CLEAN

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NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

WELL DECOMMISSIONING PLAN: 1943-1956
DISPOSAL AREA AND WEST BEACH LANDFILL

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1.0 INTRODUCTION

The objective of this project is to decommission existing ground-water monitoring wells at the 1943-1956 Disposal Area and the West Beach Landfill, Naval Air Station, Alameda, California (NAS Alameda). This report presents a hydrogeological assessment of the site, and the technical approach to decommission ground-water monitoring wells. A health and safety plan under separate cover.

1.1 BACKGROUND

NAS Alameda is located at the west end of Alameda Island, in Alameda County, California. Alameda Island lies along the eastern side of San Francisco Bay, adjacent to the city of Oakland (Figure 1). NAS Alameda occupies 2,634 acres and is approximately 2 miles long and 1 mile wide. Most of the eastern portion of the air station is developed with offices and industrial facilities, while runways and support facilities occupy its western end.

Originally a peninsula, the land that is now Alameda Island was isolated from the mainland in 1876 when a channel was cut through the peninsula's isthmus linking San Leandro Bay with the main portion of San Francisco Bay. Dredging was conducted to deepen the canal and allow commercial and industrial traffic to and from the island's early industrial sites, which included an oil refinery and a borax processing plant.

The U.S. Army acquired the site from the City of Alameda in 1930 and began construction activities in 1931. In 1936, the U.S. Navy acquired title to the land and began construction of the air station in response to the military buildup in Europe prior to World War II. After the United States entered the war in 1941, more land was acquired adjacent to the air station. Following the end of the war, the Navy returned to its original primary mission of providing facilities and support for fleet aviation activities.

Two areas on the western side of the air station were utilized as landfills, namely the 1943-1956 Disposal Area and the West Beach Landfill (Figure 2). Both of these landfills are inactive. During the late 1970s and early 1980s, various investigations and designs for closure of the landfills were completed by the Navy in response to the requirements of the Regional Water Quality Control Board (RWQCB) and the California Department of Health Services (DHS). Contaminants, including petroleum hydrocarbons and heavy metals, were identified in ground water and soil within the landfills.

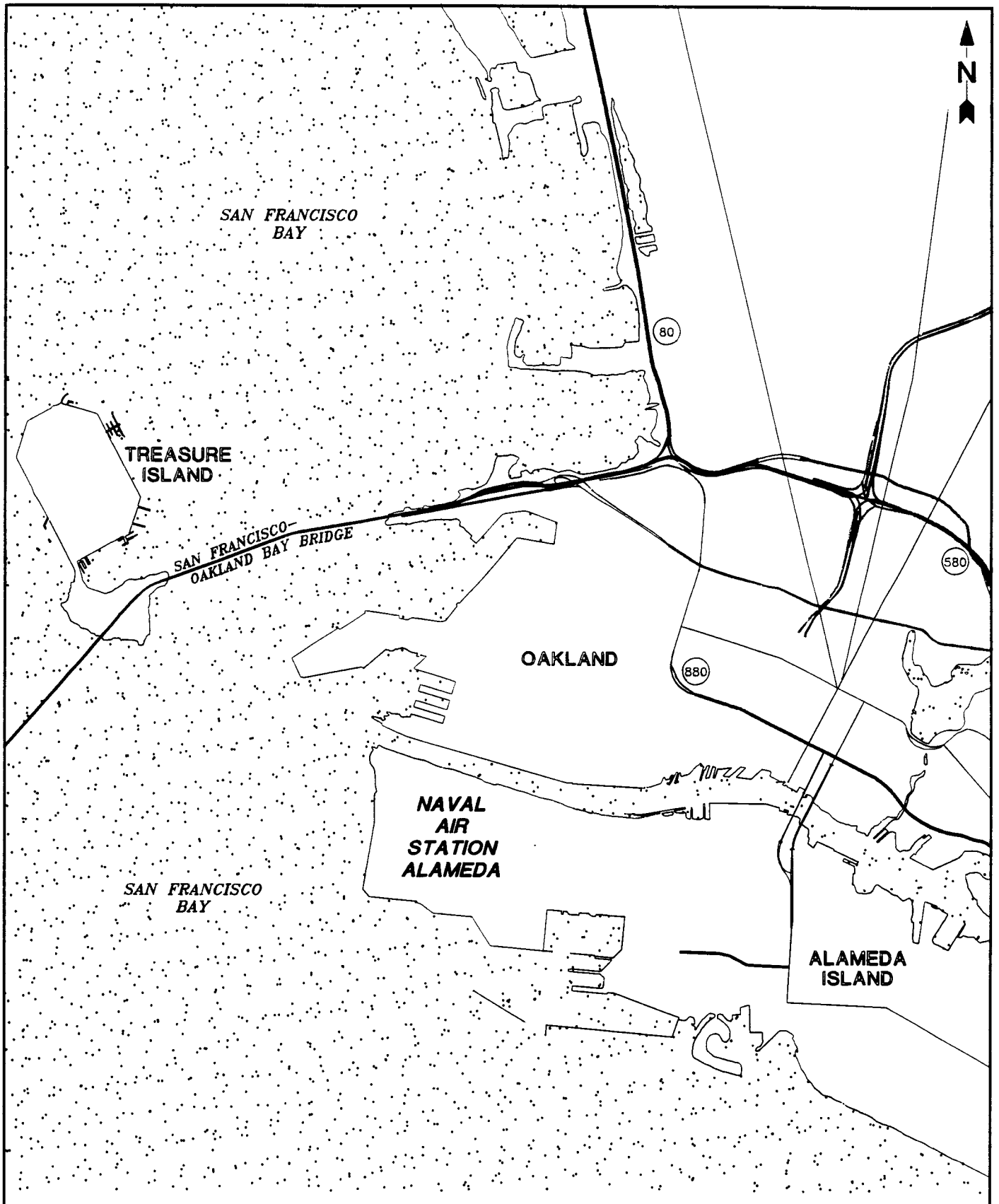
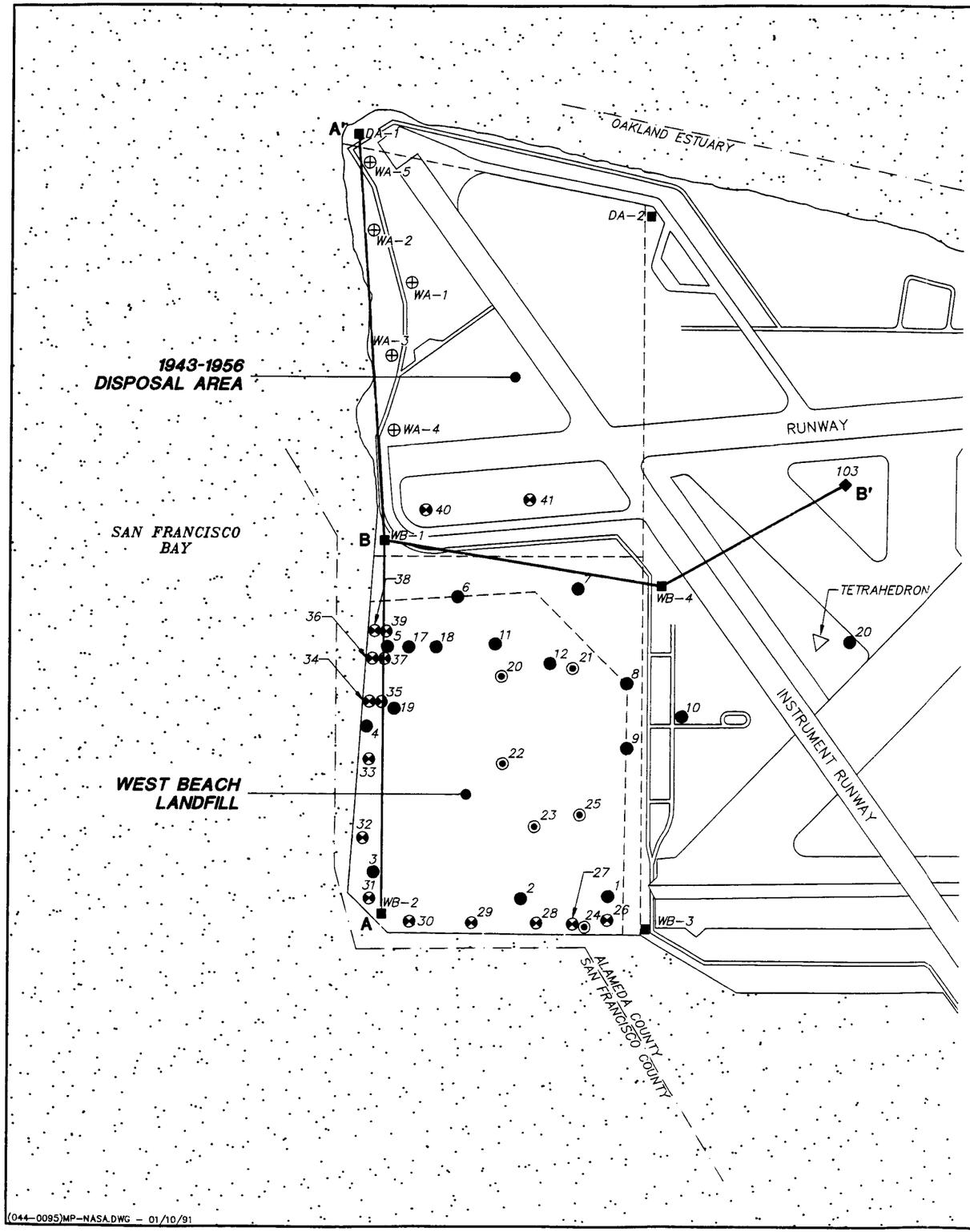


FIGURE 1

SITE LOCATION MAP
NAVAL AIR STATION
ALAMEDA, CALIFORNIA

(044-0095)NASA-LOC.DWG - 10/31/90



N

LEGEND

- ⊕ INSTALLED BY WAHLER ASSOCIATES, 1985
- ● INSTALLED BY HARDING LAWSON, 1976, 1977
- ◉ INSTALLED BY HARDING LAWSON, 1983
- ⊗ NO INFORMATION AVAILABLE

BORINGS DRILLED FOR SWAT, 1989

- ■ DRILLED BY CANONIE ENVIRONMENTAL
- ◆ DRILLED BY J.M. MONTGOMERY

A-A' GEOLOGIC CROSS SECTION (SEE FIGURES 4 AND 5)

0 850' 1700' 2550' 3400'

APPROXIMATE SCALE

FIGURE 2

MONITORING WELL LOCATIONS
1943-1956 DISPOSAL AREA AND
WEST BEACH LANDFILL
NAVAL AIR STATION
ALAMEDA, CALIFORNIA

In September 1983, the RWQCB issued an Order of Closure for the West Beach Landfill, followed in October 1987 by a second order requiring the Navy to perform a Solid Waste Assessment Test (SWAT) at both the West Beach Landfill and the 1943-1956 Disposal Area. The SWAT requirements were incorporated into a remedial investigation/feasibility study (RI/FS) program. This program is currently in progress, and addresses ground-water and soil investigations at 24 different sites within NAS Alameda. Phases 5 and 6 of the RI/FS program specifically address the 1943-1956 Disposal Area and West Beach Landfill.

In September 1990, the DHS requested that existing ground-water monitoring wells at the 1943-1956 Disposal Area and the West Beach Landfill be sampled prior to the RI/FS study. Due to the age and poor construction of the existing monitoring wells, the RWQCB would not accept the validity of laboratory analyses of ground-water samples collected from the wells. The DHS subsequently rescinded their original request to sample the existing monitoring wells, but requested that all existing ground-water monitoring wells be decommissioned.

1.2 PURPOSE

The first three sections of this document present background and hydrogeological information to support the selection of an appropriate method to decommission the wells. The last section of this report addresses the well decommissioning method. Four appendices provide boring logs and analytical results of samples from both landfills.

2.0 PREVIOUS INVESTIGATIONS

Previous Investigations at the 1943-1956 Disposal Area and the West Beach Landfill were conducted by four Navy contractors: Harding Lawson Associates (HLA) (1978 and 1983), Ecology and Environment, Inc. (1983), Wahler Associates (1985 and 1986), and Canonie (1990). According to reports prepared by these contractors, monitoring wells were installed only by Wahler Associates and HLA. Descriptions of the monitoring wells at the two areas are described below.

2.1 1943-1956 DISPOSAL AREA

The 1943-1956 Disposal Area was investigated by Wahler Associates in 1984. Five ground-water monitoring wells (WA-1, WA-2, WA-3, WA-4, and WA-5) were installed on the west perimeter of the area (Figure 2). Boring logs are shown in Appendix A, and construction

details are shown in Table 1. From the ground surface to a depth of 3 to 10 feet below the surface, soils were described as fine sand and sandy gravel. Wood chips, rubble, and other fill material were also encountered. Below depths of 3 to 10 feet, to a depth of between 16 and 28 feet below the ground surface, soils were described as fine to medium sand with occasional rubble, shells, or gravel. Flowing sands were frequently encountered in this interval. Underlying this layer, the soils were described as clayey silt to silty clay. All borings were terminated in this layer, which is the Bay mud aquitard, to depths of between 20 to 32 feet below ground surface. Ground water was encountered at a depth of 3 to 5 feet below ground surface, and was apparently unconfined. During the drilling of WA-1, WA-2, and WA-3, organic odors were noticed. High combustible gas readings were also recorded from these borings.

Soil and ground-water samples were collected from the wells and analyzed. Results of the analyses are shown in Appendix B. In summary, the analyses indicate the presence of heavy metals with copper, zinc, and lead at high concentrations. Only lead is above the total threshold limit concentration (TTLC) levels listed in Section 66699, Title 22, California Code of Regulations. Organic analyses show the presence of purgeable aromatics, phthalate esters, and polynuclear aromatic hydrocarbons. The most significant findings include trichloroethylene (TCE), trans-1,2-dichloroethylene, and benzene. Low levels of radiation were also detected.

2.2 WEST BEACH LANDFILL

Harding Lawson Associates initiated a site study at the West Beach Landfill in 1976. Based on past operations, the landfill was divided into three areas designated as Area A, Area B, and Area C (Figure 3). Area A covers approximately 51 acres and received refuse fill from 1958 to 1978. Area B (13 acres) and Area C (46 acres) were diked and used for the disposal of dredge spoil. Area B eventually was used for the disposal of refuse material. Area C, located in the southwestern portion of the landfill, reportedly received no refuse.

In 1976, HLA drilled sixteen soil borings; 13 were converted into ground-water monitoring wells. Four additional wells were installed in 1977 (17GW, 18GW, 19GW, and 20GW), and six wells were installed in 1983 (20GW, 21GW, 22GW, 23GW, 24GW, and 25GW). Locations of the monitoring wells are shown on Figure 2. Borings logs are shown in Appendix C, and construction details of the wells are summarized in Table 2. A total of 26 soil borings were drilled of which 23 were converted into ground-water monitoring wells. (There is no explanation why two monitoring wells are labeled 20GW.) Reportedly, all of these wells have been destroyed

TABLE 1

SUMMARY OF EXISTING MONITORING WELLS AT THE 1943-1956 DISPOSAL AREA

Monitoring Well	Firm	Date Installed	Depth	Drill Method	Csg. Diameter	Type	Fltr. Pack	Bent. Seal[1]	Grout Seal[1]	Water Level[2]
WA-1	Wahler Associates	10/84	25 ft.	HSA	2 in.	PVC	PG	2 ft.	3 ft.	3
WA-2	Wahler Associates	10/84	21 ft.	HSA	2 in.	PVC	PG	2 ft.	4 ft.	6
WA-3	Wahler Associates	10/84	20 ft.	HSA	2 in.	PVC	PG	2 ft.	4 ft.	4
WA-4	Wahler Associates	10/84	32 ft.	HSA	2 in.	PVC	PG	2 ft.	3 ft.	4
WA-5	Wahler Associates	10/84	27 ft.	HSA	2 in.	PVC	PG	2 ft.	2 ft.	5

NOTES:

HSA = 8-inch Hollow-Stem Auger
PVC = Polyvinyl Chloride
PG = Pea Gravel
[1]Estimated
[2]Feet below the top of casing

TABLE 2
SUMMARY OF EXISTING MONITORING WELLS AT THE WEST BEACH LANDFILL

Monitoring Well	Firm	Date Installed	Depth	Drill Method	Csg. Diameter	Type	Fltr. Pack	Bent. Seal	Grout Seal	Water Level[1]
1GW	Harding Lawson	10/76	25	FA	3 in.	Plastic	PG	NR	NR	11
2GW	Harding Lawson	10/76	47	RW	3 in.	Plastic	PG	NR	NR	8
3GW	Harding Lawson	10/76	37	RW	3 in.	Plastic	PG	NR	NR	7
4GW	Harding Lawson	10/76	29	RW	3 in.	Plastic	PG	NR	NR	4
5GW	Harding Lawson	10/76	29	RW	3 in.	Plastic	PG	NR	NR	4
6GW	Harding Lawson	10/76	68	RW	3 in.	Plastic	PG	NR	NR	2
7GW	Harding Lawson	10/76	27	RW	3 in.	Plastic	PG	NR	NR	2
8GW	Harding Lawson	10/76	25	HSA	3 in.	Plastic	PG	NR	NR	7
9GW	Harding Lawson	10/76	25	FA	3 in.	Plastic	PG	NR	NR	6
10GW	Harding Lawson	10/76	26	HSA	3 in.	Plastic	PG	NR	NR	3
11GW	Harding Lawson	10/76	24	FA	3 in.	Plastic	PG	NR	NR	6
12GW	Harding Lawson	10/76	25	FA	3 in.	Plastic	PG	NR	NR	6
13GW	Harding Lawson	11/76	11	HA	NR	NR	NR	NR	NR	1
17GW	Harding Lawson	3/77	30	HSA	3 in.	Plastic	PG	NR	NR	4
18GW	Harding Lawson	3/77	28	HSA	3 in.	Plastic	PG	NR	NR	4
19GW	Harding Lawson	3/77	25	HSA	3 in.	Plastic	PG	NR	NR	3
20GW	Harding Lawson	10/77	10	HA	3 in.	Plastic	PG	NR	NR	7
20GW	Harding Lawson	7/83	32	HSA	2 in.	PVC	Sand	1 ft	1 ft	7
21GW	Harding Lawson	7/83	31	HSA	2 in.	PVC	Sand	1 ft[2]	1 ft	8
22GW	Harding Lawson	7/83	42	HSA	2 in.	PVC	Sand	1 ft[2]	3 ft	8
23GW	Harding Lawson	7/83	37	HSA	2 in.	PVC	Sand	1 ft[2]	2 ft	17
24GW	Harding Lawson	7/83	42	HSA	2 in.	PVC	Sand	1 ft[2]	5 ft	11
25GW	Harding Lawson	7/83	35	HSA	2 in.	PVC	Sand	2 ft[2]	1 ft	12

Notes:
FA = 6-inch Flight Auger
HA = Hand Auger
HSA = 8-inch Hollow-Stem Auger
NR = Not Recorded
PVC = Polyvinyl Chloride
PG = Pea Gravel
RW = 5-inch Rotary Wash

