	ND	200.
78-93-3	2-BUTANONE (MEK)	ND	200.
75-15-0	CARBON DISULFIDE	ND	30.
56-23-5	CARBON TETRACHLORIDE	ND	30.
108-90-7	CHLOROBENZENE	ND	30.
75-00-3	CHLOROETHANE	ND	200.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	300.
67-66-3	CHLOROFORM	ND	30.
74-87-3	CHLOROMETHANE	ND	200.
108-41-8	CHLOROTOLUENE	ND	30.
124-48-1	DIBROMOCHLOROMETHANE	ND	30.
95-50-1	1,2-DICHLOROBENZENE	ND	30.
541-73-1	1,3-DICHLOROBENZENE	ND	30.
106-46-7	1,4-DICHLOROBENZENE	ND	30.
75-34-3	1,1-DICHLOROETHANE	ND	30.
107-06-2	1,2-DICHLOROETHANE	ND	30.
75-35-4	1,1-DICHLOROETHYLENE	1500.	30.
156-59-4	CIS-1,2-DICHLOROETHYLENE	41.	30.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	30.
78-87-5	1,2-DICHLOROPROPANE	ND	30.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	30.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	30.
100-41-4	ETHYLBENZENE	ND	30.
106-93-4	ETHYLENE DIBROMIDE	ND	30.
76-13-1	FREON-TF	ND	30.
119-78-6	2-HEXANONE	ND	200.
75-09-2	METHYLENE CHLORIDE	ND	200.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	200.
100-42-5	STYRENE	ND	30.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	30.
127-18-4	TETRACHLOROETHYLENE	ND	30.
109-99-9	TETRAHYDROFURAN	ND	200.
108-88-3	TOLUENE	ND	30.
71-55-6	1,1,1-TRICHLOROETHANE	ND	30.
79-00-5	1,1,2-TRICHLOROETHANE	ND	30.
79-01-6	TRICHLOROETHYLENE	2800.	30.
75-69-4	TRICHLOROFLUOROMETHANE	ND	30.
108-05-4	VINYL ACETATE	ND	200.
75-01-4	VINYL CHLORIDE	ND	200.
95-47-6	TOTAL XYLENES	ND	30.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-1S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-2S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V18
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	3.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-2S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

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.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-3D-1A
WCAS JOB #: 13290

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3D-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V19
SAMPLE AMOUNT: 500UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	50.
71-43-2	BENZENE	ND	10.
75-27-4	BROMODICHLOROMETHANE	ND	10.
75-25-2	BROMOFORM	ND	10.
74-83-9	BROMOMETHANE	ND	50.
78-93-3	2-BUTANONE (MEK)	ND	50.
75-15-0	CARBON DISULFIDE	ND	10.
56-23-5	CARBON TETRACHLORIDE	ND	10.
108-90-7	CHLOROBENZENE	ND	10.
75-00-3	CHLOROETHANE	ND	50.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	100.
67-66-3	CHLOROFORM	ND	10.
74-87-3	CHLOROMETHANE	ND	50.
108-41-8	CHLOROTOLUENE	ND	10.
124-48-1	DIBROMOCHLOROMETHANE	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.
75-34-3	1,1-DICHLOROETHANE	ND	10.
107-06-2	1,2-DICHLOROETHANE	ND	10.
75-35-4	1,1-DICHLOROETHYLENE	ND	10.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	10.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	10.
78-87-5	1,2-DICHLOROPROPANE	ND	10.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	10.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	10.
100-41-4	ETHYLBENZENE	ND	10.
106-93-4	ETHYLENE DIBROMIDE	ND	10.
76-13-1	FREON-TF	ND	10.
119-78-6	2-HEXANONE	ND	50.
75-09-2	METHYLENE CHLORIDE	ND	50.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	50.
100-42-5	STYRENE	ND	10.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	10.
127-18-4	TETRACHLOROETHYLENE	ND	10.
109-99-9	TETRAHYDROFURAN	ND	50.
108-88-3	TOLUENE	ND	10.
71-55-6	1,1,1-TRICHLOROETHANE	32.	10.
79-00-5	1,1,2-TRICHLOROETHANE	ND	10.
79-01-6	TRICHLOROETHYLENE	ND	10.
75-69-4	TRICHLOROFLUOROMETHANE	ND	10.
108-05-4	VINYL ACETATE	ND	50.
75-01-4	VINYL CHLORIDE	ND	50.
95-47-6	TOTAL XYLENES	ND	10.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-3D-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-3S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V20
SAMPLE AMOUNT: 5UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5000.
71-43-2	BENZENE	ND	1000.
75-27-4	BROMODICHLOROMETHANE	ND	1000.
75-25-2	BROMOFORM	ND	1000.
74-83-9	BROMOMETHANE	ND	5000.
78-93-3	2-BUTANONE (MEK)	ND	5000.
75-15-0	CARBON DISULFIDE	ND	1000.
56-23-5	CARBON TETRACHLORIDE	ND	1000.
108-90-7	CHLOROBENZENE	ND	1000.
75-00-3	CHLOROETHANE	ND	5000.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10000.
67-66-3	CHLOROFORM	ND	1000.
74-87-3	CHLOROMETHANE	ND	5000.
108-41-8	CHLOROTOLUENE	ND	1000.
124-48-1	DIBROMOCHLOROMETHANE	ND	1000.
95-50-1	1,2-DICHLOROBENZENE	ND	1000.
541-73-1	1,3-DICHLOROBENZENE	ND	1000.
106-46-7	1,4-DICHLOROBENZENE	ND	1000.
75-34-3	1,1-DICHLOROETHANE	ND	1000.
107-06-2	1,2-DICHLOROETHANE	ND	1000.
75-35-4	1,1-DICHLOROETHYLENE	56000.	1000.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1000.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1000.
78-87-5	1,2-DICHLOROPROPANE	ND	1000.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1000.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1000.
100-41-4	ETHYLBENZENE	ND	1000.
106-93-4	ETHYLENE DIBROMIDE	ND	1000.
76-13-1	FREON-TF	ND	1000.
119-78-6	2-HEXANONE	ND	5000.
75-09-2	METHYLENE CHLORIDE	ND	5000.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5000.
100-42-5	STYRENE	ND	1000.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1000.
127-18-4	TETRACHLOROETHYLENE	ND	1000.
109-99-9	TETRAHYDROFURAN	ND	5000.
108-88-3	TOLUENE	56000.	1000.
71-55-6	1,1,1-TRICHLOROETHANE	78000.	1000.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1000.
79-01-6	TRICHLOROETHYLENE	6000.	1000.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1000.
108-05-4	VINYL ACETATE	ND	5000.
75-01-4	VINYL CHLORIDE	ND	5000.
95-47-6	TOTAL XYLENES	ND	1000.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-5S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-5S-2R
WCAS JOB #: 13533

