INTERIM SC
SOIL
GW
JS

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PACIFIC TESTING LABORATORIES

TACOMA DIVISION
2402 Pacific Highway East
Tacoma, WA 98424
(206) 922-9299
FAX (206) 922-1512

EXECUTIVE OFFICES
3220 - 17th Avenue West
Seattle, WA 98119-1790
(206) 282-0666
FAX (206) 282-0710

EASTSIDE DIVISION
18939 - 120th Avenue N.E. Suite 107
Bothell, WA 98011
(206) 451-8436
FAX (206) 485-4611

August 1, 1991
Certificate No. 9101-7240.1

Mr. ~~John P. Pieroth, Jr.~~ GARY A. LANE
SIGNAL EQUIPMENT, INC.
1936 Fairview Avenue East
Seattle, Washington 98102

Subject: Site Characterization and Results of Soil Contamination Testing,
836 Poplar Place South, Seattle, Washington 98144
Investigation dates: July 15 and 16, 1991.

Dear Mr. Pieroth:

As requested and agreed, Pacific Testing Laboratories has completed the above task and subject investigation. Enclosed is our report.

This report is provided for the information of the client only. The reproduction of this report by any method and its transmittal by any means to a third party, without the written permission of Pacific Testing Laboratories is prohibited.

If you have any questions, please contact us at (206) 282-0666.

Prepared by: Bob Hay, Environmental Engineer BH

Sincerely,

Robert Allen Bartlett

Robert A. Bartlett, Manager
Chemistry Department

RAB/laj

Enclosure

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JAN 10 1992
DEPT. OF ECOLOGY

MR. JOHN P. PIEROTH, JR.

SIGNAL EQUIPMENT, INC.

1936 FAIRVIEW AVENUE EAST

SEATTLE, WASHINGTON 98102

SITE CHARACTERIZATION AND

RESULTS OF SOIL CONTAMINATION TESTING

838 POPLAR PLACE SOUTH

SEATTLE, WASHINGTON 98144

INVESTIGATION DATES: JULY 15 AND 16, 1991

PACIFIC TESTING LABORATORIES

3220 17TH AVENUE WEST

SEATTLE, WASHINGTON 98119

AUGUST 1, 1991

CERTIFICATE NO. 9101-7240.1

Prepared by: _____
Bob Hay, Environmental Engineer

Reviewed by: _____
Robert A. Bartlett, Manager
Chemistry Department

Approved by: _____

EXECUTIVE SUMMARY

Signal Equipment, Inc. requested Pacific Testing Laboratories to determine the extent of contamination from an on-site Leaking Underground Storage Tank (L.U.S.T.). The tank, located inside the rear lower level of 836 Poplar Place South, Seattle, Washington, was closed in place on July 1, 1991. Previous laboratory analysis from on-site soil sampling indicated a product release from the Underground Storage Tank (U.S.T). Subsequently, site characterization in this case predominately benefits future remedial conjectures.

The task included the collection of environmental media (subsurface soil and groundwater) from pre-determined locations. Seven sampling locations were advanced in addition to the three earlier on-site locations. Refer to Pacific Testing Laboratories In-place Tank Closure and Results of Soil Contaminant Testing report no. 9101-7240, dated July 10, 1991, for the subject site.

The chemical analysis of both subsurface soil and groundwater collected on July 15, 16, And 17, 1991, for this report indicated limited off-site migration of petroleum contamination. The analytical results for subsurface soils and groundwater are presented in Table 1-1 and 1-2 respectively. Use Figure No. 1 to identify the sampling locations and numbers in conjunction with the tables. Three of the twenty samples taken to prepare this report have test results greater than the minimum "Clean-up Standards" as set forth by the Washington State Department of Ecology.

FIELD SAMPLING

Environmental subsurface soil samples were collected on July 15, 16 and 17, 1991, from seven on-site locations (see Figure 1) by Pacific Testing Laboratories personnel. Each borehole was advanced by a truck-mounted drill rig employing hollow stem auger flights for the placement of split sample tubes. Concrete coring and sawing operations for borehole nos. 5 and 6 were conducted before drilling efforts.