[1]Feet below top of PVC casing

[2]A 6-inch bentonite seal was also placed in the bottom of the boring

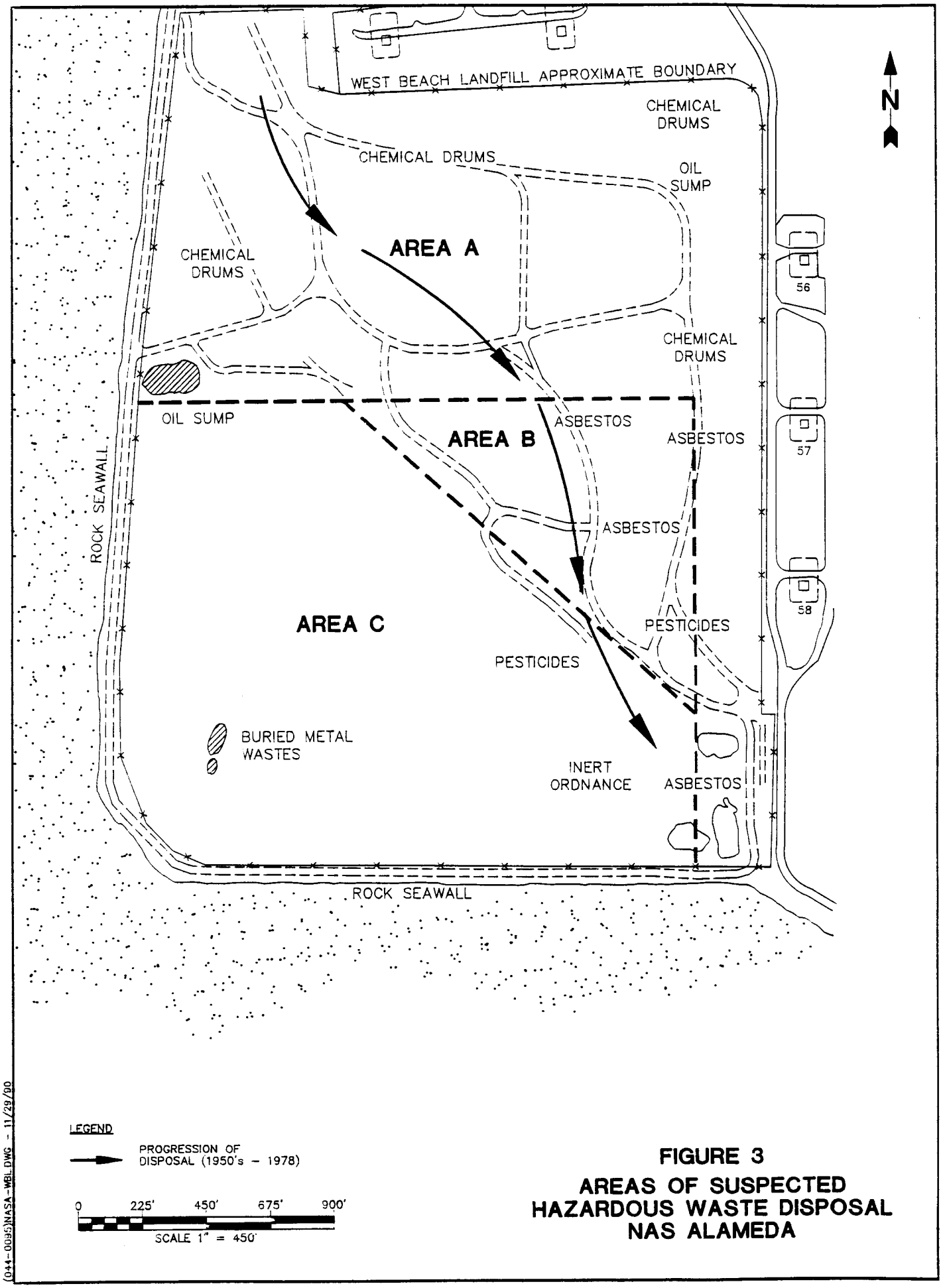


FIGURE 3

AREAS OF SUSPECTED HAZARDOUS WASTE DISPOSAL NAS ALAMEDA

(Wahler Associates 1986). Subsurface soil conditions were described as follows:

Depth Below Ground Surface, feet	Areas A and B
0 - 20	Sand and refuse fill
20 - 50	Soft Bay silt deposit (Bay mud)
	Area C
0 - 5	Bay mud fill (dredge slurry)
5 - 10	Clay and sand fill (dredge slurry)
10 - 30	Sand fill
30 - 50	Soft Bay deposit (Bay mud)

In wells 2GW and 6GW, the Bay mud below the lower sand fill layer extends 44 and 63 feet below ground surface, respectively. Below the Bay mud, firm sandy soil was encountered.

In 1983, ground-water samples were collected from twelve monitoring wells (MWs 3, 8, 9, 17, 18, 19, 20, 21, 22, 23, 24, and 25) and were analyzed for 129 priority pollutants (HLA, 1983). Phenols, oil and grease, and a trace of PCB were identified. Individual heavy metal concentrations were less than 1 part per million for each well sampled. Results of laboratory analyses are shown in Appendix D. It was also discovered that methane was being generated at the landfill and that gas concentrations in some of the borings were at combustible levels.

An additional 16 ground-water monitoring wells (labeled 26 through 41 on Figure 2) were installed along the south, west, and north perimeter of the West Beach Landfill. Information on well construction details, who installed the wells, or dates installed was not available. Based on Canonie's Sampling Plan for the RI/FS study, it is believed that HLA installed these wells. Riser pipes for these wells are visible from the road around the West Beach Landfill.

3.0 HYDROGEOLOGY

A hydrogeological study was conducted by PRC to determine which aquifers were penetrated by the ground-water monitoring wells at the 1943-1956 Disposal Area and the West Beach Landfill. The study was required to determine an appropriate method to decommission the wells. Before this study, the accepted interpretation of the geological conditions underlying the two areas was that the fill material overlies the Bay mud, which in turn overlies the Merritt sand.

The fill material was considered the upper aquifer, the Merritt sand was considered the lower aquifer, and the Bay mud was an aquitard separating the two aquifers.

The study was initiated with a literature search to identify pertinent geologic formations and the general hydrogeologic conditions in the vicinity. The references reviewed included GeoResource 1987, Goldman 1969, and Radbruch 1957. The detailed hydrogeologic conditions underlying the 1943-1956 Disposal Area and the West Beach Landfill were based on boring logs prepared by Canonie and HLA. Results of the study showed that the pertinent formations to consider for well decommissioning include the fill material, various members of the Bay mud formation, and the Merritt sand. For this study, the Posey formation, which underlies the Merritt sand, is considered a part of the Merritt formation and will not be discussed further.

Radbruch (1957) defines the Merritt sand as an orange-brown, fine-grained sand. It was deposited in a nearshore environment as an eolian beach deposit. Boring logs show that the Merritt sand exists on the north and south sides of the study area, but not in the middle (Figures 4 and 5). This indicates that after deposition of the Merritt sand, a river eroded a channel through the sands below the 1943-1956 Disposal Area and the West Beach Landfill. The channel subsequently filled with the Bay mud formation.

The Bay mud formation consists of a layer of soft clay deposited in a marine environment. The soft clay is hereinafter referred to as the Bay mud aquitard. Above and below the Bay mud aquitard are gray, fine-grained, clayey sands interbedded with stiff lenticular clay deposits. Boring logs show that the Bay mud aquitard overlies the Merritt sand where no channel was cut, and overlies gray Bay mud sand where the channel was cut. The Bay mud aquitard pinches out at the west end of the 1943-1956 Disposal Area, and the west and south end of the West Beach Landfill. Underlying the Bay mud formation and the Merritt sand is the San Antonio Formation (lower Bay mud) which is composed mostly of clay.

The Bay mud sand includes clayey sand members that are relatively permeable. Additionally, it is probable that the impermeable Bay mud aquitard, which separates the fill material from the underlying Merritt sand, does not extend continuously across the site. Therefore, it's probable that the "upper aquifer" (fill material) is hydraulically connected to the "lower aquifer" (Merritt sands), as well as the Bay mud sands. Consequently, contamination from the 1943-1956 Disposal Area and the West Beach Landfill may have migrated to ground water in all formations.

An aquifer test, with the pumping well screened in the Merritt sand, will verify the hydraulic connection between the Merritt sand and the fill material. Although an aquifer test is

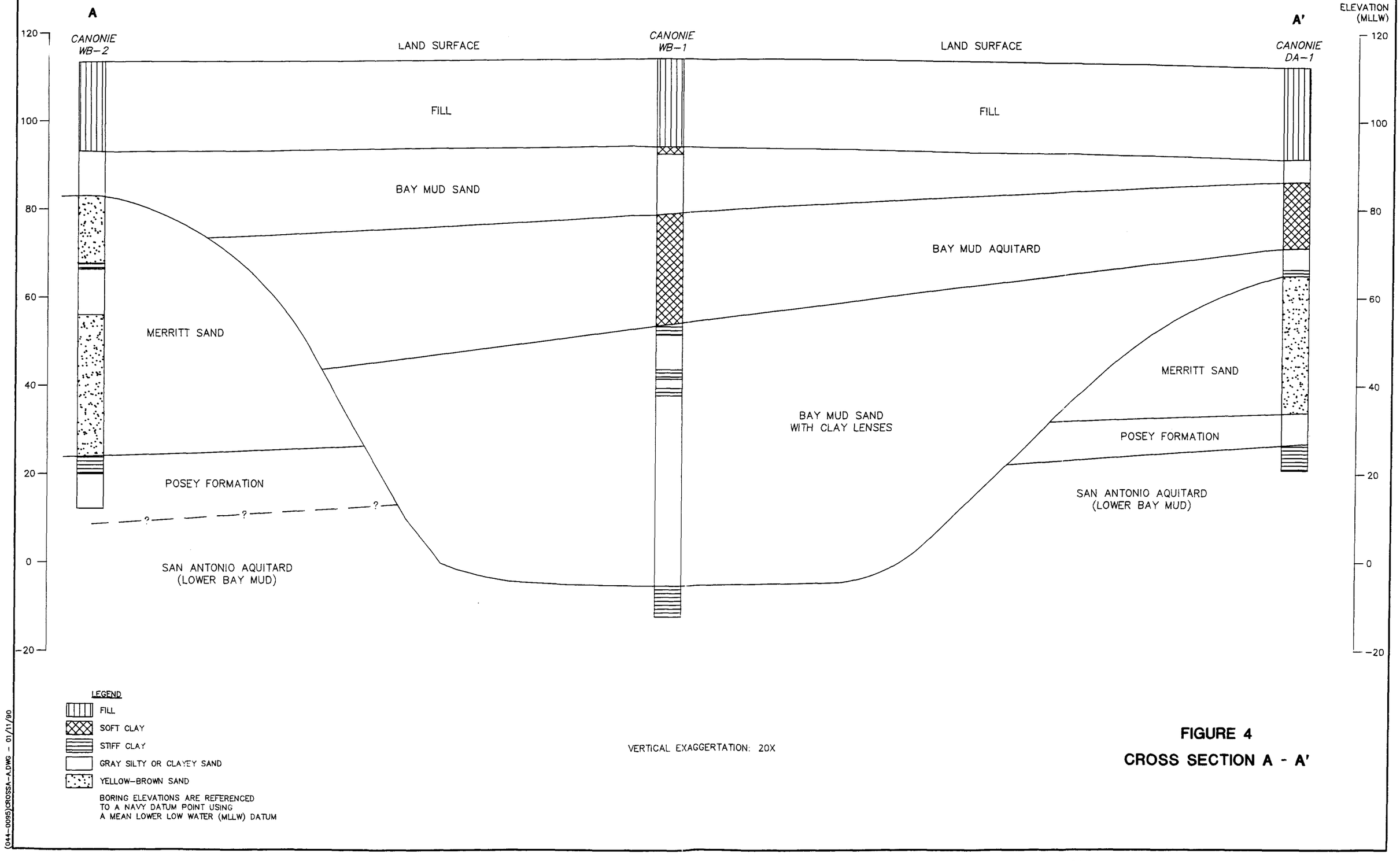
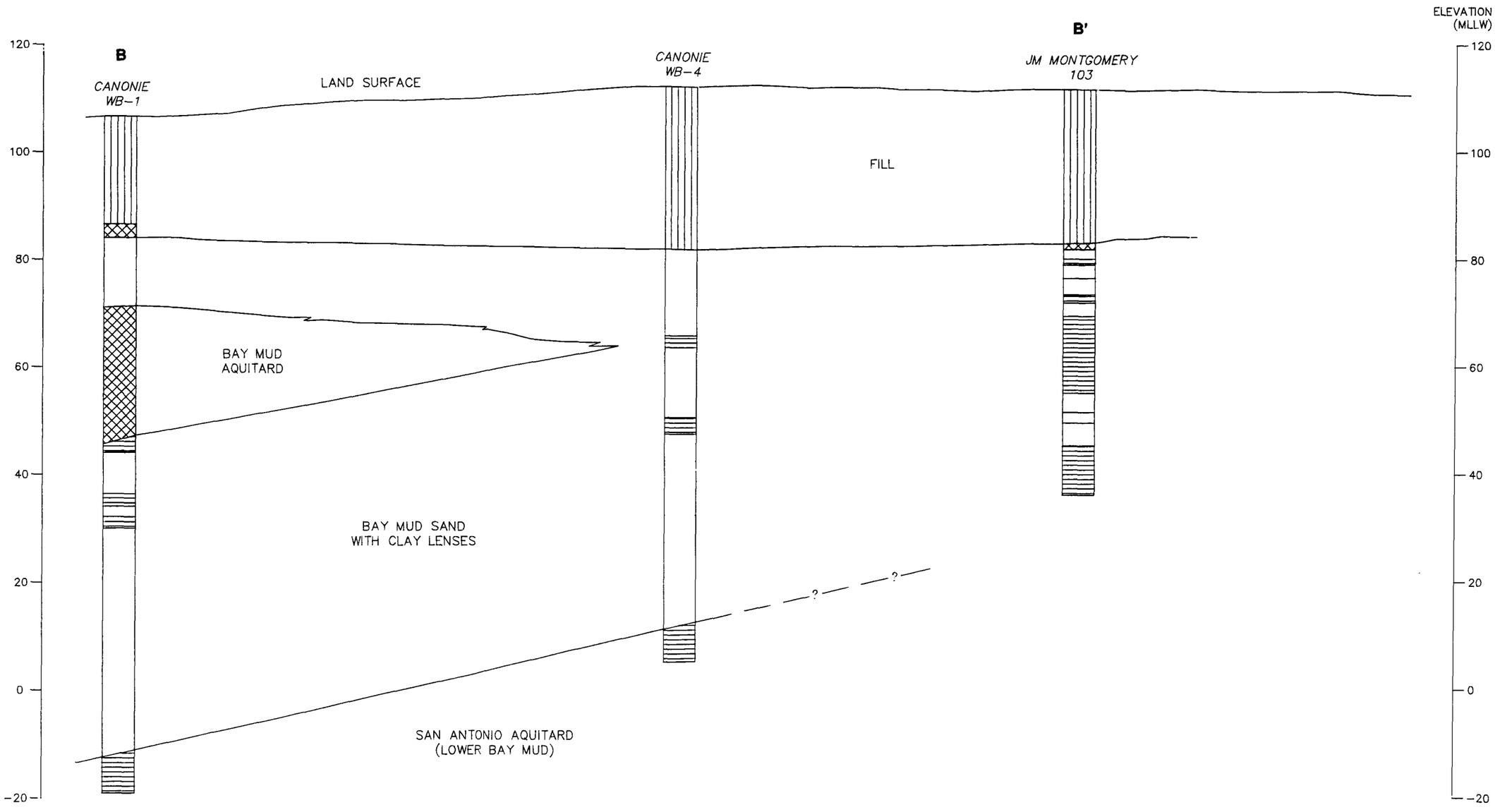


FIGURE 4

CROSS SECTION A - A'

(044-0095)CROSSA-A.DWG - 01/11/90



LEGEND

- FILL
- SOFT CLAY
- STIFF CLAY
- GRAY SILTY OR CLAYEY SAND

BORING ELEVATIONS ARE REFERENCED TO A NAVY DATUM POINT USING A MEAN LOWER LOW WATER (MLLW) DATUM (ELEVATION FOR 103 WAS ASSUMED)

VERTICAL EXAGGERTATION: 20X

FIGURE 5

CROSS SECTION B - B'

(044-0095)CROSSB-B.DWG - 01/11/90

not proposed for this project (CTO 95), more than one aquifer test will be conducted in this area for Phase 5 (CTO 107) of the Remedial Investigation/Feasibility Study.

4.0 PROPOSED WELL DECOMMISSIONING METHOD

Ground-water monitoring wells installed at the 1943-1956 Disposal Area and the West Beach Landfill were field checked before a decommissioning method was specified. All five monitoring wells at the 1943-1956 Disposal Area were located. At the West Beach Landfill only one of the wells installed by HLA was located. That well, located northeast of Instrument Runway, is not labeled, but is believed to be the well installed in 1977 designated as 20GW. Twelve of the 16 wells installed (date unknown) along the perimeter of West Beach Landfill were located. In summary, only 18 ground-water monitoring wells out of the believed existing 44 at both landfills were located. Construction details, based on field observations, are listed in Table 3.

Depth measurements indicate that all of the wells located at the West Beach Landfill penetrate only the fill material. The wells at the 1943-1956 Disposal Area penetrate the upper few feet of the Bay mud aquitard. None of the wells penetrate the Merritt sand, which has been referred to as the lower aquifer. Therefore, the wells that were located are not considered conduits that may enhance the migration of contaminants from an "upper aquifer" to a "lower aquifer."

Based on California Department of Water Resources Bulletin 74-90 (1990) two alternatives for well decommissioning exist. The first is to leave the casing, filter pack, and seal in the boring, puncture the casing where no screen exists, and place sealing material in the well under pressure. The second alternative is to pull the casing and screen, remove the filter pack and annular seal, and fill the boring with appropriate sealing material. The first method is recommended for this project. This recommendation is based on the reasons listed below:

1) There is no advantage in removing the filter pack, PVC screen, PVC casing, and seal. The source of any contamination present is the landfill itself, up to the ground surface. Additionally, the existing ground-water monitoring wells do not provide a vertical conduit for the migration of contaminants from an "upper aquifer" to a "lower aquifer." Removing the well materials and grouting the hole is no more effective in preventing further contamination than perforating the well casing and grouting all well materials in place.

TABLE 3

MONITORING WELL CONSTRUCTION DETAILS

1943 - 1956 Disposal Area

Monitoring Well	Formation Penetrated	Date Installed	Firm	Depth	Drill Method	Csg. Diameter	Type	Filter Pack	Bent. Seal	Grout Seal	Water Level	Date of Measurement
WA-1	Bay mud	10/84	Wahler Associates	25	HSA	2 in.	PVC	PG	2 ft.	3 ft.	5	10/90
WA-2	Bay mud	10/84	Wahler Associates	18	HSA	2 in.	PVC	PG	2 ft.	4 ft.	8	10/90
WA-3	Bay mud	10/84	Wahler Associates	21	HSA	2 in.	PVC	PG	2 ft.	4 ft.	6	10/90
WA-4	Bay mud	10/84	Wahler Associates	29	HSA	2 in.	PVC	PG	2 ft.	3 ft.	5	10/90
WA-5	Bay mud	10/84	Wahler Associates	24	HSA	2 in.	PVC	PG	2 ft.	2 ft.	7	10/90

West Beach Landfill

Monitoring Well	Formation Penetrated	Date	Firm	Depth	Drill Method	Csg. Diameter	Type	Filter Pack	Bent. Seal	Grout Seal	Water Level	Date
20GW	Fill Material	3/77	Harding Lawson	9	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
26	Fill Material	NA	Not Available	15	NA	3 in.	PVC	NA	NSV	NSV	9	10/90
27	Fill Material	NA	Not Available	10	NA	3 in.	PVC	NA	NSV	NSV	9	10/90
28	Fill Material	NA	Not Available	7	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
29	Fill Material	NA	Not Available	9	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
30	Fill Material	NA	Not Available	8	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
31	Fill Material	NA	Not Available	8	NA	3 in.	PVC	NA	NSV	NSV	dry	10/90
34	Fill Material	NA	Not Available	15	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
35	Fill Material	NA	Not Available	15	NA	3 in.	PVC	NA	NSV	NSV	4	10/90
36	Fill Material	NA	Not Available	10	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
37	Fill Material	NA	Not Available	14	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
38	Fill Material	NA	Not Available	11	NA	3 in.	PVC	NA	NSV	NSV	5	10/90
39	Fill Material	NA	Not Available	18	NA	3 in.	PVC	NA	NSV	NSV	6	10/90

Notes:

FA = 6-inch Flight Auger
HSA = 8-inch Hollow-Stem Auger
HA = Hand Auger
NA = Not Available
NSV = No Seal Visible
PG = Pea Gravel
PVC = Polyvinyl Chloride
RW = 5-inch Rotary Wash

Well construction details based on field check in October 1990.