DATE RECEIVED: 08/24/89 RUN NUMBER: 13533V24
DATE EXTRACTED: 09/06/89 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 09/06/89 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-3S-2R
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-4S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V22
SAMPLE AMOUNT: 1ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	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.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	360.	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	15.	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	7.	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	410.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-5S-2R
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

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.

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Dark yellowish brown, SILTY fine grained SAND (SM).									
40									1416	
45	Dark yellowish brown, SILTY CLAY (CL).									
	Dark yellowish brown, SILTY fine grained SAND (SM).									Loosing a lot of drilling MUD.
50									1427	
55	Olive brown, medium grained SAND (SP-SM), with small gravel and shell fragments.									
60									1500	
65	Dark yellowish brown, SILTY CLAY (CL), micaceous.									
	Yellowish brown, fine grained SAND (SP-SM), with small diam. gravel and shell fragments.									
70									1517	

LOG OF BORING WCC-1D

Fig. B-4

WOODWARD-CLYDE CONSULTA

BOE-C6-0071462

BORING LOCATION	See Location Map	ELEVATION AND DATUM	50.45 Feet MSL
DRILLING AGENCY	Beylik Drilling, Inc. / DRILLER D. Jones	DATE STARTED 6-28-89	DATE FINISHED 6-30-89
DRILLING EQUIPMENT	Ingersol Rand, MUD Rotary	COMPLETION DEPTH (ft) 140	ROCK DEPTH (ft) –
TYPE OF WELL CASING	PVC Sch. 40 / SCREEN PERFORATION 0.01 inch	DIAMETER OF BORING (in.) 10	DIAMETER OF WELL (IN) 4
TYPE/SIZE OF SAND PACK	Lonestar No. 0/30	TYPE/THICKNESS OF SEAL(S)	Bentonite Pellets 5 ft./Volclay grout 107 ft
No. OF SAMPLES	DIST. 4 / UNDIST. 0	CORE 0	LOGGED BY H. Reyes, P. Glaesman / CHECKED BY M. Razmajoo
WATER DEPTH (ft)	FIRST / COMPL.	24 HRS.	

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No.	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	6-inch Asphalt concrete over 6-inch base material.								1235	
	Dark yellowish brown, CLAYEY fine grained SAND (SC), with small diameter gravel.									
5									1303	
10	Dark yellowish brown, SILTY CLAY (CL), with fine grained sand.									
15									1308	
20										
25									1313	Stopped drilling to repair drill rig.
									1400	Resumed drilling
30										
	Dark yellowish brown, SILTY fine grained SAND (SM).									
35										

Project: DOUGLAS AIRCRAFT COMPANY
Project No.: 8840863

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 6
PAGE 1 OF 2
DATE 7/12/89

PROJECT NAME: Douglas Aircraft Co./C6
PROJECT NO.: 8941863 J-TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-1S-1A	WCC-1S	WATER	BAILER	40 ml VOA	ICE	NONE	CONTACT:
WCC-1S-1B							Alistair Cameron
WCC-1S-1C				4 oz glass			(714) 335-6886
WCC-1S-1R				40 ml VOA			
WCC-2S-1A	WCC-2S						
WCC-2S-1B							
WCC-2S-1C				4 oz. glass			
WCC-2S-1R				40 ml VOA			
WCC-3S-1A	WCC-3S						
WCC-3S-1B							
WCC-3S-1C				4 oz. glass			
WCC-3S-1R				40 ml VOA			
WCC-4S-1A	WCC-4S						
WCC-4S-1B							
WCC-4S-1C				4 oz. glass			
WCC-4S-1R				40 ml VOA			
WCC-5S-1A	WCC-5S						
WCC-5S-1B							
WCC-5S-1C				4 oz. glass			
WCC-5S-1R				40 ml VOA			