The depth to groundwater and soil characteristics of each borehole is indicated in the borehole logs (see Appendix A). The top and bottom two inches of soil in the split spoon sample barrel was discarded before sample collection. Groundwater samples were obtained by open end sampling methods. Borehole logging and sampling data was recorded by Pacific Testing Laboratories Environmental Engineer in accordance with ASTM D-1586. Sampling appurtenances were decontaminated with detergent and water to prevent cross-contamination between sampling points.

The location of sampling points for subsurface soils and groundwater are shown on Figure 1. After sample completion at each location, the borehole was backfilled with granular bentonite and finished to match the surface with concrete mix where applicable. Analytical lab results from these sample locations are depicted in Table 1-1 and 1-2.

An Industrial Scientific Model HMX271 hydrogen sulfide, combustible gas and oxygen monitor (S/N 0907030-043) was utilized during all field exercises to preclude extenuating impacts. Petroleum hydrocarbon vapors were evident during sampling efforts at borehole nos. 4, 6, and 7.

SOIL AND GROUNDWATER ANALYSIS

Soil and groundwater samples collected during the sampling efforts were placed in precleaned I-Chem bottles and stored at a temperature of 4°C ± 2°C until analyzed. Each soil and water sample was analyzed for Total Petroleum Hydrocarbons (TPH), EPA Method 418.1 and Benzene, Toluene, Ethyl Benzene, Xylenes (BTEX) EPA Method 8020. The analytical results are presented in Tables 1-1 and 1-2.

The samples were analyzed on July 17, 1991, and July 18, 1991. Chemical analysis for TPH parameters were accomplished by using a Perkin Elmer 1600 Series FTIR (S/N 135991). BTEX content analysis was determined by using a Hewlett-Packard 5890A Gas Chromatograph (S/N 2429 A 03040).

The analysis of soil Sample No. 12 and groundwater Sample No. 13 and 22 exceed soil and groundwater action levels for confirmed release indicator constituents, as stated in Chapter 173-340 WAC and Chapter 173-200 WAC. See Tables 1-1, 1-2, and 1-3.

CONCLUSION/RECOMMENDATIONS

Completion of site characterization Phase I results signifies the site requires further action. Analytical results for subsurface soils and groundwater samples submitted identify petroleum hydrocarbons contamination of these medias. The extent of site contamination appears limited to areas surrounding the former underground storage tank, however, groundwater contamination exceeds the eastern property boundary.

A firm specializing in on-site remediation engineering is recommended to perform/propose the actual feasibility and treatment alternatives at this site.

END OF REPORT TEXT

SIGNAL EQUIPMENT, INC.
Certificate No. 9101-7240.1

Table 1-1. Summary of Subsurface Soil Results*
Signal Equipment, Inc.
Analyzed July 15 and 16, 1991

Sample No.	Borehole No.	Depth (feet)	Benzene	Toluene	Ethyl Benzene	Total Xylene	Total Petroleum Hydrocarbons
7	3	---	--	--	--	--	--
8	3	---	--	--	--	--	--
9	3	---	--	--	--	--	--
11	4	---	0.20	--	--	--	22.02
12	4	---	1.09	--	--	3.90	21.51
14	5	---	--	--	--	--	--
15	5	---	--	--	--	--	--
17	6	---	--	--	--	--	--
18	6	---	--	--	--	--	--
20	7	---	--	--	--	--	--
21	7	---	--	--	--	--	--
23	8	---	--	--	--	--	--
25	9	---	--	--	--	--	--

-- Analyzed for but not detected above limits
* Results are in ppm

Table 1-2. Summary of Groundwater Analysis*
Signal Equipment, Inc.
Analyzed July 1, 1991

Sample Number	Borehole Number	Benzene	Toluene	Ethyl Benzene	Total Xylene	Total Petroleum Hydrocarbons
10	3	--	--	--	--	---
13	4	950.0	21,140.0	2,490.0	12,080.0	85,610.0
16	5	--	--	--	--	---
19	6	--	--	--	--	---
22	7	24,760.0	--	25,950.0	7,800.0	90,490.0
24	8	--	--	--	--	---
26	9	--	--	--	--	---

-- Analyzed for but not detected above limits
* Results are in ppb

Table 1-3. Action Levels for Petroleum Releases

Indicator Constituent	Groundwater Action Level	Soil Action Level
Benzene	1 ppb	0.5 ppm
Toluene	40 ppb	40.0 ppm
Ethyl Benzene	30 ppb	20.0 ppm
Xylene	20 ppb	20.0 ppm
TPH - Gasoline	1,000 ppb	100.0 ppm

Note: ppb = part per billion; ppm = part per million

See Figure 1 for sample locations.