2) It will eliminate the need to dispose of material removed from the wells. Disposing of soil contaminated with heavy metals, infectious wastes, or high concentrations of chlorinated hydrocarbons is becoming increasingly difficult to accomplish. Additionally, transferring contaminated material from one landfill to another landfill is not recommended.

3) Possible exposure of field personnel to hazardous materials and other contaminants will be highly reduced.

It is therefore proposed that all 18 ground-water monitoring wells located at the 1943-1956 Disposal Area and the West Beach Landfill be abandoned by perforating the well casing and pressure grouting all well materials in place with cement-bentonite grout. Different methods to accomplish these tasks are available, all of which are acceptable. The method will be specified by the contractor who performs the work. The method and specifications to be used for well abandonment will be submitted to the DHS for review prior to initiating work.

No ground-water samples or soil samples will be collected before or during well decommissioning. A summary report documenting all field activities, including any problems encountered, will be prepared.

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APPENDIX A

BORING LOGS FROM THE 1943-1956 DISPOSAL AREA

BORING LOCATION Opposite to Ground Electronics Maintenance Division			GROUND EL.
DEPTH/ELEV. WATER 4.5 ft	DRILL CONTRACTOR EXCELTECH-RPM		TOTAL DEPTH 25 ft
DRILL RIG Mobile B-24	BORING DIA. 8" ϕ HA	DATE DRILLED 10/12/84	LOGGED BY JMc/CL

SOIL CLASS.	DESCRIPTION	DEPTH (ft)	SAMPLE NO.	PR / ROD	REC.	MODE	REMARKS
GP	0.0'-3.0' Sandy GRAVEL, angular to rounded gravel to ~2" max. with some minor rubble within top 2", tan/light brown (0-2') to dark brown (2'-3'), moist	0				HA	
SP	3.0'-20.0' Fine to Medium SAND with gravel, brown changing to gray at 4 ft, moist to saturated at 5 ft, mild organic odor at 3 ft.		S-1A S-1B	2/4/6	18"	DR	▽ Minor gas odor at 4 ft; 4% LEL at 5 ft; Minor gas odor
		5	S-2A S-2B	5/3/3	14"	DR	
						HA	
				2/6/16		DR	Auger at 10 ft, stem filled to ~7.5 ft with running sand, PR take in the stem
		10				HA	Poor cutting return throughout interval
				4/2/3		DR	Auger at 15 ft, stem filled to ~13 ft with running sand. PR taken in the stem.
		15					
						HA	
MH-ML	20.0'-25.0' Clayey SILT, some sand, gray, soft, saturated	20					Installed 2" ϕ sch. 40 PVC pipes, (0-5 ft: blank, 5-25 ft: slotted 0.01")
	hole terminated at 25'	25					

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

THIS LOG INDICATES CONDITIONS IN THIS HOLE ONLY ON THE DATE INDICATED AND MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND ON OTHER DATES. ANY WATER LEVELS SHOWN ARE SUBJECT TO VARIATION.

THIS HOLE WAS LOGGED IN SUCH A WAY AS TO PROVIDE DATA PRIMARILY FOR DESIGN PURPOSES AND NOT NECESSARILY FOR THE PURPOSES OF SPECIFIC CONTRACTORS.

THE STRATIFICATION LINES OR DEPTH INTERVALS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES, AND THE TRANSITIONS MAY BE GRADUAL.

SOIL CLASSIFICATIONS SHOWN ON LOGS ARE FIELD CLASSIFICATIONS BASED ON THE UNIFIED SOILS CLASSIFICATION SYSTEM.

Wahler Associates	CONFIRMATION STUDY NAS-ALAMEDA	EXPLORATION BORING LOG	PROJECT NO.	BORING NO WA-1
			SHEET NO.	

BORING LOCATION North End of Skeet Range			GROUND EL.
DEPTH/ELEV. WATER 3 ft ±	DRILL CONTRACTOR EXCELTECH - 12PM		TOTAL DEPTH 21.5 ft
DRILL RIG Mobile B-34	BORING DIA. 8" ϕ HA	DATE DRILLED 10/12/84	LOGGED BY JMc / CL

SOIL CLASS.	DESCRIPTION	DEPTH (ft)	SAMPLE NO.	PR / ROD	REC.	MODE	REMARKS
GP	0.0'–5.0' Sandy GRAVEL, gravel particles are 3/4" to 1 1/2" in size, light brown, some concrete rubble up to 12"x 12"x 3".	0				HA	DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES MAY FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING ADVANCING HOLES.
							▽ ± THIS LOG INDICATES CONDITIONS IN THIS HOLE ONLY ON THE DATE INDICATED AND MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND OTHER DATES. ANY WATER LEVELS SHOWN ARE SUBJECT TO VARIATION.
							THIS HOLE WAS LOGGED IN SUCH A WAY AS TO PROVIDE DATA PRIMARILY FOR DESIGN PURPOSES AND NOT NECESSARILY FOR THE PURPOSES OF SPECIFIC CONTRACTORS.
							THE STRATIFICATION LINES OR DEPTH INTERVALS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES, AND THE TRANSITIONS MAY BE GRADUAL.
							SOIL CLASSIFICATIONS SHOWN ON LOG ARE FIELD CLASSIFICATIONS BASED ON THE UNIFIED SOILS CLASSIFICATION SYSTEM.
SP-GP	5.0'–8.0' Gravelly fine to medium SAND, brown to gray, damp to wet	5	S-1A S-1B	2/4/4	12"	DR	
						HA	
SP	8.0'–19.0' Fine to Medium SAND, blue gray, saturated	10					Moderate petroleum fuel odor Definite oily band on sampler @ 10', oil sheen on spilled water Much milder odor at about 12 ft
	Gray-brown, appeared oxidized						
	Numerous shell fragments to 1/4" at about 15 ft	15		2/5/3		DR	Auger at 15 ft, stem filled to ~10 ft with running sand
						HA	
MH-CH	19.0'–21.5' Clayey SILT, blue gray, saturated, soft, plastic, sometimes dilatant	20		1/1/0		DR	Trace gray clay on bit and plug No fuel smell
	Hole terminated at 20.5' after drilling out the sampled interval						Installed 2" ϕ sch. 40 PVC Threaded; (0–5.5': blank, 5.5'–19.5' slotted, 0.01")

Wahler Associates	CONFIRMATION STUDY NAS-ALAMEDA	EXPLORATION BORING LOG PROJECT NO. [illegible] SHEET NO. 1 OF 1	BORING NO. VA-2

BORING LOCATION By the fence at Party Hut Picnic Ground			GROUND EL.
DEPTH/ELEV. WATER	DRILL CONTRACTOR EXCELTECH - RPM		TOTAL DEPTH 20.0 ft
DRILL RIG Mobile B-34	BORING DIA. 8" ϕ HA	DATE DRILLED 10/15/84	LOGGED BY CL

SOIL CLASS.	DESCRIPTION	DEPTH (ft)	SAMPLE NO.	PR / RQD	REC.	MODE	REMARKS
SM-SP	0.0'-5.0' Fine SAND with wood chips and rubble, Moist, dark gray and black	0				HA	
SP	5.0'- 8.0' Fine to medium SAND with wood chips, rubble, wires, etc., black.	5	S-1	2/2/3	6"	DR	Strong diesel and oil odor
						HA	
SP	8.0'-16.5' Fine to medium SAND, gray, saturated, loose, saturated	10		1/14" and 1/6"		DR	Diesel odor (not as strong as S-1). 8% LEL at 10 ft
						HA	400 ppm at 15 ft
		15		2/1/0		DR	At the last 6" drive, the sampler dropped to about 18 ft
CH-MH	16.5'- 20.0' Silty CLAY, gray, very soft					HA	Sidewall pressure: drive rotation pressure (on 3rd gear) increased from 600 to 715 psi
	Hole terminated at 20 ft	20					Installed 2" ϕ sch.40 PVC pipes, (0-6' blank, 6'-16' slotted, 16'-20' blank)

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

THIS LOG INDICATES CONDITIONS IN THIS HOLE ONLY ON THE DATE INDICATED AND MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND ON OTHER DATES. ANY WATER LEVELS SHOWN ARE SUBJECT TO VARIATION.

THIS HOLE WAS LOGGED IN SUCH A WAY AS TO PROVIDE DATA PRIMARILY FOR DESIGN PURPOSES AND NOT NECESSARILY FOR THE PURPOSES OF SPECIFIC CONTRACTORS.

THE STRATIFICATION LINES OR DEPTH INTERVALS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN MATERIAL TYPES, AND THE TRANSITIONS MAY BE GRADUAL.

SOIL CLASSIFICATIONS SHOWN ON LOGS ARE FIELD CLASSIFICATIONS BASED ON THE UNIFIED SOILS CLASSIFICATION SYSTEM.

Wahler Associates	CONFIRMATION STUDY NAS-ALAMEDA	EXPLORATION BORING LOG	PROJECT NO.	BORING NO WA-3
			SHEET NO. 1 OF 1	

BORING LOCATION: West End of Runway 7, Northwestern Corner			GROUND EL.
DEPTH/ELEV. WATER: 4 ft	DRILL CONTRACTOR: EXCELTECH-RDM		TOTAL DEPTH: 31.5 ft
DRILL RIG: Mobile B-24	BORING DIA.: 8" Φ HA	DATE DRILLED: 10/17/84	LOGGED BY: CL

SOIL CLASS.	DESCRIPTION	DEPTH (ft)	SAMPLE NO.	PR / RQD	REC.	MODE	REMARKS
GP-GC	0.0'-4.0' Gravelly fine SAND, some silt and clay, dark brown, moist, gravel to ~2" max., some rubble and roots	0				HA	
							▽
SP	4.0'-14.0' Fine to medium SAND, some gravel, brown, moist. Became saturated at ~5 feet.	5	S-1	7/2/10	18"	DR	No noticeable odor
						HA	
		10		3/5/6		DR	
						HA	
SM-SP	14.0'-28.0' Fine to medium SAND, some silt, trace gravel, dark gray, saturated. No noticeable odor. (Gas meter did not register any reading)	15				DR	Much water came out with cutting during drilling. Could not get sample at this depth. Drillers could not get the plug out because of running sand. Water was poured into the stem and driven through.
						HA	
		20				DR	Same condition occurred at 20'. No sampling
	More silt and less gravel					HA	
		25					

Wahler Associates	CONFIRMATION STUDY NAS-ALAMEDA	EXPLORATION BORING LOG	BORING NO. WA-4
		PROJECT NO. WA4.1124	SHEET NO. 1 OF 2

BORING LOCATION	West End of Runway 7. Northwestern Corner		GROUND EL.
DEPTH/ELEV. WATER	DRILL CONTRACTOR		TOTAL DEPTH
DRILL RIG	BORING DIA.	DATE DRILLED	LOGGED BY

SOIL CLASS.	DESCRIPTION	DEPTH	SAMPLE NO.	PR / ROD	REC.	MODE	REMARKS
		25				DR	Same condition occurred at 25 ft. No sampling
						HA	
CH	28.0'-31.5' Silty CLAY, trace Sand and shells, gray, Soft.	30		1/1/1		DR	
	Terminated at 31.5 ft						Installed 2" ϕ sch. 4t PVC pipes (0-5': blan 5'-25' slotted, 25'-30': blank). Material kep coming up in the stem Hole was cleaned one more time before bein able to set the tip of the pipe at 30 ft.

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

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THIS HOLE WAS LOGGED IN SUCH A WAY AS TO PROVIDE DATA PRIMARILY FOR DESIGN PURPOSES AND NOT NECESSARILY FOR THE PURPOSES OF SPECIFIC CONTRACTORS.

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BORING LOCATION North End of Runway 13. West side			GROUND EL.
DEPTH/ELEV. WATER 5 ft	DRILL CONTRACTOR		TOTAL DEPTH 26.5 ft
DRILL RIG Mobile B-34	BORING DIA. 2" Ø HA	DATE DRILLED 10/19/84	LOGGED BY CL

SOIL CLASS.	DESCRIPTION	DEPTH	SAMPLE NO.	PR / RQD	REC.	MODE	REMARKS
GP-GM	0.0'–5.0' Silty GRAVEL and SAND, some cobble, rubble, groves, etc., damp, dark brown	0				HA	
		5					▽
GP-GM	5.0'–10.0' Silty GRAVEL and SAND, some cobble, moist to wet, dark brown		S-1A S-1B	12/14/5	18"	DR	Gas meter reading negligible Radiation survey meter reading negligible
						HA	
		10					
GP-GM	10.0'–24.0' Fine to medium SAND, some silt, trace shells and gravel, gray, saturated, loose			2/3/4		DR	Gas meter reading negligible Radiation survey meter reading negligible
						HA	
		15		1/2/4		DR	
						HA	
		20		3/3/5		DR	
						HA	
	(See next sheet)	25					

Wahler Associates	CONFIRMATION STUDY NAS-ALAMEDA	EXPLORATION BORING LOG	BORING NO. WA-5
		PROJECT NO. WA 1112 A	SHEET NO. 1 OF 2

BORING LOCATION	North End of Runway 13, West side		GROUND EL.
DEPTH/ELEV. WATER	DRILL CONTRACTOR		TOTAL DEPTH
DRILL RIG	BORING DIA.	DATE DRILLED	LOGGED BY

SOIL CLASS.	DESCRIPTION	DEPTH	SAMPLE NO.	PR / ROD	REC.	MODE	REMARKS
CH-MH	24.0'-26.5' Silty CLAY, trace Sand, gravel and shells, dark gray, soft	25		1/0/1		DR	
	Hole terminated at 26.5'	30					Installed 2"ϕ Sch. 40 PVC pipes (0-4' blank 4'-24' slotted) The stem was filled with soft material. The hole was cleaned and the tip of the pipe was set at 24'

DATA ON THIS LOG ARE AN APPROXIMATION OF THE GEOLOGIC AND SUBSURFACE CONDITIONS BECAUSE THE INFORMATION WAS OBTAINED FROM INDIRECT, DISCONTINUOUS, AND POSSIBLY DISTURBED SAMPLING NECESSITATED BY USE OF SMALL-DIAMETER HOLES. ROTARY AND WASH BORING HOLES HAVE FURTHER COMPLICATIONS IN THIS REGARD BECAUSE OF THE NEED TO USE DRILLING FLUID AND/OR CASING IN ADVANCING HOLES.

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APPENDIX B

ANALYTICAL RESULTS FROM THE 1943-1956 DISPOSAL AREA

1943-1956 DISPOSAL AREA SOIL AND GROUND WATER TEST RESULTS

Constituent Concentrations, mg/kg = mg/l = ppm, Except as Noted

	Soil Samples - Well Number					Ground Water Samples - Well Number				
	WA-1	WA-2	WA-3	WA-4	WA-5	WA-1	WA-2	WA-3	WA-4	WA-5
Date sampled	10/12/84	10/12/84	10/15/84	10/17/84	10/19/84	1/21/85	1/21/85	1/21/85	1/21/85	1/22/85
Sample depth, feet	6.0-6.5	6.0-6.5	6.0-6.5	6.0-6.5	6.0-6.5	16	17	16	16	15
Screened depth, feet						5-25	6-20	6-16	5-25	4-24
Static water, feet										
depth						3.16	5.73	4.13	3.69	4.47
elevation						107.45	107.06	106.73	106.72	106.99
Combustible gas in casing, as hexane, max. obs.*										
before pumping,						95%	240 ppm	140 ppm	65 ppm	130 ppm
after pumping						100%	5%	12%	125 ppm	185 ppm
pH (no units)	8.8	8.0	7.9	8.4	8.0	7.6	7.6	7.4	7.4	6.7
Electrical conductivity umhos/cm	240	580	330	210	60	1080	3200	11800	7000	750
Gross alpha, pCi/g or l	4.4±3.3	8.0±5.4	0.1±4.8	9.6±7.2	45.7±10.8	7.2±6.6	5.5±10.8	NR	NR	0.4±2.8
Gross beta, pCi/g or l	31.7±4.4	16.1±4.4	10.5±3.3	17.6±4.2	11.2±3.5	69.3±31.6	33.8±57.4	NR	NR	50.4±16.8
Antimony ,Sb	-5.	-5.	-5.	-5.	-5.	-1.	-1.	-1.	-1.	-1.
Arsenic ,As	-5.	-5.	5.3	-5.	9.1	-1.	-1.	-1.	-1.	-1.
Barium ,Ba	80.	49.	250.	13.	57.	-0.5	-0.5	-0.5	-0.5	-0.5
Beryllium ,Be	-0.5	-0.5	-0.5	-0.5	-0.5	-0.05	-0.05	-0.05	-0.05	-0.05
Cadmium ,Cd	24.	1.6	19.	0.65	1.0	-0.1	-0.1	-0.1	-0.1	-0.1
Chromium ,Cr	90.	29.	56.	21.	49.	-0.1	-0.1	-0.1	-0.1	-0.1
Cobalt ,Co	3.8	6.4	8.2	3.7	9.4	-0.1	-0.1	-0.1	-0.1	-0.1
Copper ,Cu	160.	31.	330.	7.8	57.	-0.1	-0.1	-0.1	-0.1	-0.1
Lead ,Pb	1100.	38.	700.	-5.	6.5	-0.1	-0.1	-0.1	-0.1	-0.1
Mercury ,Hg	0.1	0.14	2.3	-0.1	-0.1	-1.	-1.	-1.	-1.	-1.
Molybdenum ,Mo	-10.	-10.	-10.	-10.	-10.	-0.01	-0.01	0.77	-0.01	-0.01
Nickel ,Ni	70.	28.	53.	18.	68.	-0.1	-0.1	-0.1	-0.1	-0.1
Selenium ,Se	-1.	-1.	-1.	-1.	-1.	-0.5	-0.5	-0.5	-0.5	-0.5
Silver ,Ag	-2.	-2.	-2.	-2.	-2.	-0.5	-0.5	-0.5	-0.5	-0.5
Thallium ,Tl	-5.	-5.	-5.	-5.	-5.	-1.	-1.	-1.	-1.	-1.
Vanadium ,V	7.5	22.	17.	14.	21.	-0.5	-0.5	-0.5	-0.5	-0.5
Zinc ,Zn	420.	64.	1800.	16.	49.	0.13	-0.1	-0.1	-0.1	-0.1