Total Number of Samples Shipped: 38 | Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: David Rozicki	Date: 7/13/89
Printed Name: Peter Glarsman	Printed Name: DAVID ROZICKI	Time: 9:05
Company: WCC	Company: A-1	
Reason: for ~~analysis by~~ WCAS		
Relinquished By: delivery to	Received By: April Richards	Date: 7/13/89
Signature: D. Rozicki	Signature: April Richards	Time: 13:10
Printed Name: D. Rozicki	Printed Name: APRIL RICHARDS	
Company: A-1	Company: WCAS 013191	
Reason: DELIVERED		
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

BOE-C6-0071464

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 6

PAGE 2 OF 2

DATE 7/12/89

PROJECT NAME: Douglas Aircraft Co./C6

PROJECT NO.: 894(863) - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-7S-1A	WCC-7S	Water	Bailer	40 ml VOA	ICE	NONE	Contact:
WCC-7S-1B							[illegible]
WCC-7S-1C				4 oz glass			(7.4) 335-[illegible]
WCC-7S-1R				40 ml VOA			
WCC-8S-1A	WCC-8S						
WCC-8S-1B							
WCC-8S-1C				4 oz. glass			
WCC-8S-1R				40 ml VOA			
WCC-10S-1A	WCC-10S						
WCC-10S-1B							
WCC-10S-1C				4 oz. glass			
WCC-10S-1R				40 ml VOA			
WCC-11S-1A	WCC-11S						
WCC-11S-1B							
WCC-11S-1C				4 oz. glass			
WCC-11S-1R				40 ml VOA			
D.I.-A	Jug		grab				
D.I.-B	Jug		grab				

Total Number of Samples Shipped: 38

Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: David Rozicki	Date: 7/13/89
Printed Name: Peter Glaesman	Printed Name: DAVID Rozicki	Time: 9:05
Company: WCC	Company: A-1	
Reason: for ~~analysis by~~ WCAS		
Relinquished By: delivery to	Received By: April Richards	Date: 7/13/89
Signature: D. Rozicki	Signature: April Richards	Time: 17 [illegible]
Printed Name: D. Rozicki	Printed Name: APRIL RICHARDS	
Company: A-1	Company: WCAS	
Reason: DELIVERED		
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-018

BOE-C6-0071465

August 9, 1989

RECEIVED
AUG 10 1989
WCC-SANTA ANA

WCAS
WEST COAST ANALYTICAL SERVICE, INC.

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

Attn: Dr. Alistaire Callender

JOB NO. 13290

A

LABORATORY REPORT

Samples Received: Twelve (12) waters
Date Received: 7-26-89
Date Released for Analysis: 8-7-89
Purchase Order No: Proj#: 8941863J/Task 1-Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Two (2) waters	Volatile Organics by EPA 624	Data Sheets

Michael Shelton
Senior Chemist

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

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

BOE-C6-0071466

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-1D-1A
WCAS JOB #: 13290

DATE RECEIVED: 07/26/89 RUN NUMBER: 13290V1
DATE EXTRACTED: 08/08/89 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 08/08/89 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	5.	5.
108-88-3	TOLUENE	1.	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	2.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-1D-1A
WCAS JOB #: 13290

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-3D-1A
WCAS JOB #: 13290

DATE RECEIVED: 07/26/89 RUN NUMBER: 13290V2
DATE EXTRACTED: 08/08/89 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 08/08/89 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	11.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	3.	1.
71-55-6	1,1,1-TRICHLOROETHANE	49.	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	4.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-7S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V25
SAMPLE AMOUNT: 200UL
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	100.
71-43-2	BENZENE	ND	30.
75-27-4	BROMODICHLOROMETHANE	ND	30.
75-25-2	BROMOFORM	ND	30.
74-83-9	BROMOMETHANE	ND	100.
78-93-3	2-BUTANONE (MEK)	ND	100.
75-15-0	CARBON DISULFIDE	ND	30.
56-23-5	CARBON TETRACHLORIDE	ND	30.
108-90-7	CHLOROBENZENE	ND	30.
75-00-3	CHLOROETHANE	ND	100.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	300.
67-66-3	CHLOROFORM	ND	30.
74-87-3	CHLOROMETHANE	ND	100.
108-41-8	CHLOROTOLUENE	ND	30.
124-48-1	DIBROMOCHLOROMETHANE	ND	30.
95-50-1	1,2-DICHLOROBENZENE	ND	30.
541-73-1	1,3-DICHLOROBENZENE	ND	30.
106-46-7	1,4-DICHLOROBENZENE	ND	30.
75-34-3	1,1-DICHLOROETHANE	ND	30.
107-06-2	1,2-DICHLOROETHANE	ND	30.
75-35-4	1,1-DICHLOROETHYLENE	1100.	30.
156-59-4	CIS-1,2-DICHLOROETHYLENE	31.	30.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	30.
78-87-5	1,2-DICHLOROPROPANE	ND	30.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	30.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	30.
100-41-4	ETHYLBENZENE	ND	30.
106-93-4	ETHYLENE DIBROMIDE	ND	30.
76-13-1	FREON-TF	ND	30.
119-78-6	2-HEXANONE	ND	100.
75-09-2	METHYLENE CHLORIDE	ND	100.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	100.
100-42-5	STYRENE	ND	30.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	30.
127-18-4	TETRACHLOROETHYLENE	ND	30.
109-99-9	TETRAHYDROFURAN	ND	100.
108-88-3	TOLUENE	ND	30.
71-55-6	1,1,1-TRICHLOROETHANE	66.	30.
79-00-5	1,1,2-TRICHLOROETHANE	ND	30.
79-01-6	TRICHLOROETHYLENE	1400.	30.
75-69-4	TRICHLOROFLUOROMETHANE	ND	30.
108-05-4	VINYL ACETATE	ND	100.
75-01-4	VINYL CHLORIDE	ND	100.
95-47-6	TOTAL XYLENES	ND	30.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-7S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-8S-2A
WCAS JOB #: 13533