APPENDIX A

PACIFIC TESTING LABORATORIES

EXECUTIVE OFFICES
3220 - 17th Avenue West
Seattle, WA 98119
(206) 282-0666
Fax (206) 282-0710

[illegible] DIVISION
240[illegible] Highway East
Tacoma, WA 98424
(206) 922-9299
Fax (206) 922-1512

Description Signal Equipment Borehole Locations

Cert. No. 9101-7[illegible] Dept. CHEMISTRY
Calculated by _____ Date _____
Checked by RAB Date 8/2/91
Scale NOT TO SCALE Sheet _____ of _____

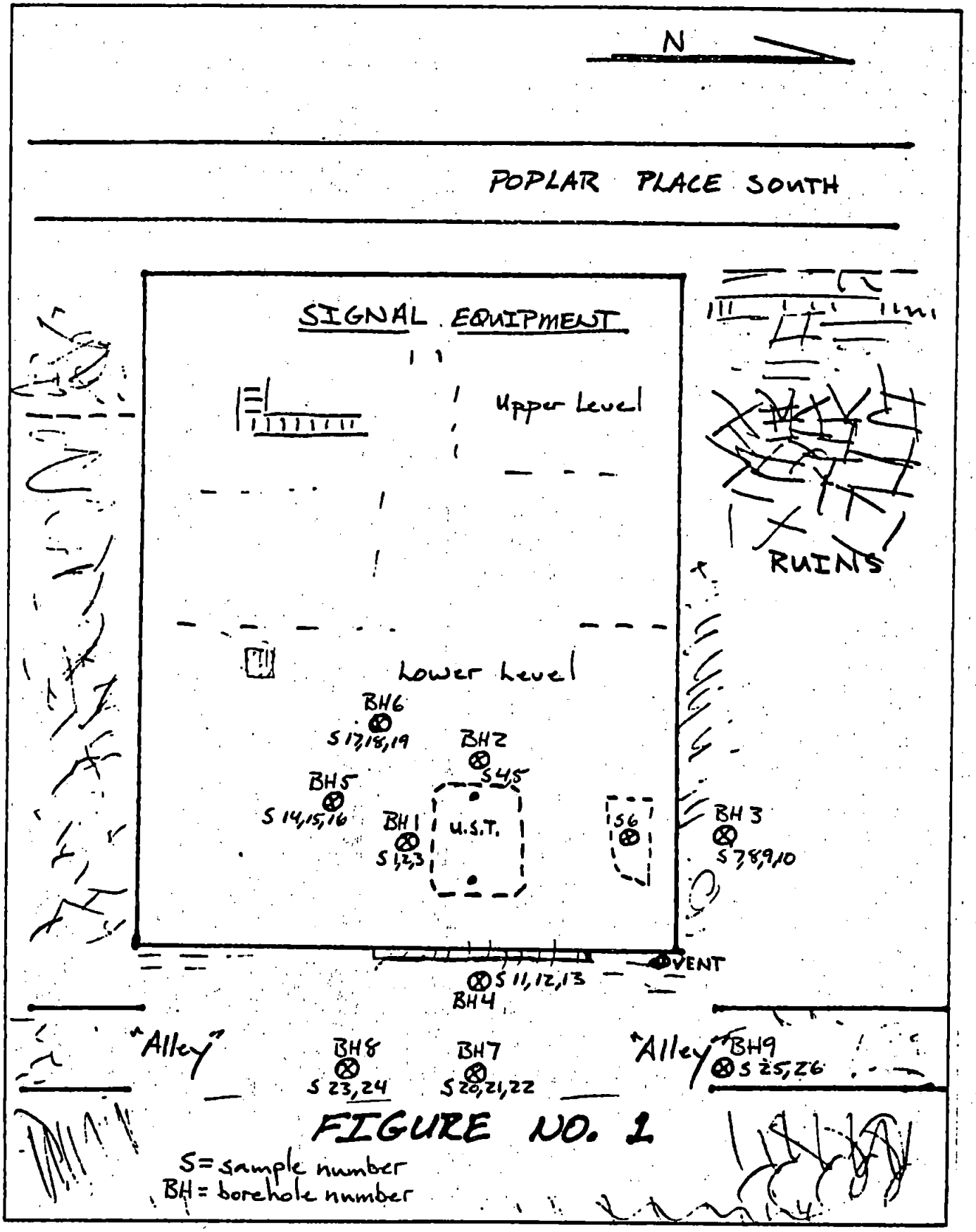


FIGURE NO. 1

S = sample number
BH = borehole number

LOG OF TEST BORING

BORING 3

PROJECT: SIGNAL
LOCATION: POPLAR PLACE
DRILL METHOD: AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay
CAVING: N/A

Cert. No.: 91017240
START: 7-15-91
FINISH: 7-15-91
BORING NO: 3
ELEVATION:
SCALE: 2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0				NO DETECTABLE READING
2.5	1/6, 5/6, 5/6		SAND AND SILT WITH BLUE CLAY	SAMPLE #7
5				
7.5	8/6, 3/6, 2/6		FINE SANDS, GREEN CLAY, PLASTICITY 25% MOIST	SAMPLE #8
10				
12.5	1/6, 11/6, 11/6		GREEN MOIST SAND AND SILT 12-FT CAVE-IN	SAMPLE #9
15	Water Checked AUGER			
	Boring continues			

TOTAL DEPTH - 17 FEET

Figure Number 1

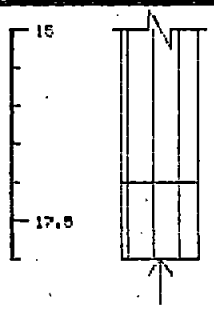
PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING 3

PROJECT: SIGNAL
LOCATION:POPLAR PLACE
DRILL METHOD:AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay
CAVING:N/A

Cert. No.:91017240
START:7-15-91
FINISH:7-15-91
BORING NO:3
ELEVATION:
SCALE:2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
15				
17.5			DOWN 17 FT AND BACKED OUT 1 LETER SAMPLE	SAMPLE #10

TOTAL DEPTH - 17 FEET