CONTINUED ON NEXT PAGE

NOTES: *) Maximum observed reading within the casing - may represent multiple readings at different times or days.
1) "NR" = not reportable because of excessive noise due to high salt content.
2) Metals by inductively-coupled plasma emission spectroscopy, after strong acid digestion ("total metals" basis) of soils.
3) Data reported on a moist-sample-weight (as-received) basis.
4) "-" = "less than"

Continued)

1943-1956 DISPOSAL AREA SOIL AND GROUND WATER TEST RESULTS

Constituent Concentrations, mg/kg = mg/l = ppm, Except as Noted

	Soil Samples - Well Number					Ground Water Samples - Well Number				
	WA-1	WA-2	WA-3	WA-4	WA-5	WA-1	WA-2	WA-3	WA-4	WA-5
Date sampled	10/12/84	10/12/84	10/15/84	10/17/84	10/19/84	1/21/85	1/21/85	1/21/85	1/21/85	1/22/85
Sample depth, feet	6.0-6.5	6.0-6.5	6.0-6.5	6.0-6.5	6.0-6.5	16	17	16	16	15
Screened depth, feet						5-25	6-20	6-16	5-25	4-24
Static water, feet										
depth						3.16	5.73	4.13	3.69	4.47
elevation						107.45	107.06	106.73	106.72	106.99
trichloroethylene	-0.001	-0.001	-0.001	-0.001	-0.001	0.291	0.005	-0.001	-0.001	-0.001
trans-1,2-dichloroethylene	-0.001	-0.001	-0.001	-0.001	-0.001	0.957	0.246	0.008	-0.001	-0.001
benzene	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002	-0.001	-0.001	0.009
acetone	0.058	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010
other purgeable organics	None detected at detection limits generally below 0.001 ppm									
bis(2-ethylhexyl) phthalate	-0.040	0.625	-0.040	-0.100	-0.001	0.060	-0.001	-0.001	-0.001	-0.001
di-n-butyl phthalate	2.700	0.665	-0.040	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
acenaphthene	-0.040	-0.040	2.030	-0.100	-0.001	-0.001	0.064	-0.001	-0.001	-0.001
acenaphthylene	-0.040	-0.040	-0.040	-0.100	-0.001	-0.001	0.005	-0.001	-0.001	-0.001
napthalene	-0.040	-0.040	5.200	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
benzo(a)anthracene	-0.040	-0.040	0.370	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
benzo(b)fluoranthene	-0.040	-0.040	0.580	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
benzo(ghi)perylene	-0.040	-0.040	0.440	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
benzo(a)pyrene	-0.040	-0.040	1.330	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
ideno(1,2,3-cd)pyrene	-0.040	-0.040	1.000	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
pyrene	-0.040	-0.040	-0.040	-0.100	-0.001	-0.001	0.043	-0.001	-0.001	-0.001
chrysene	-0.040	-0.040	0.470	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
fluorene	-0.040	-0.040	1.840	-0.100	-0.001	-0.001	0.016	-0.001	-0.001	-0.001
phenanthrene	-0.040	-0.040	0.200	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
dibenzofuran	-0.040	-0.040	1.360	-0.100	-0.001	-0.001	0.014	-0.001	-0.001	-0.001
2-methylnapthalene	-0.040	-0.040	0.800	-0.100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
2-cyclohexen-1-one*	-0.040	-0.040	-0.040	-0.100	-0.001	-0.001	-0.001	0.010	-0.001	-0.001
2,5-diethyltetrahydrofuran*	-0.040	-0.040	-0.040	-0.100	-0.001	-0.001	-0.001	0.043	-0.001	-0.001
unidentified, non-priority pollutants	one	two	several	four	none	none	none	none	none	none
other acid and base/neutral extractable organics	None detected at detection limits generally below 0.040 ppm (soils) or 0.001 ppm (water)									

NOTES: *) Estimated concentrations, tentative identification.
1) Analyses by EPA Method 624 and 625 - all statistically significant peaks reported, even if unidentified.
2) Data reported on a moist-sample-weight (as-received) basis.
3) "-" = "less than".

APPENDIX C

BORING LOGS FROM THE WEST BEACH LANDFILL

APPENDIX C – BORING LOGS FROM THE WEST BEACH LANDFILL

FINAL
WELL DECOMMISSIONING PLAN: 1943 - 1956 DISPOSAL AREA AND WEST BEACH LANDFILL

THE ABOVE IDENTIFIED APPENDIX HAS MISSING PAGES. IT COULD NOT BE DETERMINED WHETHER THESE PAGES ARE MISSING OR THE DOCUMENT WAS ISSUED WITHOUT THEM.

QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

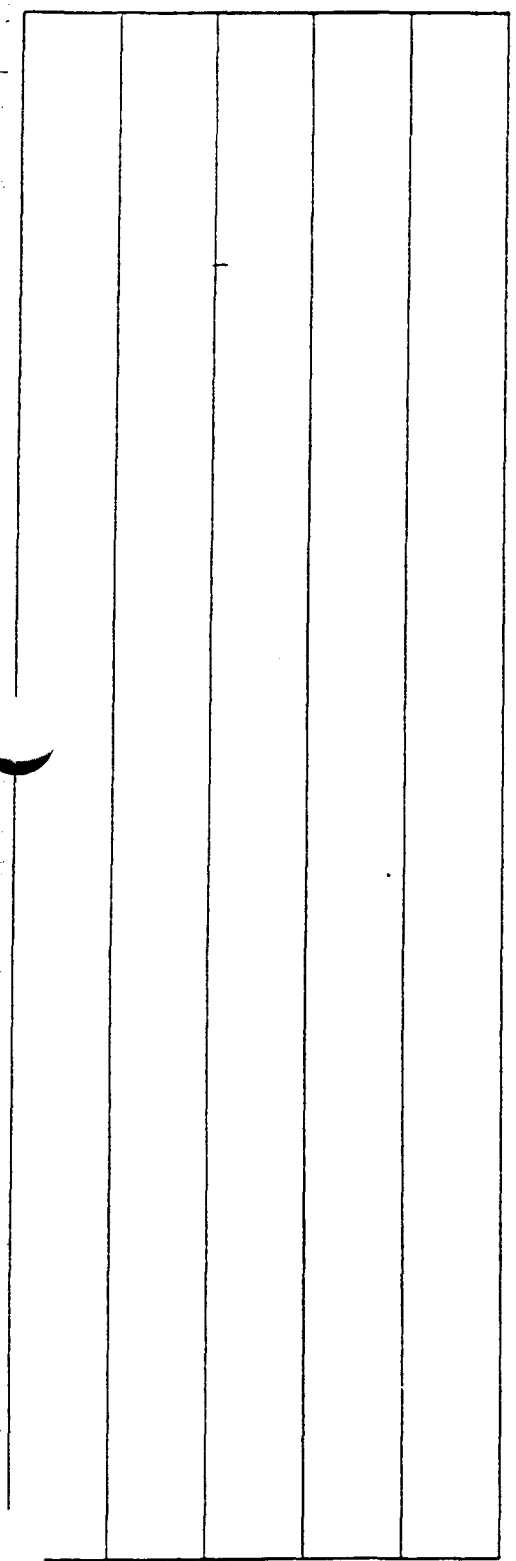
TELEPHONE: (619) 532-3676

LOG OF BORING 1

Equipment 6" Flight Auger

Elevation 115.5* feet Date 10/29/76

Shear Strength (lbs/sq ft) | Moisture Content (%) | Dry Density (pcf) | Depth (ft) | Sample



0

BROWN SILTY SAND (SM)
loose to medium dense, moist,
with debris

5

10

water level 4/18/77

15

BROWN SAND (SP)
loose, saturated,

20

25

30

35

40

Refuse Fill

Hydraulic Fill

*Reference: Topo, NAS Alameda Sanitary Dump Facility, 1975, by M. B. Cristi

HARDING-LAWSON ASSOCIATES
Consulting Engineers and Geologists

Job No 2176,030.01 Appr: JCD Date 5/20/77

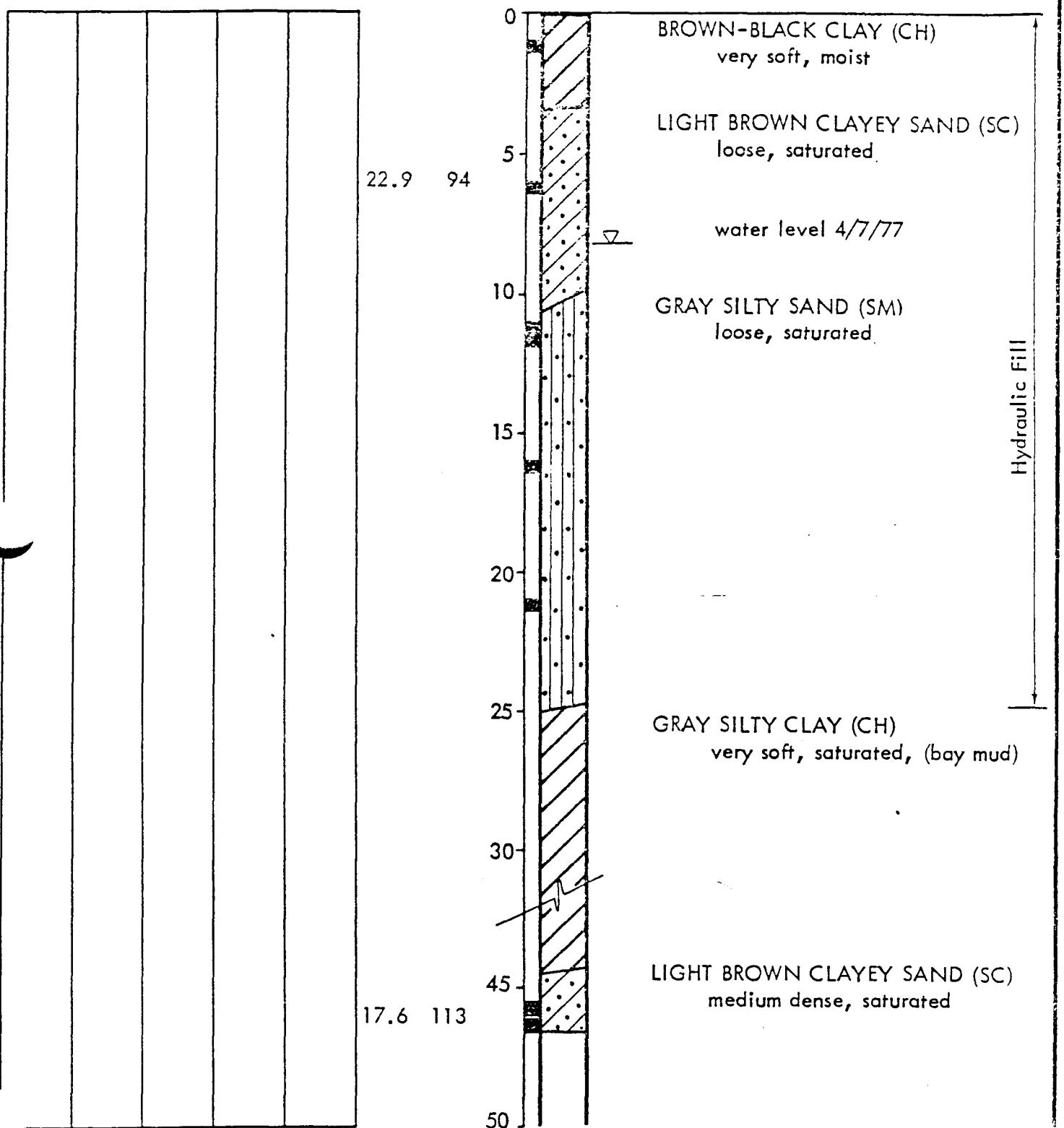
LOG OF BORING 1
Sanitary Landfill Site
Alameda Naval Air Station

PLATE 2

LOG OF BORING 2

Equipment 5" Rotary Wash

Elevation 113.4 feet Date 10/26/76



HARDING-LAWSON ASSOCIATES

Consulting Engineers and Geologists

Job No 2176,030.01 Appr: KD Date 5/10/77

LOG OF BORING 2

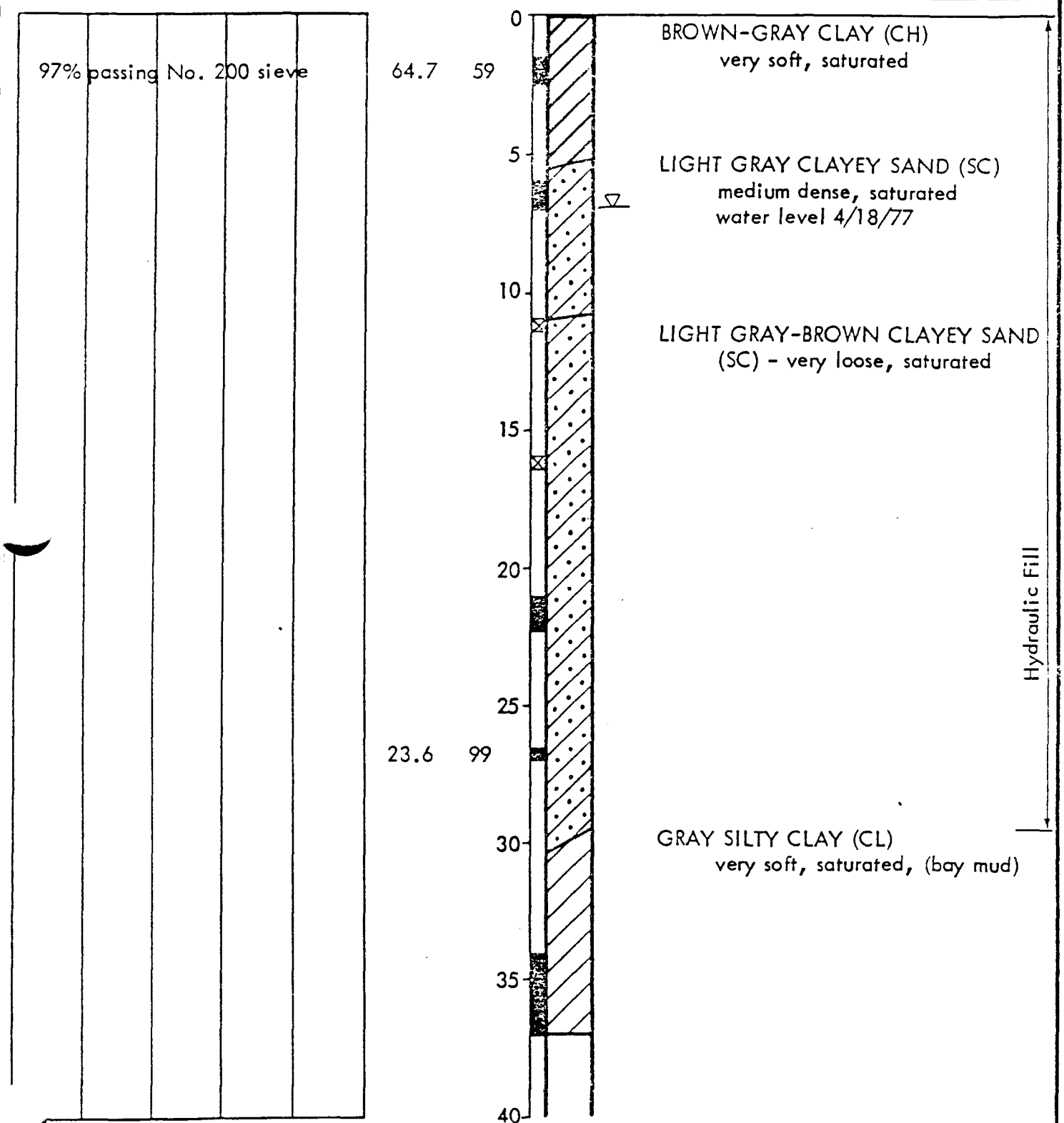
Sanitary Landfill Site
Alameda Naval Air Station

PLATE 3

LOG OF BORING 3

Equipment 5" Rotary Wash

Elevation 111.4 feet Date 10/25/76



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Job No 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORING 3

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 4

LOG OF BORING 4

Equipment 5" Rotary Wash

Elevation 110.7 feet Date 10/21/76

Shear Strength (lbs/sq ft)	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
			0		LIGHT BROWN CLAYEY SAND (SC) loose, dry, with debris
					Refuse Fill
			5		DARK GRAY SILTY SAND (SM) medium dense, saturated, with concrete rubble
13% passing No. 200 sieve	18.5	104			water level 4/18/77
			10		Hydraulic & Sea Wall Fill
			15		
			20		DARK GRAY CLAY (CH) soft, saturated, (bay mud)
			25		
			30		
			35		
			40		

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LOG OF BORING 4

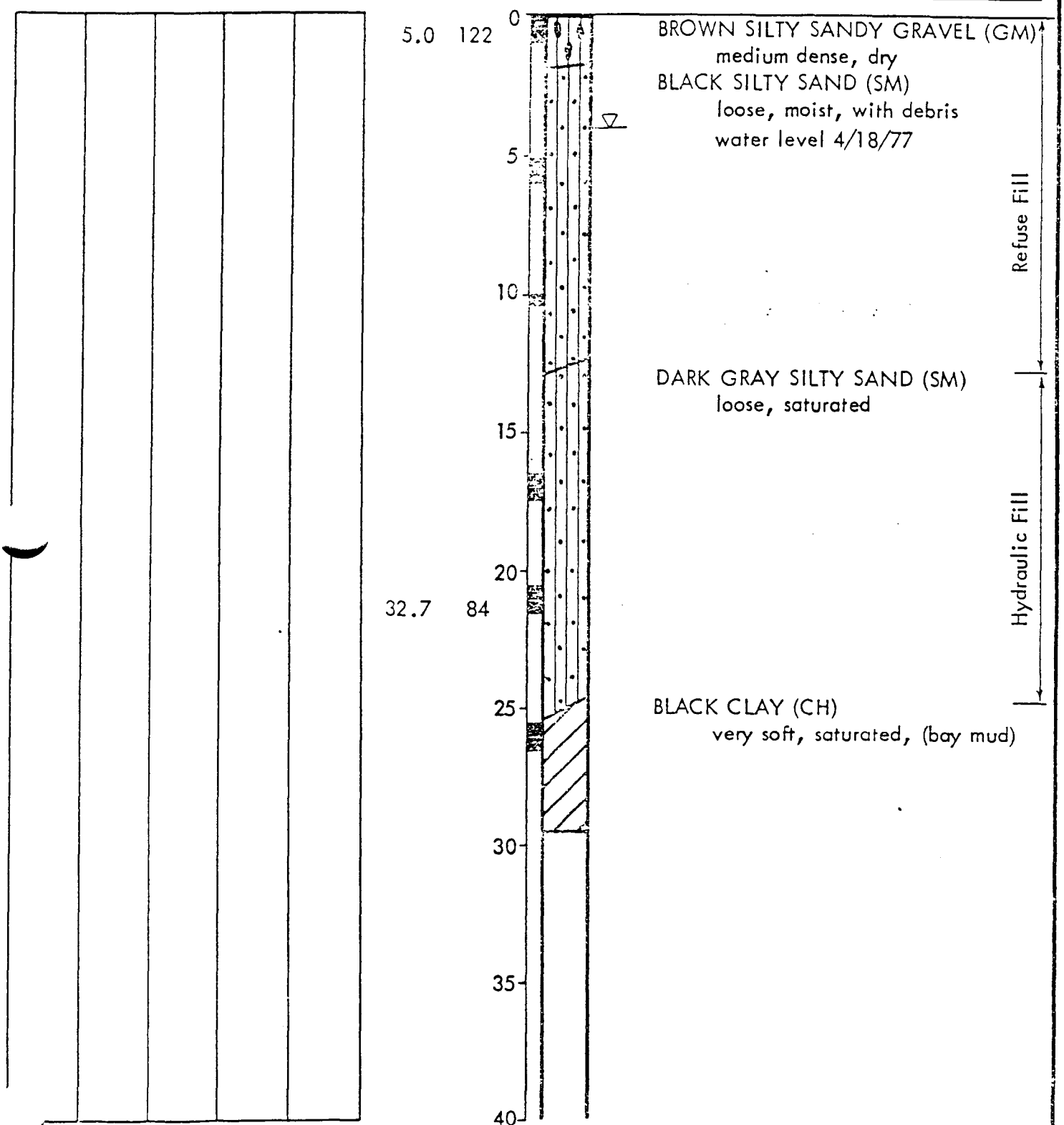
Sanitary Landfill Site
Alameda Naval Air Station