DATE RECEIVED: 08/24/89 RUN NUMBER: 13533V26
DATE EXTRACTED: 09/06/89 SAMPLE AMOUNT: 1ML
DATE ANALYZED: 09/06/89 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	ND	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	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.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	820.	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	7.	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	ND	5.
71-55-6	1,1,1-TRICHLOROETHANE	130.	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	430.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-8S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-10S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V27
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	4.	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	4.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	81.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-10S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-10S-2R

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V28
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-10S-2R
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

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.

Woodward-Clyde Consultants

SHIPMENT NO.: —

PAGE 1 OF 3

DATE 8/23/89

CHAIN OF CUSTODY RECORD

PROJECT NAME: Douglas Aircraft Co. (C6)

PROJECT NO.: 8941863 J - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-1S-2A	WCC-1S	~~[illegible]~~ WATER	BAILER	~~BRASS TUBE~~ 40 ml VOA	ICE	NONE	
WCC-1S-2B							
WCC-1S-2C				4 oz. glass			
WCC-1S-2R				40 ml VOA			
WCC-1S-2S							
WCC-2S-2A	WCC-2S						
WCC-2S-2B							
WCC-2S-2C				4 oz. glass			
WCC-2S-2R				40 ml VOA			
WCC-2S-2S							
WCC-3S-2A	WCC-3S						
WCC-3S-2B							
WCC-3S-2C				4 oz. glass			
WCC-3S-2R				40 ml VOA			
WCC-3S-2S							
WCC-4S-2A	WCC-4S						
WCC-4S-2B							
WCC-4S-2C				4 oz. glass			
WCC-4S-2R				40 ml VOA			
WCC-4S-2S							

Total Number of Samples Shipped:

Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 8-24-89
Printed Name: Peter Glaesman	Printed Name: [illegible]	Time: [illegible]
Company: WCC	Company: A-1	
Reason: for ~~analysis~~ delivery to WCAS		

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: Mary Cederwall	Date: 8/24/89
Printed Name: Kim Kerr	Printed Name: Cederwall	Time: 11:06 a.m.
Company: A-1	Company: WCAS	
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:

13533

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

LA/OR-0183-421

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-4S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	UNIDENTIFIED COMPOUND	VOA	300.

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS
WCAS JOB #: 13533

SAMPLE: WCC-5S-2A

DATE RECEIVED: 08/24/89
DATE EXTRACTED: 09/06/89
DATE ANALYZED: 09/06/89

RUN NUMBER: 13533V29
SAMPLE AMOUNT: 5ML
MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	4.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	12.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

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OCT 0 4 1989

WCC-SANTA ANA

September 29, 1989

WEST COAST ANALYTICAL SERVICE, INC.

ANALYTICAL CHEMISTS

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

Attn: Dr. Alistaire Callender

JOB NO. 13764

A

LABORATORY REPORT

Samples Received: Thirteen (13) soils
Date Received: 9-25-89
Purchase Order No: Proj#: 8941863J-I/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Three (3) soils	Volatile Organics by EPA 8240	Data Sheets