Figure Number 2

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING 4

PROJECT: SIGNAL
LOCATION: POPLAR PLACE
DRILL METHOD: AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay
CAVING: N/A

Cert. No.: 91017240
START: 7-15-91
FINISH: 7-15-91
BORING NO: 4
ELEVATION:
SCALE: 2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0				
2.5	2/6 2/6 1/6		UP END PEA GRAVEL, LOW END COMPACT SAND & SILT - NOTICEABLE PROD ODOR.	SAMPLE #11 LEL 5%
5				
7.5	3/6 5/6 2/6		SAND AND SILT FREE PRODUCT	SAMPLE #12 LEL 8%
10				
12.5			WATER NOTICEABLE FREE PRODUCT	SAMPLE #13
15 Water Checked AUGER				

Figure Number 3

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING 5

PROJECT: SIGNAL
LOCATION:POPLAR PLACE
DRILL METHOD:AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay 2.5
CAVING:N/A

Cert. No.:91017240
START:7-15-91
FINISH:7-15-91
BORING NO:5
ELEVATION:
SCALE:2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0				
2.5	6/6 4/6 3/6		NO SAMPLE PEA GRAVEL	
5				
7.5	4/6 7/6 9/6		BLUE CLAY AND SILTY SANDS	SAMPLE #14
10				
12.5	5/6 8/6 12/6		SAND AND SILTY SOIL	SAMPLE #15
15				

Water Checked AUGER
Boring continues

TOTAL DEPTH - 15 FEET

Figure Number 4

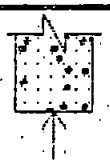
PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING 5

PROJECT: SIGNAL
LOCATION:POPLAR PLACE
DRILL METHOD:AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay
CAVING:N/A

Cert. No.:91017240
START:7-15-91
FINISH:7-15-91
BORING NO:5
ELEVATION:
SCALE:2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
15			WATER NO SIGN OF FREE PRODUCT	SAMPLE #16