PLATE 5

LOG OF BORING 5

Equipment 5" Rotary Wash

Elevation 110.1 Date 10/20/76



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Job No 2176,030.01 Appr: KD Date 5/20/77

LOG OF BORING 5

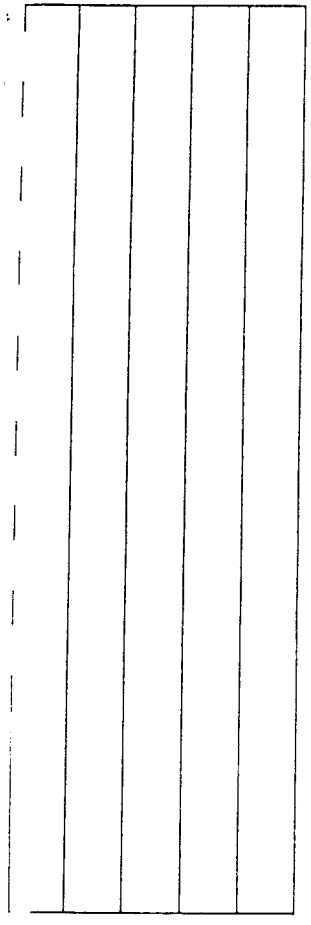
Sanitary Landfill Site
Alameda Naval Air Station

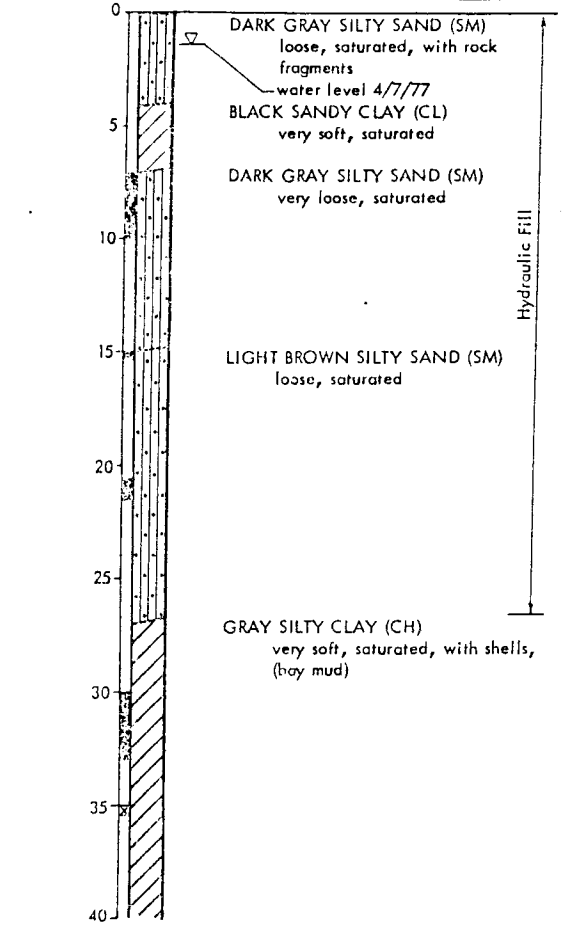
PLATE 6

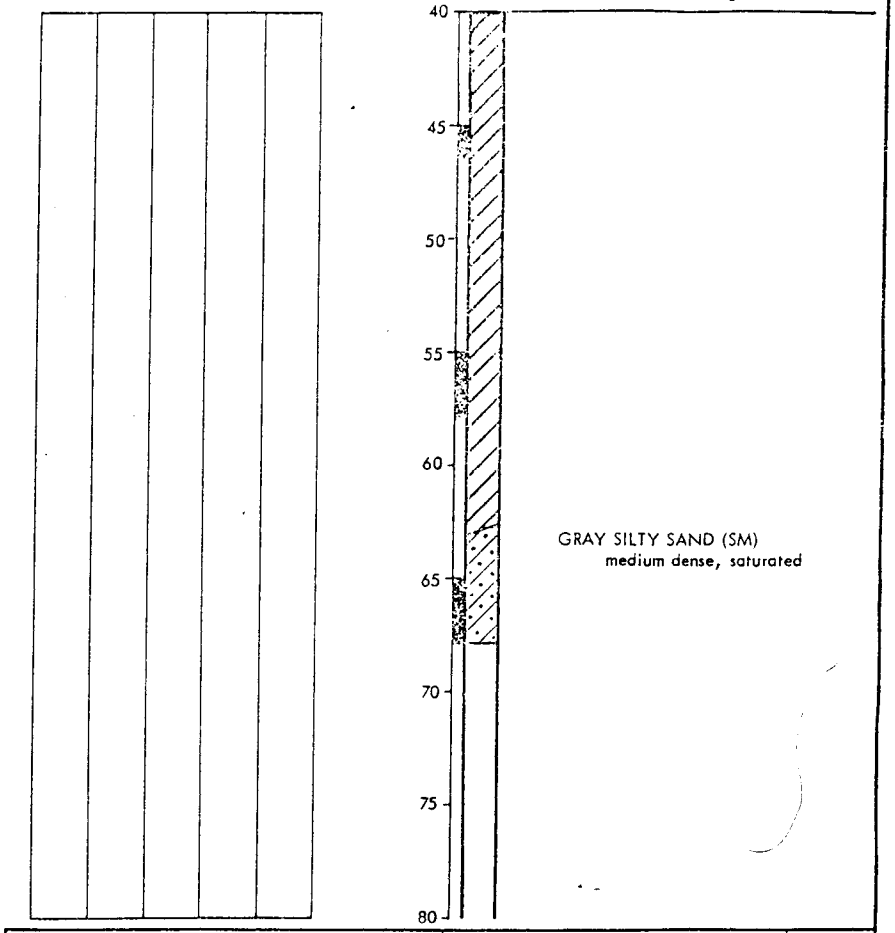
LOG OF BORING 6

Equipment 5" Rotary Wash

Elevation 108.2 feet Date 10/21/76





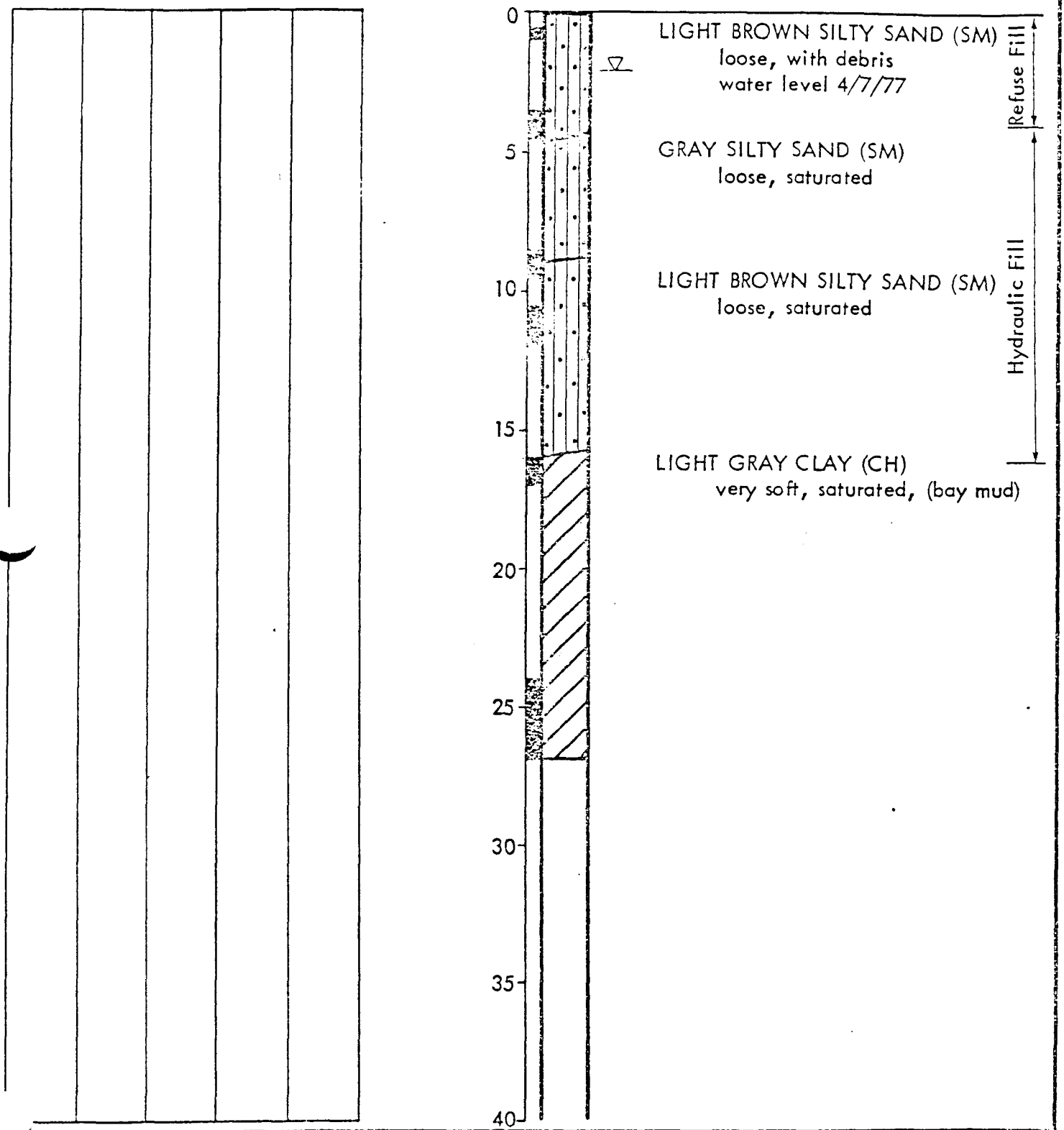


HARDING-LAWSON ASSOCIATES Consulting Engineers and Geologists	LOG OF BORING 6 Sanitary Landfill Site Alameda Naval Air Station	PLATE 7
Job No 2176,030.01 Appr. JCD Date 5/20/77		

LOG OF BORING 7

Equipment 5" Rotary Wash

Elevation 109.9 feet Date 10/25/76



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Job No 2176,030.01 Appr: JCO Date 5/10/77

LOG OF BORING 7

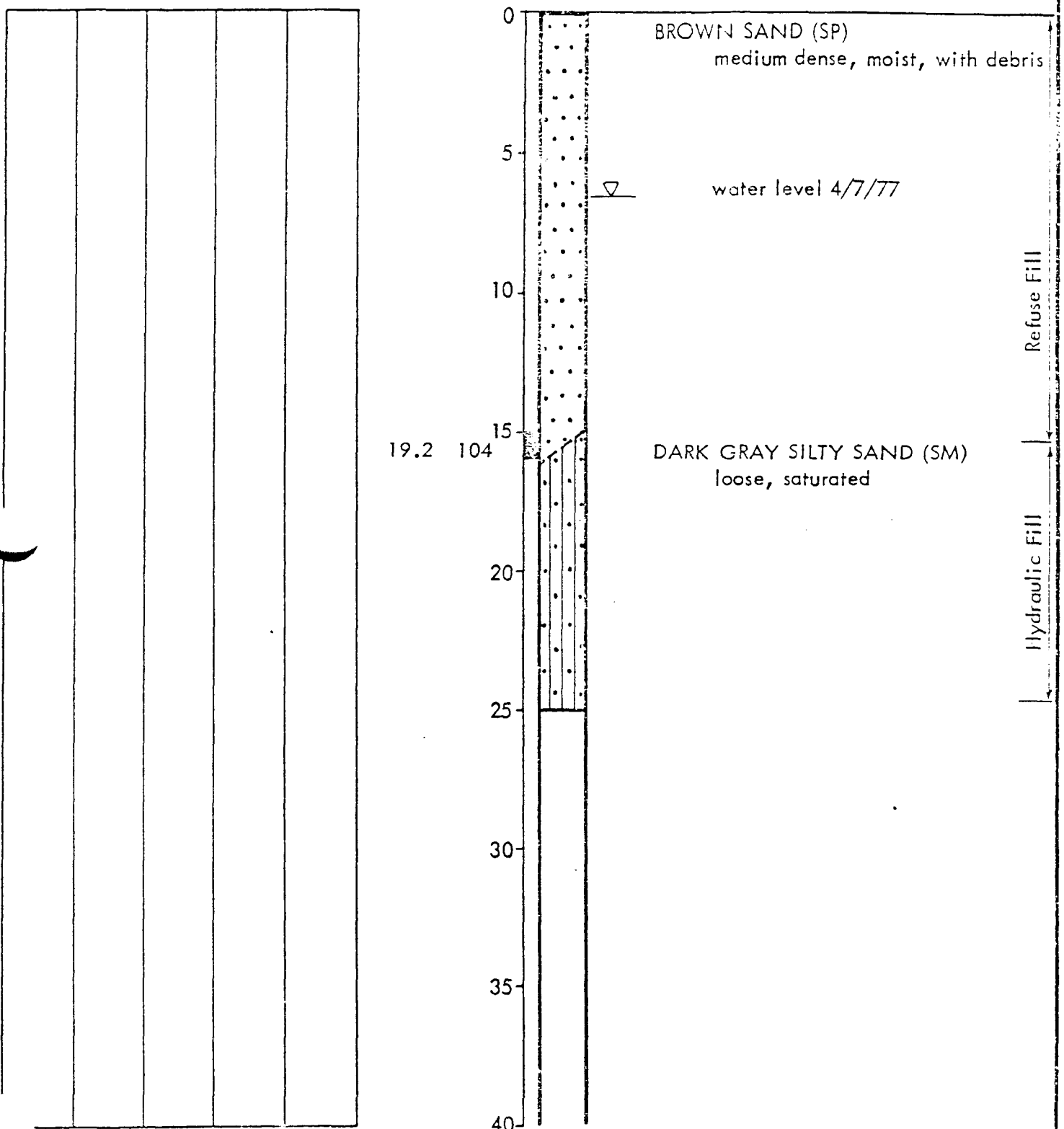
Sanitary Landfill Site
Alameda Naval Air Station

PLATE 3

LOG OF BORING 8

Equipment 8" Hollow Auger

Elevation 114.0 feet Date 10/29/77



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Consulting Engineers and Geologists

Job No 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORING 8

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 9

LOG OF BORING 9

Equipment 6" Flight Auger

Elevation 113.8 feet Date 10/29/76

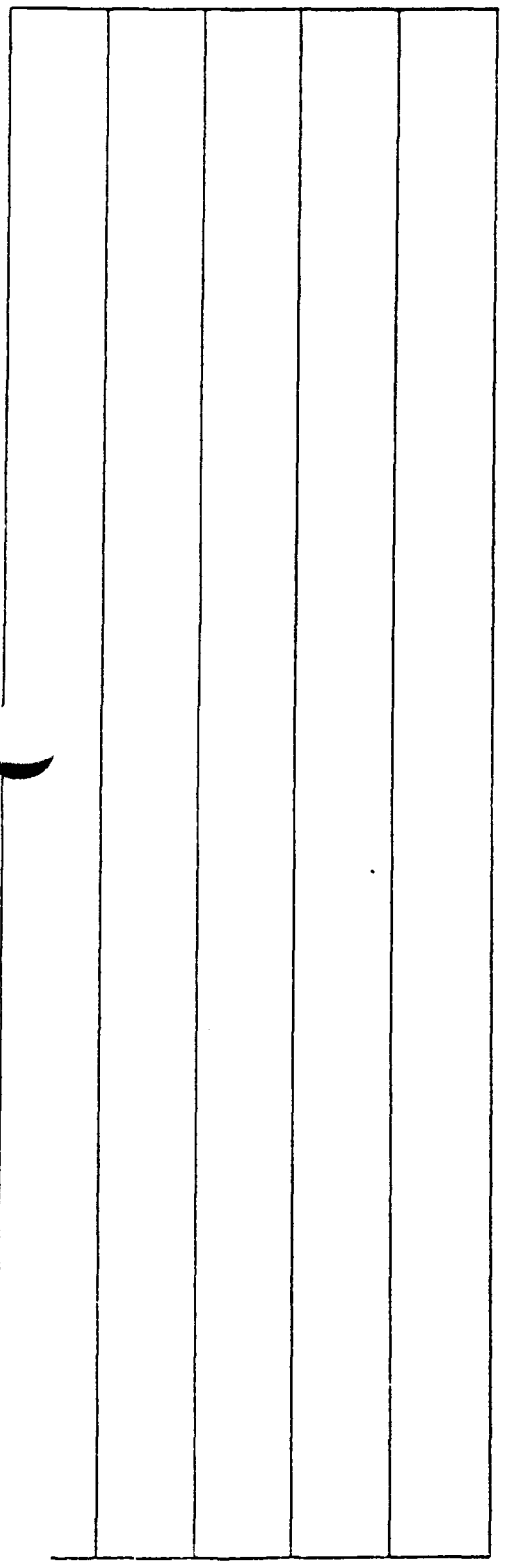
Shear Strength (lbs/sq ft)

Moisture Content (%)

Dry Density (pcf)

Depth (ft)

Sample



0

5

10

15

20

25

30

35

40

BROWN SILTY SAND (SM)
loose to medium dense, moist, with debris

water level 4/7/77

Refuse Fill

DARK GRAY CLAYEY SILT (MH)
soft to medium stiff, saturated, (bay mud)

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Consulting Engineers and Geologists