B. Michael Hovanec
Senior Staff Chemist

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

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225 • FAX 213/948-5850

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

RECEIVED
OCT 0 4 1989
WCC-SANTA ANA

SAMPLE: 6S-8-4

DATE RECEIVED: 09/25/89
DATE EXTRACTED: 09/29/89
DATE ANALYZED: 09/29/89

RUN NUMBER: 13764V4
SAMPLE AMOUNT: 0.1G
MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	300.
71-43-2	BENZENE	ND	50.
75-27-4	BROMODICHLOROMETHANE	ND	50.
75-25-2	BROMOFORM	ND	50.
74-83-9	BROMOMETHANE	ND	300.
78-93-3	2-BUTANONE (MEK)	9400.	300.
75-15-0	CARBON DISULFIDE	ND	50.
56-23-5	CARBON TETRACHLORIDE	ND	50.
108-90-7	CHLOROBENZENE	ND	50.
75-00-3	CHLOROETHANE	ND	300.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	500.
67-66-3	CHLOROFORM	ND	50.
74-87-3	CHLOROMETHANE	ND	300.
108-41-8	CHLOROTOLUENE	ND	50.
124-48-1	DIBROMOCHLOROMETHANE	ND	50.
95-50-1	1,2-DICHLOROBENZENE	ND	50.
541-73-1	1,3-DICHLOROBENZENE	ND	50.
106-46-7	1,4-DICHLOROBENZENE	ND	50.
75-34-3	1,1-DICHLOROETHANE	ND	50.
107-06-2	1,2-DICHLOROETHANE	ND	50.
75-35-4	1,1-DICHLOROETHYLENE	ND	50.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	50.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	50.
78-87-5	1,2-DICHLOROPROPANE	ND	50.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	50.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	50.
100-41-4	ETHYLBENZENE	ND	50.
106-93-4	ETHYLENE DIBROMIDE	ND	50.
76-13-1	FREON-TF	ND	50.
119-78-6	2-HEXANONE	ND	300.
75-09-2	METHYLENE CHLORIDE	ND	300.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	8400.	300.
100-42-5	STYRENE	ND	50.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	50.
127-18-4	TETRACHLOROETHYLENE	ND	50.
109-99-9	TETRAHYDROFURAN	ND	300.
108-88-3	TOLUENE	1000.	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	50.
79-00-5	1,1,2-TRICHLOROETHANE	ND	50.
79-01-6	TRICHLOROETHYLENE	ND	50.
75-69-4	TRICHLOROFLUOROMETHANE	ND	50.
108-05-4	VINYL ACETATE	ND	300.
75-01-4	VINYL CHLORIDE	ND	300.
95-47-6	TOTAL XYLENES	ND	50.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE SAMPLE: 6S-8-4
WCAS JOB #: 13764

UNITS: UG/KG (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	BUTYL CELLOSOLVE	VOA	300.

WCAS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-9-4

DATE RECEIVED: 09/25/89
DATE EXTRACTED: 09/29/89
DATE ANALYZED: 09/29/89

RUN NUMBER: 13764V2
SAMPLE AMOUNT: 0.1G
MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	300.
71-43-2	BENZENE	ND	50.
75-27-4	BROMODICHLOROMETHANE	ND	50.
75-25-2	BROMOFORM	ND	50.
74-83-9	BROMOMETHANE	ND	300.
78-93-3	2-BUTANONE (MEK)	9200.	300.
75-15-0	CARBON DISULFIDE	ND	50.
56-23-5	CARBON TETRACHLORIDE	ND	50.
108-90-7	CHLOROBENZENE	ND	50.
75-00-3	CHLOROETHANE	ND	300.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	500.
67-66-3	CHLOROFORM	ND	50.
74-87-3	CHLOROMETHANE	ND	300.
108-41-8	CHLOROTOLUENE	ND	50.
124-48-1	DIBROMOCHLOROMETHANE	ND	50.
95-50-1	1,2-DICHLOROBENZENE	ND	50.
541-73-1	1,3-DICHLOROBENZENE	ND	50.
106-46-7	1,4-DICHLOROBENZENE	ND	50.
75-34-3	1,1-DICHLOROETHANE	ND	50.
107-06-2	1,2-DICHLOROETHANE	ND	50.
75-35-4	1,1-DICHLOROETHYLENE	240.	50.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	50.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	50.
78-87-5	1,2-DICHLOROPROPANE	ND	50.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	50.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	50.
100-41-4	ETHYLBENZENE	ND	50.
106-93-4	ETHYLENE DIBROMIDE	ND	50.
76-13-1	FREON-TF	ND	50.
119-78-6	2-HEXANONE	ND	300.
75-09-2	METHYLENE CHLORIDE	ND	300.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	2500.	300.
100-42-5	STYRENE	ND	50.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	50.
127-18-4	TETRACHLOROETHYLENE	ND	50.
109-99-9	TETRAHYDROFURAN	ND	300.
108-88-3	TOLUENE	2200.	50.
71-55-6	1,1,1-TRICHLOROETHANE	ND	50.
79-00-5	1,1,2-TRICHLOROETHANE	ND	50.
79-01-6	TRICHLOROETHYLENE	83.	50.
75-69-4	TRICHLOROFLUOROMETHANE	ND	50.
108-05-4	VINYL ACETATE	ND	300.
75-01-4	VINYL CHLORIDE	ND	300.
95-47-6	TOTAL XYLENES	ND	50.

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE SAMPLE: 6S-9-4
WCAS JOB #: 13764

UNITS: UG/KG (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	BUTYL CELLOSOLVE	VOA	700.