TOTAL DEPTH - 15 FEET

Figure Number 5

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING 6

PROJECT: SIGNAL
LOCATION: POPLAR PLACE
DRILL METHOD: AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay
CAVING: N/A

Cert. No.: 91017240
START: 7-15-91
FINISH: 7-15-91
BORING NO: 6
ELEVATION:
SCALE: 2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0				
2.5	4/6 5/6 5/6		DARK SANDS AND SILTS PRODUCT ODOR	SAMPLE #17 LEL 9.5%
5				
7.5	5/6 6/6 7/6		BLUE CLAY AND SAND	SAMPLE #18
10				
			WATER	SAMPLE #19
12.5				
15				

Water Checked AUGER

TOTAL DEPTH - 15 FEET

Figure Number 6

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING 7

PROJECT: SIGNAL
LOCATION: POPLAR PLACE
DRILL METHOD: AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay
CAVING: N/A

Cert. No.: 91017240
START: 7-15-91
FINISH: 7-15-91
BORING NO: 7
ELEVATION:
SCALE: 2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0				
2.5	3/6 4/6 4/6		SAND AND SILT MIXTURE WITH BLUE CLAY	SAMPLE #20
5				
7.5	2/6 1/6 2/6		BLUE CLAY AND SAND	SAMPLE #21 5% LEL
10				
			WATER FREE PRODUCT	SAMPLE #22
12.5				
15				

Water Checked AUGER

TOTAL DEPTH - 15 FEET

Figure Number 7

PACIFIC TESTING LABORATORIES

LOG OF TEST BORING

BORING 9

PROJECT: SIGNAL
LOCATION:POPLAR PLACE
DRILL METHOD:AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay 2.5
CAVING:N/A

Cert. No.:91017240
START:7-15-91
FINISH:7-15-91
BORING NO:9
ELEVATION:
SCALE:2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
0				
2.5				
5				
7.5	2/6 3/6 3/6		PEA GRAVEL, TOP 7" BLUE CLAY AND SAND. PROD ODOR.	SAMPLE #25
10			WATER	SAMPLE #26
12.5				
15	Water Checked AUGER			

TOTAL DEPTH - 15 FEET

Figure Number 9

PACIFIC TESTING LABORATORIES

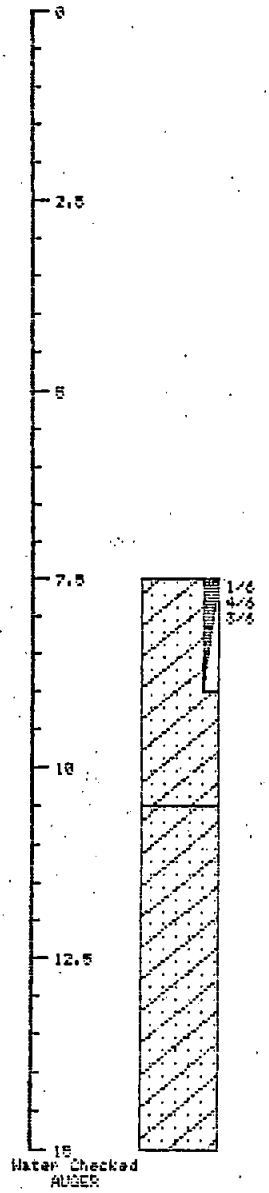
LOG OF TEST BORING

BORING 8

PROJECT: SIGNAL
LOCATION: POPLAR PLACE
DRILL METHOD: AUGER
GROUND WATER DEPTH:
ENGINEER: Bob Hay
CAVING: N/A

Cert. No.: 91017240
START: 7-15-91
FINISH: 7-15-91
BORING NO: 8
ELEVATION:
SCALE: 2 feet per inch

ELEV / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Description	Remarks
7.5	1/6 4/6 3/6		BLUE CLAY AND SAND	SAMPLE #23
10			WATER	SAMPLE #24



TOTAL DEPTH - 15 FEET

Figure Number 8

PACIFIC TESTING LABORATORIES