Job No 2176,030.01 Appr. JCD Date 5/20/77

LOG OF BORING 9

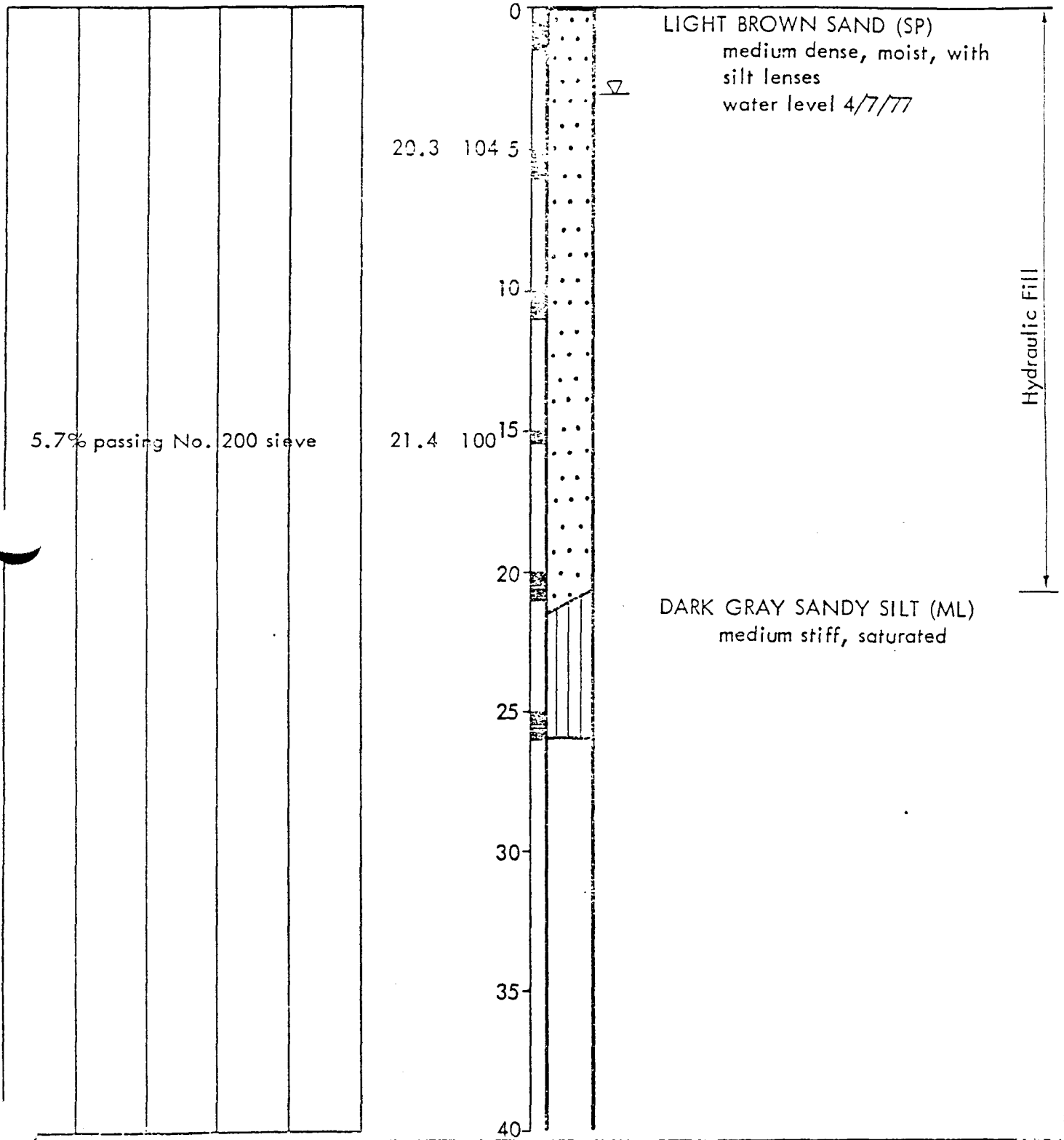
Sanitary Landfill Site
Alameda Naval Air Station

PLATE 10

LOG OF BORING 10

Equipment 8" Hollow Auger

Elevation 112.0 feet Date 10/28/76



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Consulting Engineers and Geologists

Job No 2176,030.01 Appr. JCD Date 5/20/77

LOG OF BORING 10

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 11

LOG OF BORING 11

Equipment 6" Flight Auger

Elevation 112.5 feet Date 10/29/77

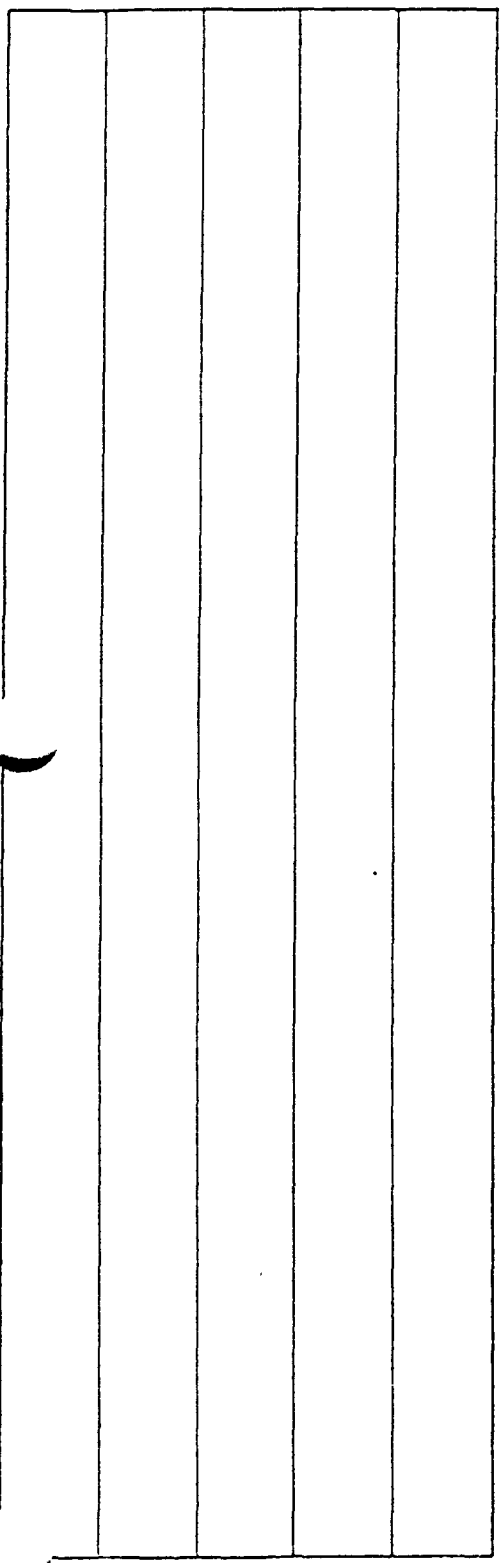
Shear Strength (lbs/sq ft)

Moisture Content (%)

Dry Density (pcf)

Depth (ft)

Sample



0

5

10

15

20

25

30

35

40

BROWN SILTY SAND (SM)
loose to medium dense, with debris

water level 4/7/77

Refuse Fill

DARK BLUE-GRAY SILTY SAND (SM)
loose, saturated

BLUE-GRAY CLAYEY SILT (MH)
medium stiff, saturated, with lenses of silty sand

Hydraulic Fill

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Job No 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORING 11

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 12

LOG OF BORING 12

Equipment 6" Flight Auger

Elevation 113.0 feet Date 10/29/76

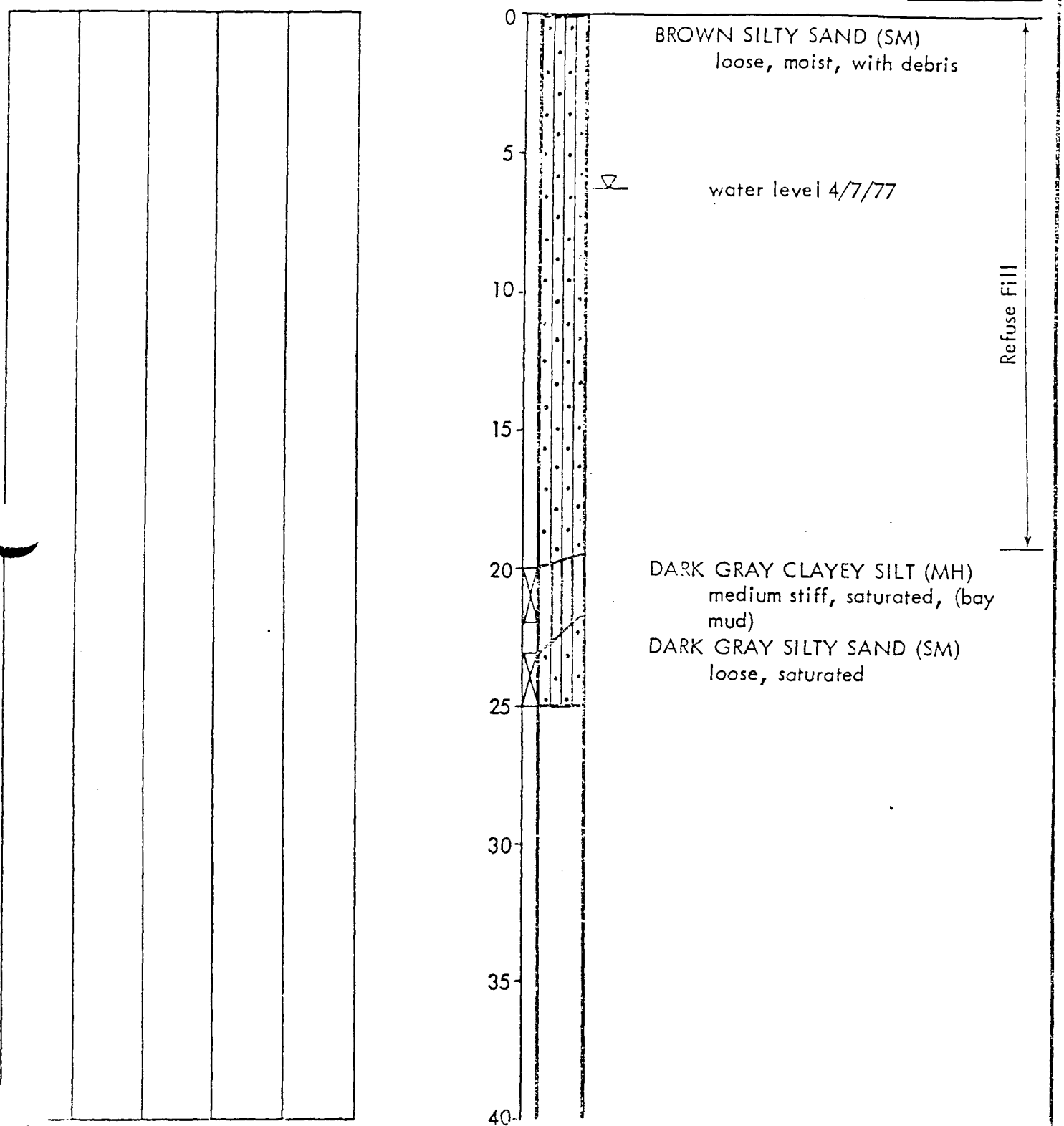
Shear Strength (lbs/sq ft)

Moisture Content (%)

Dry Density (pcf)

Depth (ft)

Sample



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Job No. 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORING 12

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 13

Shear Strength (lbs/sq ft)

Moisture Content (%)

Dry Density (pcf)

Depth (ft)

Sample

LOG OF BORING 13

Equipment Hand Auger

Elevation 109.5 feet Date 11/9/76

82.3% passing No. 200 sieve

0

5

10

15

▽

BROWN CLAYEY SILT (MH)
stiff, dry, (desiccated bay mud)
becoming soft, moist at 3'
water level 4/7/77

DARK GRAY SILTY SAND (SM)
loose, saturated, (fill)

Hydraulic Fill

LOG OF BORING 14

Equipment Hand Auger

Elevation 113.3 feet Date 11/9/76

15% passing No. 200 sieve

0

5

10

15

BROWN SAND (SP)
loose, moist, with organic matter

GRAY-BLACK SILT (MH)
soft, saturated

BROWN SAND (SP)
loose, moist
becoming wetter at 6'

Hydraulic Fill

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Consulting Engineers and Geologists

Job No. 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORINGS 13&14

Sanitary Landfill Site
Alameda Naval Air Station

PLATE

Shear Strength (lbs/sq ft)

Moisture Content (%)

Dry Density (pcf)

Depth (ft)

Sample

LOG OF BORING 15

Equipment Hand Auger

Elevation 113.9 feet Date 11/16/76

0

LIGHT BROWN SILT (MH)
medium stiff, dry, (desiccated bay mud)

LIGHT BROWN SAND (SP)
medium dense, dry

5

wet at 8'

10

15

Hydraulic Fill

LOG OF BORING 16

Equipment Hand Auger

Elevation 109.3 feet Date 11/16/76

95.4% passing No. 200 sieve

0

BROWN SILT (MH)
soft to medium dense, moist, (desiccated bay mud)
becoming softer at 4'

5

10

15

Hydraulic Fill

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Consulting Engineers and Geologists

Job No. 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORINGS 15&16

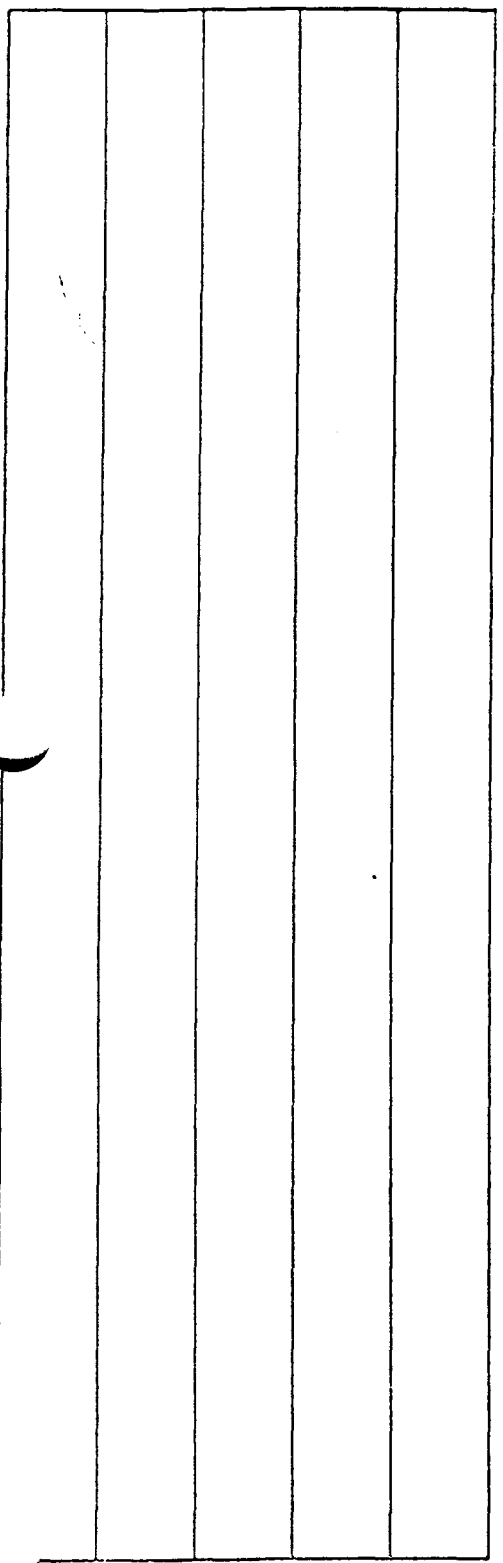
Sanitary Landfill Site
Alameda Naval Air Station

PLATE 15

LOG OF BORING 17

Equipment 9" Hollow Auger

Elevation 110.3 feet Date 3/16/77



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Job No 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORING 17

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 16

LOG OF BORING 18

Equipment 9" Hollow Auger

Elevation 110 feet Date 3/16/77

Shear Strength (lbs/sq ft)	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
			0		BROWN SANDY CLAY (CL) medium stiff, wet, with debris
					DEBRIS FILL loose
			5		water level 4/18/77
			10		Refuse Fill
15.0% passing No. 200 sieve	20.9	107	15		BLACK SILTY SAND (SM) loose, saturated
			20		Hydraulic Fill
			25		DARK GRAY CLAYEY SILT (MH) soft, saturated, (bay mud)
			30		
			35		
			40		

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Job No. 2176,030.01 Appr: JCD Date 5/20/77

LOG OF BORING 18

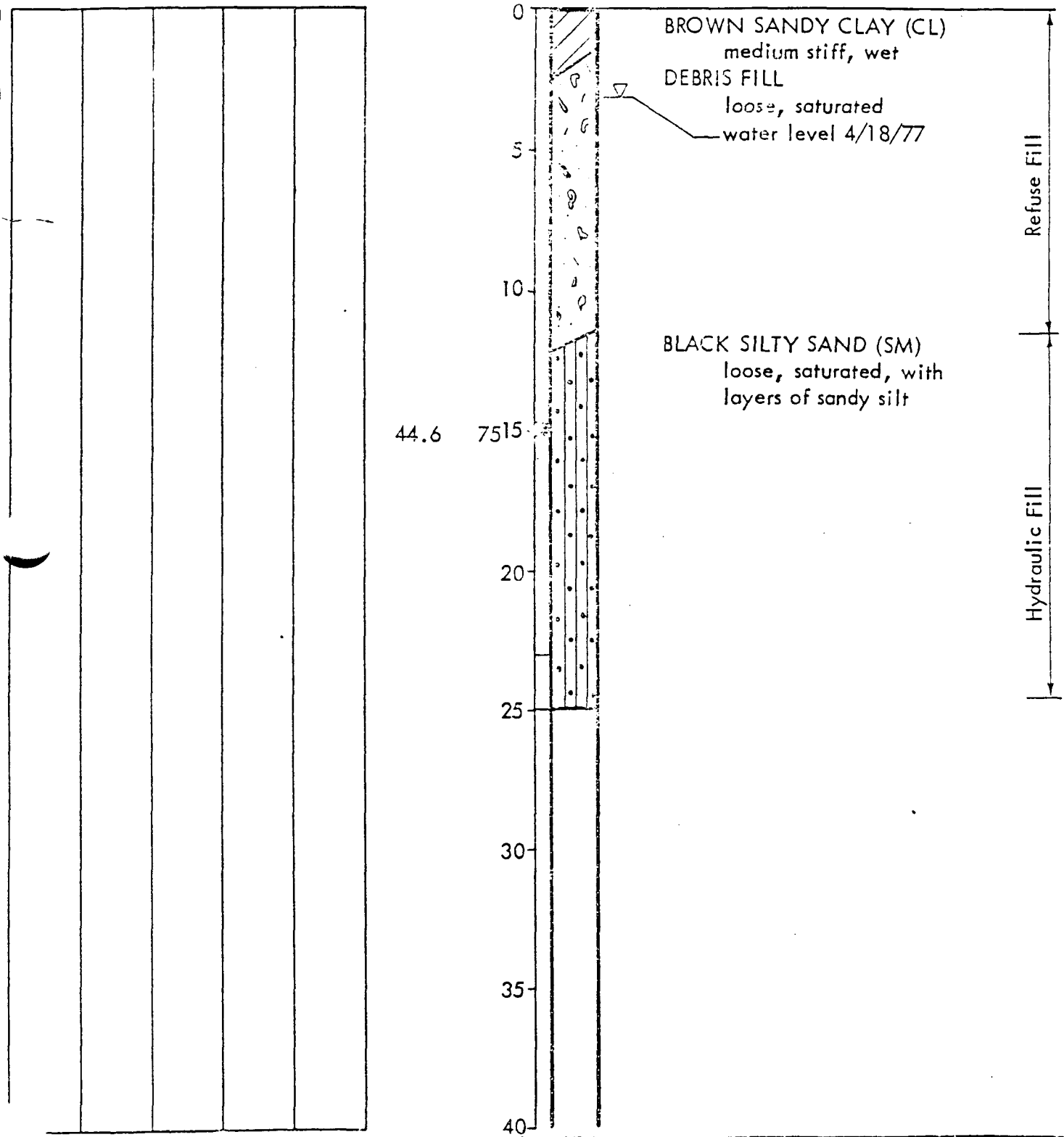
Sanitary Landfill Site
Alameda Naval Air Station

PLATE 17

LOG OF BORING 19

Equipment 9" Hollow Auger

Elevation 109.8 feet Date 3/16/77



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Job No. 2176,030.01 Appr. JCD Date 5/20/77