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-10-4

DATE RECEIVED: 09/25/89
DATE EXTRACTED: 09/29/89
DATE ANALYZED: 09/29/89

RUN NUMBER: 13764V1
SAMPLE AMOUNT: 1.0G
MATRIX: SOIL

VOLATILE ORGANICS (EPA 624/8240)

UNITS: UG/KG (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	30.
71-43-2	BENZENE	ND	5.
75-27-4	BROMODICHLOROMETHANE	ND	5.
75-25-2	BROMOFORM	ND	5.
74-83-9	BROMOMETHANE	ND	30.
78-93-3	2-BUTANONE (MEK)	550.	30.
75-15-0	CARBON DISULFIDE	ND	5.
56-23-5	CARBON TETRACHLORIDE	ND	5.
108-90-7	CHLOROBENZENE	ND	5.
75-00-3	CHLOROETHANE	ND	30.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	50.
67-66-3	CHLOROFORM	ND	5.
74-87-3	CHLOROMETHANE	ND	30.
108-41-8	CHLOROTOLUENE	ND	5.
124-48-1	DIBROMOCHLOROMETHANE	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.
75-34-3	1,1-DICHLOROETHANE	ND	5.
107-06-2	1,2-DICHLOROETHANE	ND	5.
75-35-4	1,1-DICHLOROETHYLENE	ND	5.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	5.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	5.
78-87-5	1,2-DICHLOROPROPANE	ND	5.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	5.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	5.
100-41-4	ETHYLBENZENE	ND	5.
106-93-4	ETHYLENE DIBROMIDE	ND	5.
76-13-1	FREON-TF	ND	5.
119-78-6	2-HEXANONE	ND	30.
75-09-2	METHYLENE CHLORIDE	ND	30.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	330.	30.
100-42-5	STYRENE	ND	5.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	5.
127-18-4	TETRACHLOROETHYLENE	ND	5.
109-99-9	TETRAHYDROFURAN	ND	30.
108-88-3	TOLUENE	150.	5.
71-55-6	1,1,1-TRICHLOROETHANE	ND	5.
79-00-5	1,1,2-TRICHLOROETHANE	ND	5.
79-01-6	TRICHLOROETHYLENE	7.	5.
75-69-4	TRICHLOROFLUOROMETHANE	ND	5.
108-05-4	VINYL ACETATE	ND	30.
75-01-4	VINYL CHLORIDE	ND	30.
95-47-6	TOTAL XYLENES	ND	5.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE
WCAS JOB #: 13764

SAMPLE: 6S-10-4

UNITS: UG/KG (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

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.

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WCC-SANTA ANA

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 1
PAGE 1 OF 1
DATE 9 [illegible]

PROJECT NAME: DOUGLAS AIRCRAFT CO.
PROJECT NO.: 294.963.J - T

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required*
		Material	Method		Temp	Chemical	
[illegible]	[illegible]	[illegible]		[illegible] TUBE	ICE	NONE	[illegible]
[illegible]							
[illegible]							
[illegible]							
[illegible]							
[illegible]							
[illegible]							
[illegible]							
[illegible]							[illegible]
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[illegible]							[illegible]
[illegible]							[illegible]
[illegible]							[illegible]
[illegible]							[illegible]
[illegible]							

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

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

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

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

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

Special Shipment / Handling / Storage Requirements:

[illegible]

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

LA/OR-0183-421

October 18, 1989

RECEIVED
OCT 19 1989
WCC-SANTA ANA

WEST COAST ANALYTICAL SERVICE, INC

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

Attn: Dr. Alistaire Callender

JOB NO. 13882

LABORATORY REPORT

Samples Received: Three (3) liquids in quadruplicate
Date Received: 10-9-89
Date Released for Analysis: 10-11-89
Purchase Order No: Proj#: 8941863J/Douglas Aircraft

The samples were analyzed as follows:

Samples Analyzed	Analysis	Results
Three (3) liquids	Volatile Organics by EPA 624	Data Sheets

Shelley Stuart
for Michael Shelton
Senior Chemist

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

9840 Alburtis Avenue • Santa Fe Springs, California 90670 • 213/948-2225 • FAX 213/948-5850

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-6S-1A
WCAS JOB #: 13882

DATE RECEIVED: 10/09/89 RUN NUMBER: 13882V5
DATE EXTRACTED: 10/17/89 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/17/89 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	4.	1.
107-06-2	1,2-DICHLOROETHANE	3.	1.
75-35-4	1,1-DICHLOROETHYLENE	210.	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	12.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	7.	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	ND	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	130.	1.
79-00-5	1,1,2-TRICHLOROETHANE	4.	1.
79-01-6	TRICHLOROETHYLENE	140.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-6S-1A
WCAS JOB #: 13882

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-9S-1A
WCAS JOB #: 13882

DATE RECEIVED: 10/09/89 RUN NUMBER: 13882V7
DATE EXTRACTED: 10/17/89 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/17/89 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	7.	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	2.	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	15.	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-9S-1A
WCAS JOB #: 13882

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-12S-1A
WCAS JOB #: 13882

DATE RECEIVED: 10/09/89 RUN NUMBER: 13882V8
DATE EXTRACTED: 10/17/89 SAMPLE AMOUNT: 5ML
DATE ANALYZED: 10/17/89 MATRIX: WATER

VOLATILE ORGANICS (EPA 624/8240) UNITS: UG/L (PPB)