LOG OF BORING 19

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 10

LOG OF BORING 20

Equipment Hand Auger

Elevation 114.5 feet Date 10/6/77

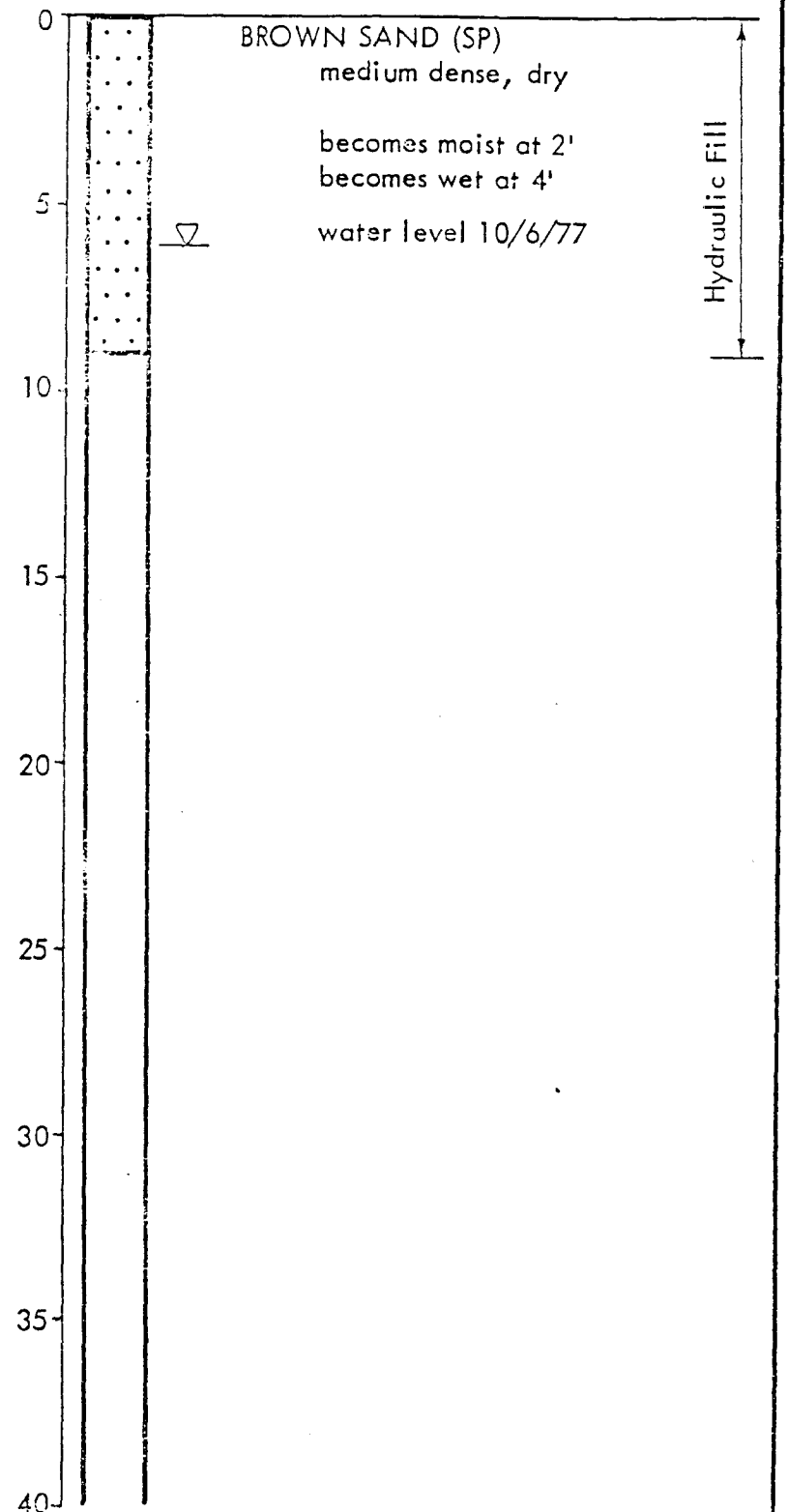
Shear Strength (lbs/sq ft)

Moisture Content (%)

Dry Density (pcf)

Depth (ft)

Sample



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Job No 2176,030.01 Appr. JD Date 11/21/77

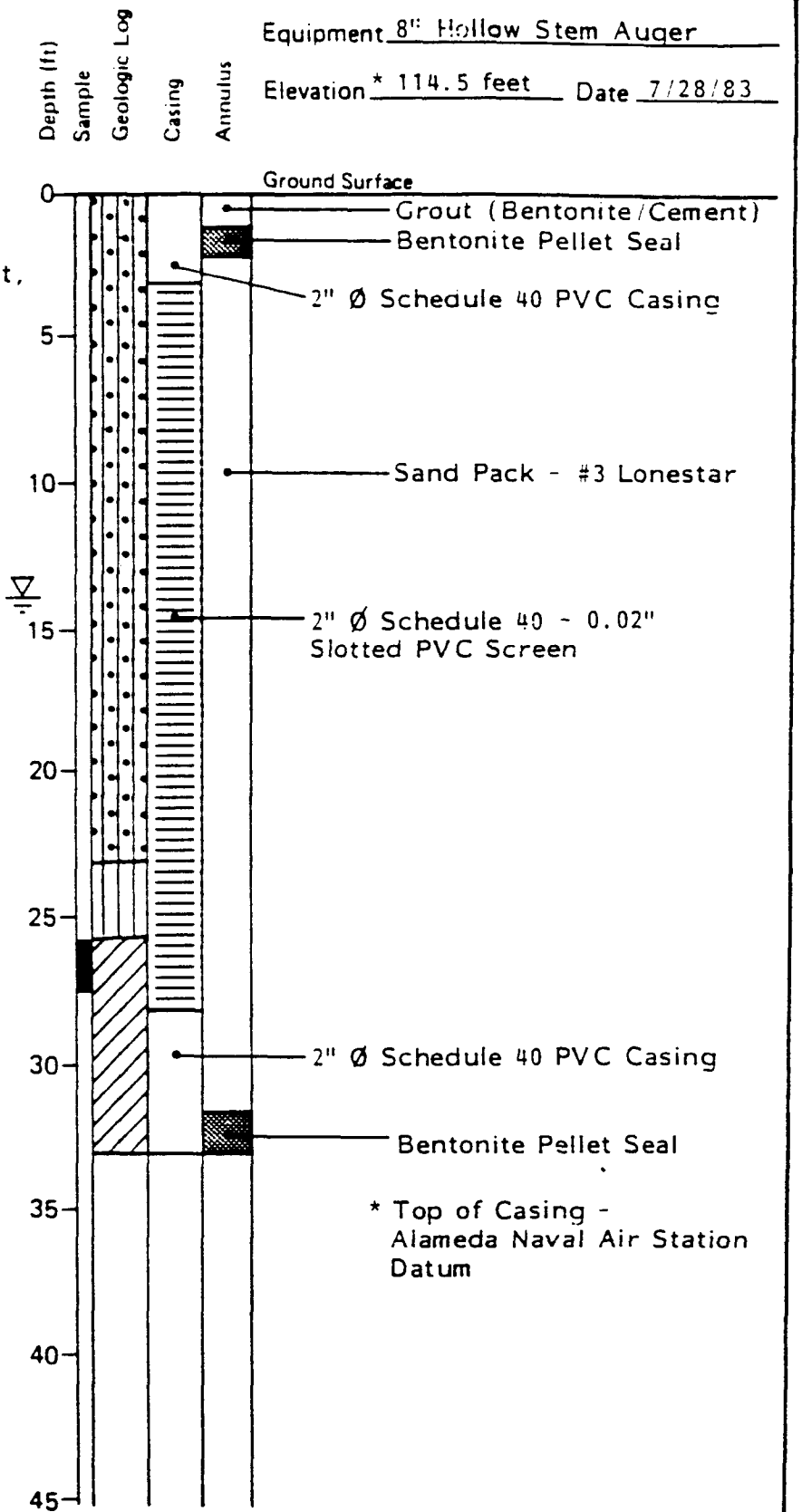
LOG OF BORING 20

Sanitary Landfill Site
Alameda Naval Air Station

PLATE 19

Equipment 8" Hollow Stem Auger

Elevation * 114.5 feet Date 7/28/83



BROWN SILTY SAND (SM)
loose to medium dense, moist, with debris beginning at 1.5 feet

DARK BROWN SANDY SILT (ML) - medium stiff, saturated

GRAY CLAY (CH)
soft, saturated

* Top of Casing - Alameda Naval Air Station Datum

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Boring 20
Sanitary Landfill Site
Alameda Naval Air Station
Alameda, California

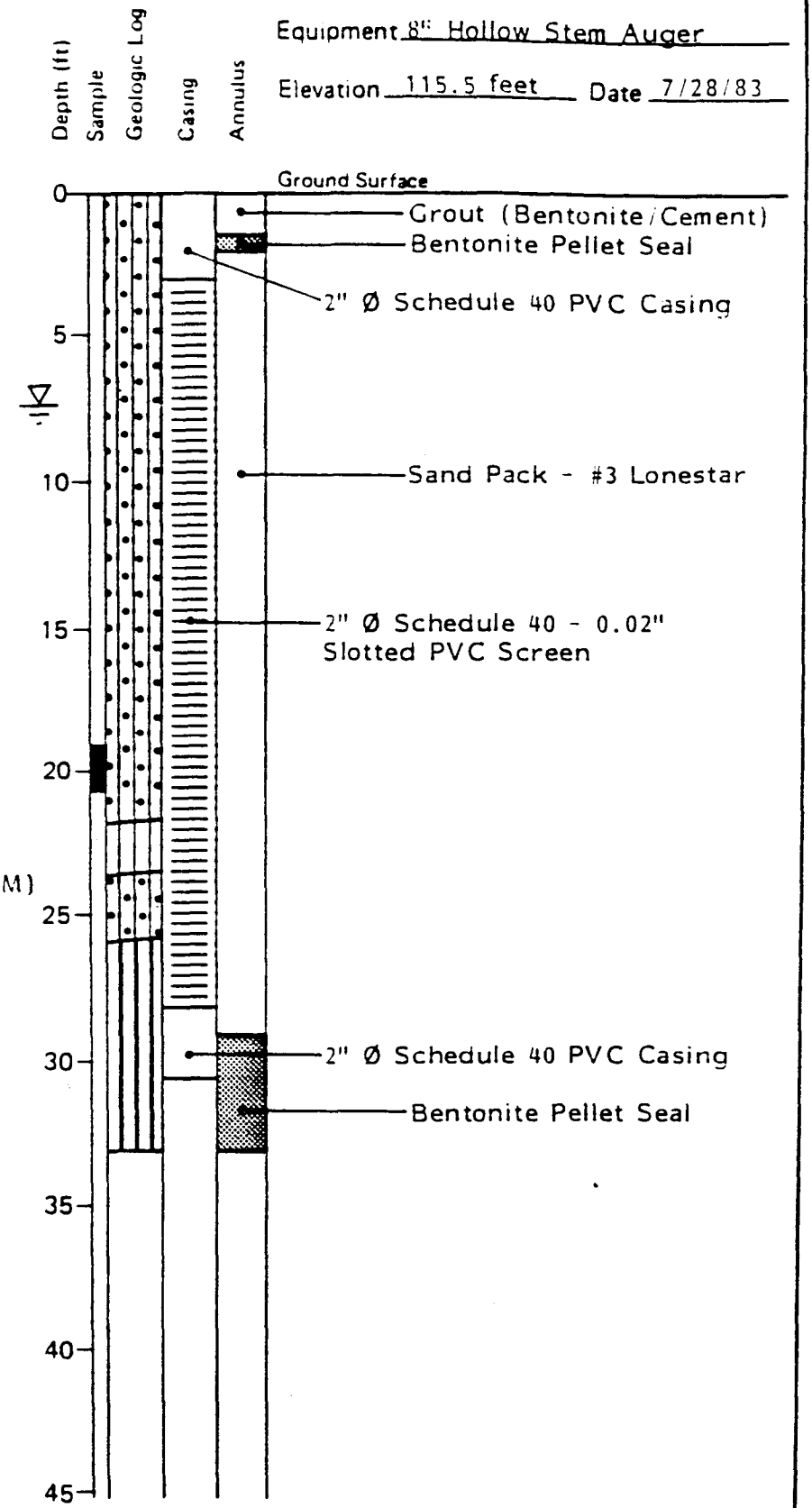
PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
MLQ	2176.059.01		10/83		

2176.059.0002

Equipment 8" Hollow Stem Auger

Elevation 115.5 feet Date 7/28/83



BROWN SILTY SAND (SM)
loose, dry,
moist with debris at 2 feet

DARK GRAY SILT (ML)
medium stiff, saturated

DARK GRAY SILTY SAND (SM)
loose, saturated

DARK GRAY SILT (MH)
medium stiff, saturated

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Engineers Geologists
& Geophysicists

Log of Boring 21
Sanitary Landfill Site
Alameda Naval Air Station
Alameda, California

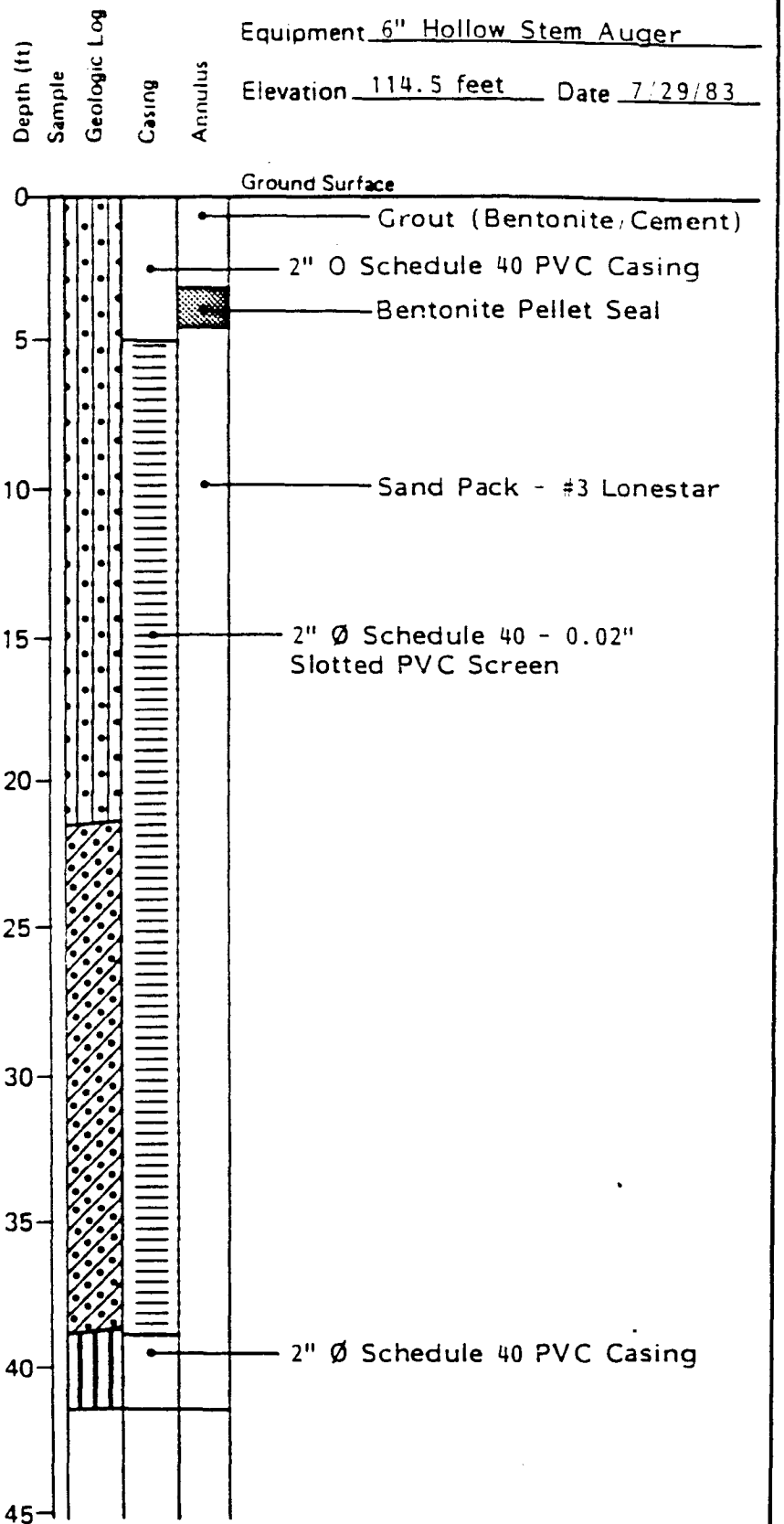
PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
MLQ	2176,059.01		10/83		

2176,059.0003

Equipment 6" Hollow Stem Auger

Elevation 114.5 feet Date 7/29/83



BROWN SILTY SAND (SM) loose, dry, with debris at 1.0 feet

change to gray in color at 6 feet

DARK GRAY CLAYEY SAND (SC) - loose, saturated

DARK GRAY SILT (MH) medium stiff, saturated

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Log of Boring 22
Sanitary Landfill Site
Alameda Naval Air Station
Alameda, California

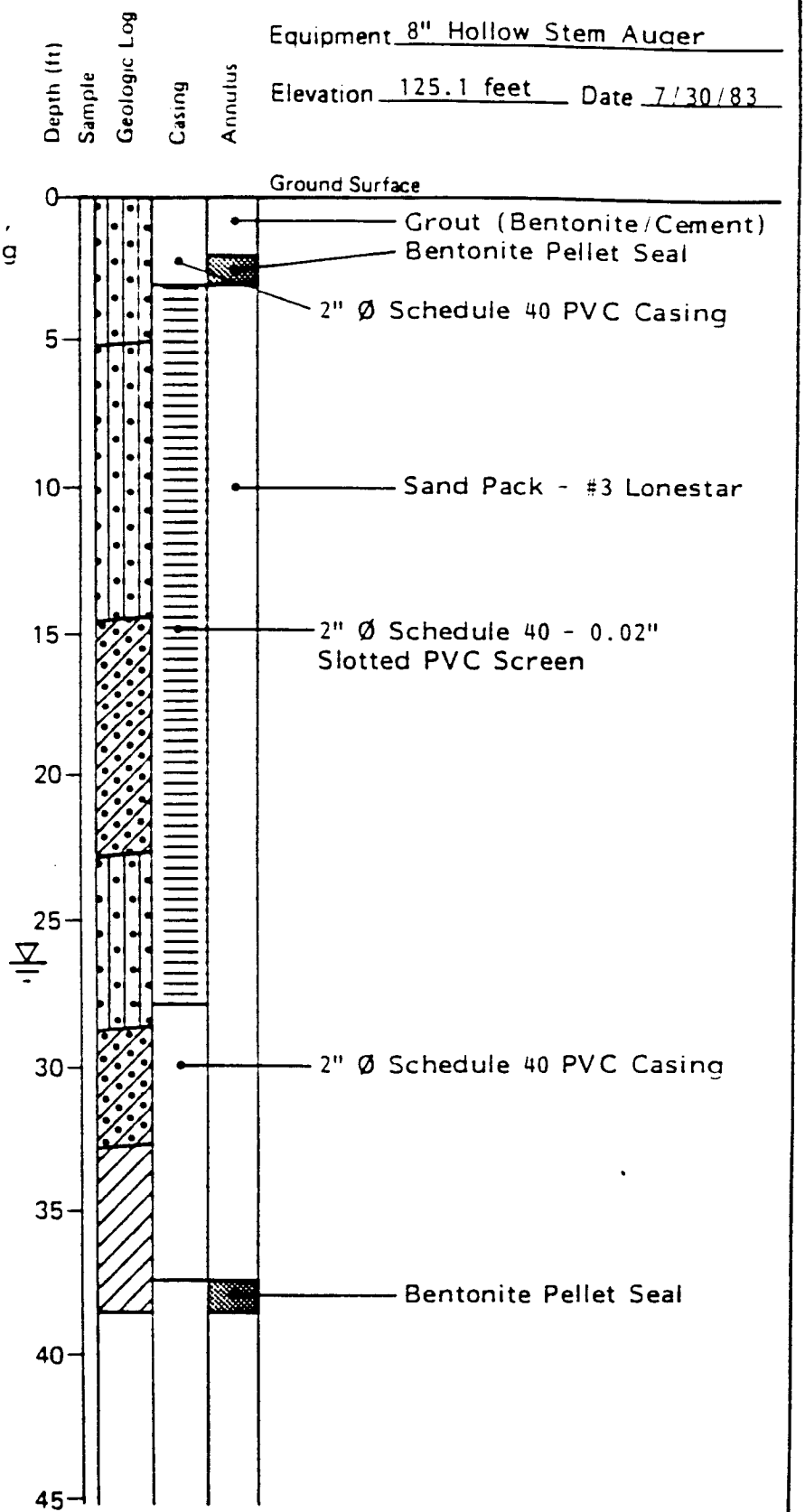
PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
MLQ	2176.059.01		10/83		