CAS #	COMPOUND	CONCENTRATION	DET LIMIT
67-64-1	ACETONE	ND	5.
71-43-2	BENZENE	ND	1.
75-27-4	BROMODICHLOROMETHANE	ND	1.
75-25-2	BROMOFORM	ND	1.
74-83-9	BROMOMETHANE	ND	5.
78-93-3	2-BUTANONE (MEK)	ND	5.
75-15-0	CARBON DISULFIDE	ND	1.
56-23-5	CARBON TETRACHLORIDE	ND	1.
108-90-7	CHLOROBENZENE	ND	1.
75-00-3	CHLOROETHANE	ND	5.
110-75-8	2-CHLOROETHYLVINYL ETHER	ND	10.
67-66-3	CHLOROFORM	ND	1.
74-87-3	CHLOROMETHANE	ND	5.
108-41-8	CHLOROTOLUENE	ND	1.
124-48-1	DIBROMOCHLOROMETHANE	ND	1.
95-50-1	1,2-DICHLOROBENZENE	ND	1.
541-73-1	1,3-DICHLOROBENZENE	ND	1.
106-46-7	1,4-DICHLOROBENZENE	ND	1.
75-34-3	1,1-DICHLOROETHANE	ND	1.
107-06-2	1,2-DICHLOROETHANE	ND	1.
75-35-4	1,1-DICHLOROETHYLENE	ND	1.
156-59-4	CIS-1,2-DICHLOROETHYLENE	ND	1.
156-60-5	TRANS-1,2-DICHLOROETHYLENE	ND	1.
78-87-5	1,2-DICHLOROPROPANE	ND	1.
10061-01-5	CIS-1,3-DICHLOROPROPENE	ND	1.
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ND	1.
100-41-4	ETHYLBENZENE	ND	1.
106-93-4	ETHYLENE DIBROMIDE	ND	1.
76-13-1	FREON-TF	4.	1.
119-78-6	2-HEXANONE	ND	5.
75-09-2	METHYLENE CHLORIDE	ND	5.
108-10-1	4-METHYL-2-PENTANONE (MIBK)	ND	5.
100-42-5	STYRENE	ND	1.
79-34-5	1,1,2,2-TETRACHLOROETHANE	ND	1.
127-18-4	TETRACHLOROETHYLENE	ND	1.
109-99-9	TETRAHYDROFURAN	ND	5.
108-88-3	TOLUENE	ND	1.
71-55-6	1,1,1-TRICHLOROETHANE	ND	1.
79-00-5	1,1,2-TRICHLOROETHANE	ND	1.
79-01-6	TRICHLOROETHYLENE	ND	1.
75-69-4	TRICHLOROFLUOROMETHANE	ND	1.
108-05-4	VINYL ACETATE	ND	5.
75-01-4	VINYL CHLORIDE	ND	5.
95-47-6	TOTAL XYLENES	ND	1.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-12S-1A
WCAS JOB #: 13882

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS

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.

1-533,408

Woodward-Clyde Consultants

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: —

PAGE 2 OF 3

DATE 8/23/89

PROJECT NAME: Douglas Aircraft Co. (CG)

PROJECT NO.: 8941863J - TASK 1

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required*
WCC-5S-2A	WCC-5S	WATER	BAILER	40 ml VOA	ICE	NONE	
WCC-5S-2B							
WCC-5S-2C				4 oz. glass			
WCC-5S-2R				40 ml VOA			
WCC-5S-2S							
WCC-7S-2A	WCC-7S						
WCC-7S-2B							
WCC-7S-2C				4 oz. glass			
WCC-7S-2R				40 ml VOA			
WCC-7S-2S							
WCC-8S-2A	WCC-8S						
WCC-8S-2B							
WCC-8S-2C				4 oz. glass			
WCC-8S-2R				40 ml VOA			
WCC-8S-2S							
WCC-10S-2A	WCC-10S						
WCC-10S-2B							
WCC-10S-2C				4 oz. glass			
WCC-10S-2R				40 ml VOA			
WCC-10S-2S							

Total Number of Samples Shipped:

Sampler's Signature: [signature]

Relinquished By:	Received By:	Date / Time
Signature: [signature]	Signature: [signature]	Date: 8/24/89
Printed Name: Peter Glaesman	Printed Name: [illegible]	Time: 8:47
Company: WCC	Company:	
Reason: for delivery to WCAS		
Signature: [signature]	Signature: Mary Cederwall	Date: 8/24/89
Printed Name: [illegible]	Printed Name: Cederwall	Time: 11:06A
Company: [illegible]	Company: WCAS	
Reason: [illegible]		
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		
Signature:	Signature:	Date: / /
Printed Name:	Printed Name:	Time:
Company:	Company:	
Reason:		

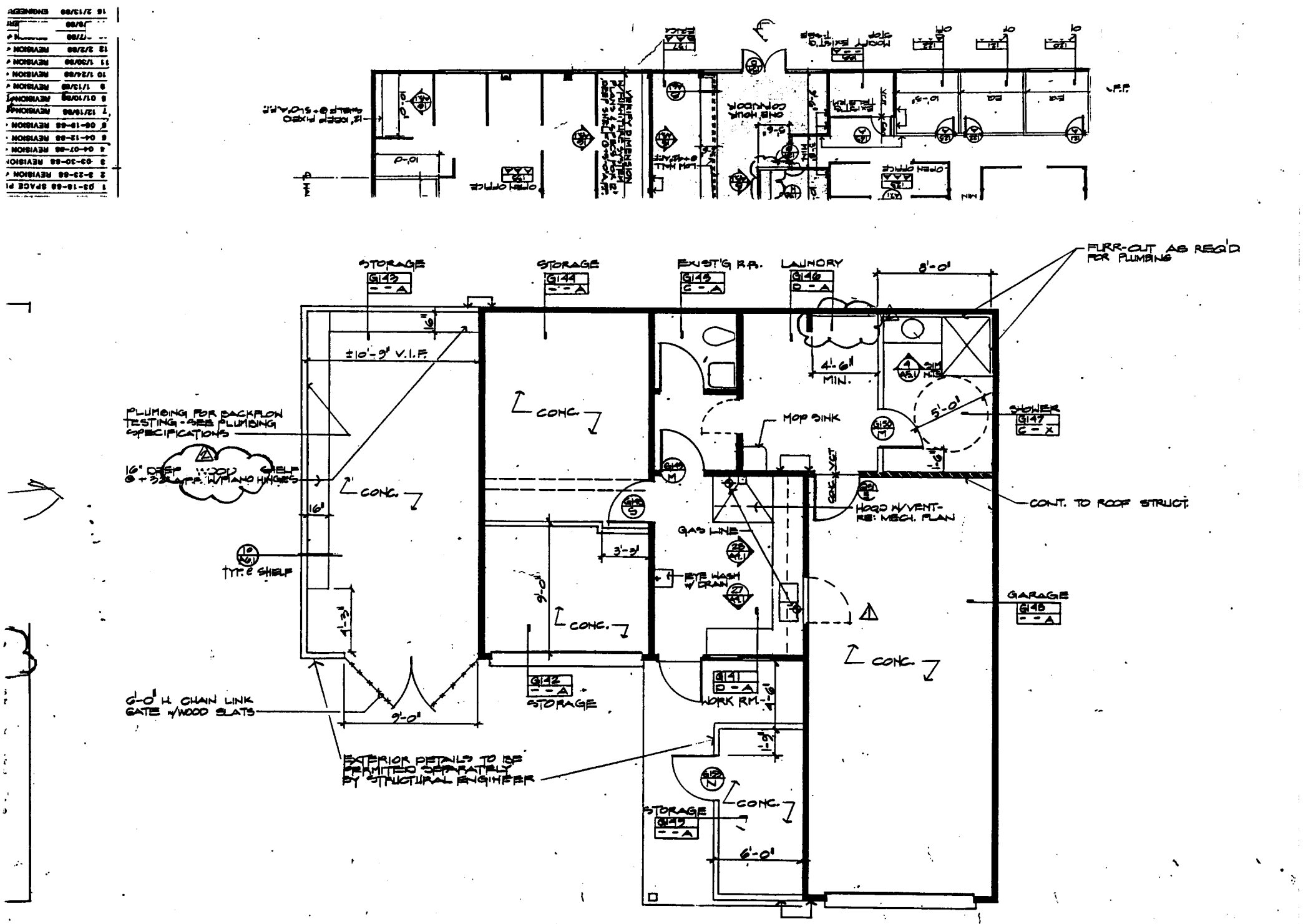
Special Shipment / Handling / Storage Requirements:

13533

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

LA/OR-0183-421

BOE-C6-0071499



BOE-C6-0071500

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-4S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	UNIDENTIFIED COMPOUND	VOA	300.

WCAS

DEPTH (feet)	DESCRIPTION	LITHOLOGIC LOG	WELL COMPLETION LOG	SAMPLES No	Type	Blow Count	O.V.A. (ppm) Head-Space	Back-Ground	Drilling Rate (Time)	REMARKS
	(continued) Dark yellowish brown, SILTY fine grained SAND (SM).									
40									1416	
45	Dark yellowish brown, SILTY CLAY (CL).									
	Dark yellowish brown, SILTY fine grained SAND (SM).									Loosing a lot of drilling MUD.
50									1427	
55	Olive brown, medium gnrained SAND (SP-SM), with small gravel and shell fragments.									
60									1500	
65	Dark yellowish brown, SILTY CLAY (CL), micaceous.									
	Yellowish brown, fine grained SAND (SP-SM), with small diam. gravel and shell fragments.									
70									1517	

LOG OF BORING WCC-1D

Fig. B-4

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-3S-2A
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	UNIDENTIFIED COMPOUND	VOA	10000.

WCAS

TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT: WOODWARD-CLYDE CONSULTANTS SAMPLE: WCC-3S-2R
WCAS JOB #: 13533

UNITS: UG/L (PPB)

	COMPOUND NAME	FRACTION	APPROXIMATE CONCENTRATION
1	NONE FOUND	VOA	

WCAS