2176.059.0004

Equipment 8" Hollow Stem Auger

Elevation 125.1 feet Date 7/30/83



BROWN GRAVELLY SILTY SAND (SM) - medium dense, moist, with debris beginning at 1.0 feet

BROWN SILTY SAND (SM) loose, saturated, with debris

BROWN CLAYEY SAND (SC) medium dense, saturated, with small amount of debris

GRAY SILTY SAND (SM) medium dense, saturated

DARK GRAY CLAYEY SAND (SC) - medium dense, saturated

DARK GRAY SANDY CLAY (CH) - medium stiff, saturated

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Boring 23
Sanitary Landfill Site
Alameda Naval Air Station
Alameda, California

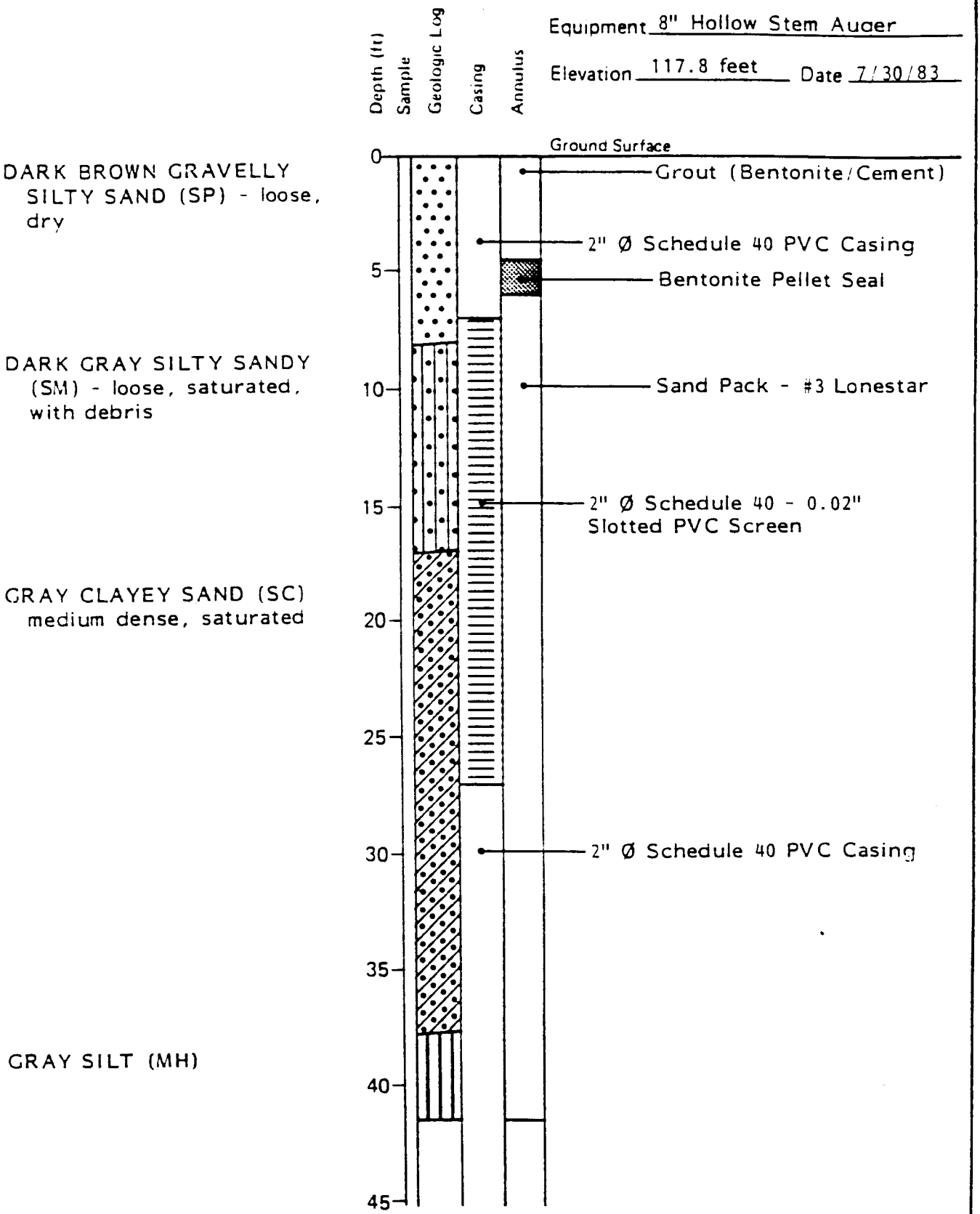
PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
MLQ	2176.059.01		10/83		

2176.059.0005

Equipment 8" Hollow Stem Auger

Elevation 117.8 feet Date 7/30/83



Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Boring 24
Sanitary Landfill Site
Alameda Naval Air Station
Alameda, California

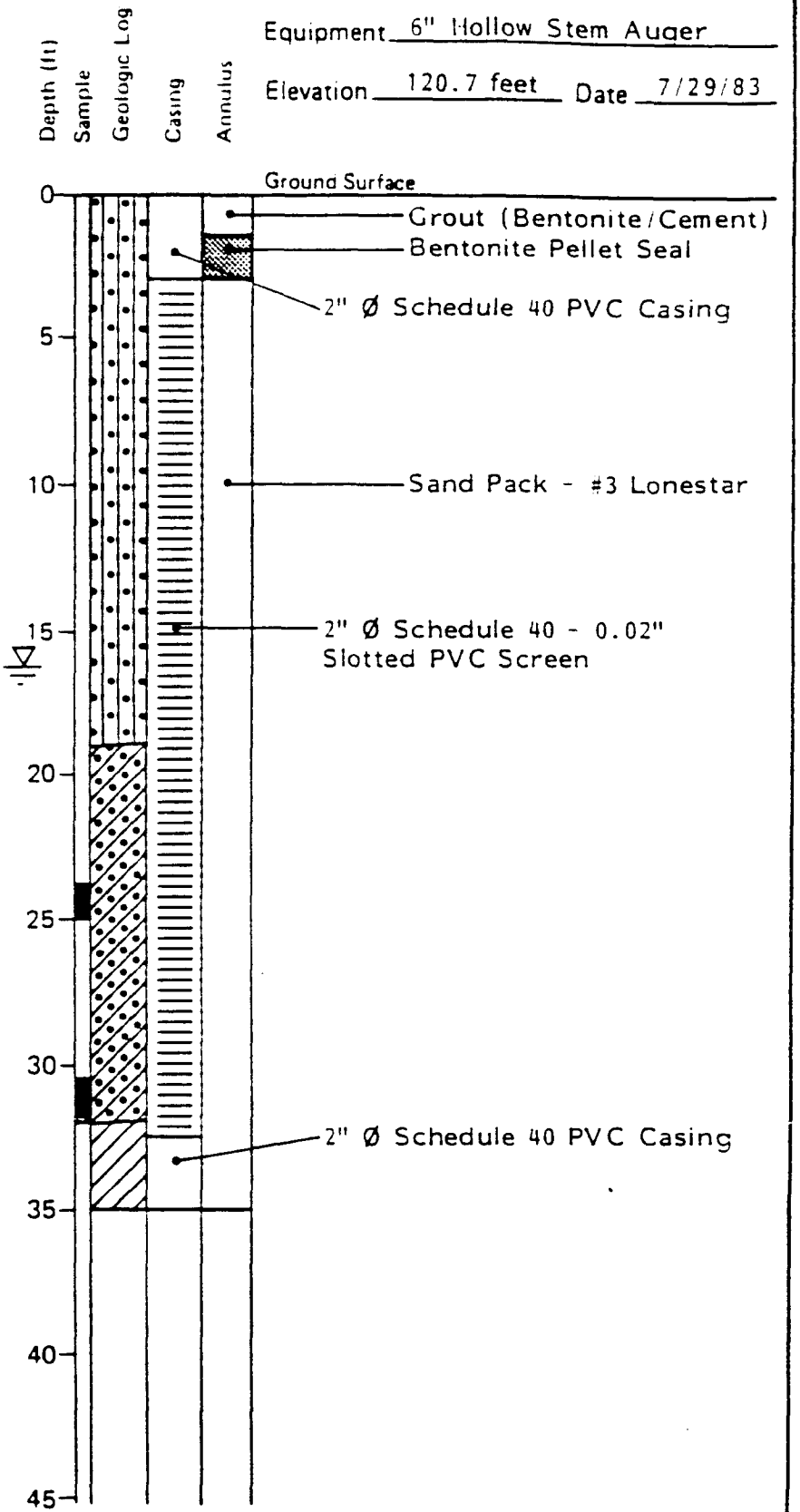
PLATE **6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
MLQ	2176.059.01		10/83		

2176.059.0006

Equipment 6" Hollow Stem Auger

Elevation 120.7 feet Date 7/29/83



BROWN SILTY SAND (SM)
loose, moist, with debris

GRAY CLAYEY SAND (SC)
loose, saturated

GRAY BROWN CLAY (CH)
medium stiff, saturated

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Boring 25
Sanitary Landfill Site
Alameda Naval Air Station
Alameda, California

PLATE **7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
MLQ	2176,059.01		10/83		

2176.059.0007

APPENDIX D

ANALYTICAL RESULTS FROM THE WEST BEACH LANDFILL

ANALYTICAL SCIENCE ASSOCIATES, Inc.
4560 HORTON ST. • EMERYVILLE, CA 94608 • (415) 547-6390

GC screen

HLA Project No. 2176,059.01
April 1, 1983

ABSTRACT

Samples were received from the Alameda Naval Air Station on March 16 and 17 for the screening of Priority Pollutants. No contaminants were detected in the volatile or Base-Neutral fraction. The acid and pesticide fractions contained traces of phenol and polychlorinated biphenyls. No metals were detected above 1 ppm.

METHODS

I Volatile Fraction

Samples were analyzed by gas-chromatography[1,2] for the volatile priority pollutants using GCFID and GCHSD under the following analytical conditions:

Instrument	:	Perkin Elmer 3B
Column	:	SP 1000/Carbopack B
Program	:	50^{o}-200^{o} @ 8^{o}/minute

II Base Neutral/Acid Fraction

Samples were analyzed by GCFID under the following analytical conditions:

Instrument	:	Perkin Elmer 3920
Column	:	1% SP2150 DB; Tenax 60/80
Program	:	50^{o}-270^{o} @ 8^{o}/minute; 180^{o}-300^{o}

Methods (continued)

III Pesticide Fraction

The 6, 15 and 50 percent Florisil fractions were analyzed[3] by GCHSD under the following conditions:

Instrument	:	Perkin Elmer 3B
Column	:	3% OV1
Temperature	:	180°C

IV Metals

Samples were filtered (0.45 um) and analyzed by Atomic Absorption spectroscopy.

RESULTS

Data are presented in Table I. Only the actual organic components found have been reported.

---

1. 40 CFR, part 141 app. C
2. Sampling and Analysis Procedures for the Screening of Industrial Effluents. EPA 1979
3. Methods for the Organic Analysis of Water and Wastes. EPA 1980.

TABLE I

LANDFILL WELL NO.	17	18	3	19	9	8	near 6	near 12
Sample ID	9001	9002	9003	9004	9005	9006	9007	9008
Cadmium	0.053	0.03	0.024	0.024	0.018	0.011	0.012	0.009
Copper	0.72	0.06	0.06	0.04	0.04	0.03	0.06	0.08
Lead	0.17	0.09	0.07	0.05	0.06	0.06	0.07	0.06
Selenium	0.08	0.04	0.03	0.04	0.04	0.04	0.03	0.04
Silver	k0.05	k0.05	k0.05	k0.05	k0.05	k0.05	k0.05	k0.05
Zinc	0.48	0.13	0.038	0.032	0.16	0.013	0.044	0.076
Oil & Grease	30	20	15	50	80	40	20	15
Phenol (ppb)	26	11	k10	k10	11	10	11	10
TICH (ppb, as arochlor 1248)	0.52	0.08	0.05	0.60	0.40	k0.05	0.20	0.10
Arsenic	0.09	0.06	0.05	0.06	0.04	0.04	0.05	0.05
Beryllium	0.012	k0.01	k0.01	k0.01	k0.01	k0.01	k0.01	k0.01
pH	7.4	7.0	7.3	7.1	7.2	7.2	7.5	7.7
Conductivity	6400	19,000	13,000	16,000	2700	3500	1500	1300
Nickel	0.11	0.11	0.10	0.13	0.12	0.07	0.06	0.07

All values in ppm unless otherwise noted.

ADDENDUM

LANDFILL WELL NO.	17	18	3	19	9	8	near 6	near 12
Sample ID	9001	9002	9003	9004	9005	9006	9007	9008
Chromium	k0.05	k0.05	k0.05	k0.05	k0.05	k0.05	k0.05	k0.05
Mercury	0.0008	k0.0001	k0.0001	k0.0001	0.0002	k0.0001	k0.0001	k0.0001
Magnesium	120	420	420	420	57	68	33	35

All values in ppm unless otherwise noted.

k = less than value

ANALYTICAL SCIENCE ASSOCIATES, Inc.
4560 HORTON ST. • EMERYVILLE, CA 94608 • (415) 547-6390

GC analysis

7 September 1983

Lyle Lewis
HARDING LAWSON ASSOCIATES
P. O. Box 578
Novato, CA 94948

Dear Lyle:

Enclosed is the Alameda Naval Air Station Analytical Report. If you have any questions please call.

Sincerely,

Bill

William Prater

WP:la

Enclosure

ABSTRACT

Samples from Alameda Naval Air Station were screened for Priority Pollutants and pesticides using EPA 608/624/625 GCFID/EC methodology. The only parameters found were low-level (<10 ppb) PCB ontamination in two wells.

METHODS

(A) Volatile Fraction

Samples were analyzed for volatile components by GCEC/FID[1] using the following analytical conditions:

Instrument	:	Perkin-Elmer Sigma 3
Detector	:	EC/FID
Column	:	SP1000/Graphitized Carbon Black
Temperature	:	50^{o} - 210^{o} C.

(B) Base-Neutral/Acid Fraction

Samples were analyzed[2] under the following analytical conditions:

Instrument	:	Perkin-Elmer Sigma 3B
Detector	:	FID
Column	:	SP2100 DB; SP1240 DA
Temperature	:	50^{o} - 270^{o}; 50^{o} - 200^{o}
Internal Standard	:	D_{10}Anthracene; 2 Nitrophenol

(C) Pesticides/PCB's

Samples were analyzed[2] under the following analytical conditions:

Instrument	:	Perkin-Elmer 3B
Detector	:	EC
Column	:	3% OV1
Temperature	:	180^{o}C
Internal Standard	:	Aldrin

1. 40 CFR Part III, App. C.
2. 40 CFR Vol 44, #233.

TABLE I

All values in ppb

SAMPLE ID	Well No.	VOLATILE	ACID, B-N	PESTICIDES/PCB's(3)
W01	19	<1	<20	-
W04	3	<1	<20	-
W07	24	<1	<20	-
W10	Blank	<1	<20	-
W17	25	<1	<20	-
W20	9	<1	<20	-
W23	20	<1	<20	-
W36	8	<1	<20	-
W201	19	<1	<20	ND
W203	20	<1	<20	8
W205	[illegible]	<1	<20	ND
W207	Blank	<1	<20	ND
W209	3	<1	<20	ND
W211	24	<1	<20	ND
W213	23	<1	<20	ND
W215	8	<1	<20	ND
W217	18	<1	<20	ND
W219	25	<1	<20	ND
W221	21	<1	<20	4
W223	22	<1	<20	ND

(3) Detection Limit 1 ppb.

TABLE II

PERCENT RECOVERY
OF INTERNAL STANDARDS

SAMPLE ID.	VOLATILE(1)	ACID(2)	B-N(3)	PESTICIDES(4) & PCBs
W01	95	79	98	
W04	97	85	100	
W07	93	85	100	
W10	95	90	96	
W17	95	88	95	
W20	96	89	100	
W23	98	79	95	
W36	99	75	92	
W201	93	80	100	85
W203	95	82	100	85
W205	99	80	100	90
W207	95	85	95	100
W209	96	80	96	85
W211	94	90	97	88
W213	95	85	95	89
W215	95	85	100	90
W217	100	90	95	89
W219	100	88	95	90
W221	95	90	96	88
W223	96	85	99	90

1. Bromodichloromethane
2. 2 Nitrophenol
3. D_{10}Anthracene
4. Aldrin

EAL Corporation

GC-MS

Thermo Electron CORPORATION

2030 Wright Avenue
Richmond, California 94804
(415) 235-2633
(TWX) 910-382-8132

ANALYSIS REPORT

HARDING LAWSON ASSOCIATES
P O BOX 578
NOVATO CA 94947
Attention: Lyle Lewis

DATE: 9-7-83
Samples Received: 8-8-83
EAL W.O. No. 45-5300
Harding Lawson Job #: 2176.059.01
Samples Collected: 8-2-83 1st sampling

Well No.		23	21
Analysis	Units	ANLW-16 255-84-7	ANLW-31 255-84-8
Antimony	MG/L	0.70	<0.01
Arsenic	MG/L	0.044	0.006
Beryllium	MG/L	<0.01	<0.01
Cadmium	MG/L	0.057	0.005
Chromium	MG/L	0.057	<0.01
Copper	MG/L	0.09	0.020
Lead	MG/L	0.33	0.04
Mercury	MG/L	<0.0005	<0.0005
Nickel	MG/L	0.40	0.08
Selenium	MG/L	0.06	<0.006
Silver	MG/L	0.053	<0.01
Thallium	MG/L	0.2	<0.01
Zinc	MG/L	0.087	0.043

EAL Corporation

Thermo Electron Corporation

2030 Wright Avenue
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(415) 235-2633
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Report to HARDING LAWSON ASSOCIATES

Well No.		22	23	21	22
Analysis	Units	ANLW-35 255-84-9	ANLW-16 255-84-10	ANLW-31 255-84-11	ANLW-35 255-84-12
Antimony	MG/L	0.62	---	---	---
Arsenic	MG/L	0.056	---	---	---
Beryllium	MG/L	<0.01	---	---	---
Cadmium	MG/L	0.055	---	---	---
Chromium	MG/L	0.057	---	---	---
Copper	MG/L	0.06	---	---	---
Lead	MG/L	0.28	---	---	---
Mercury	MG/L	<0.001	---	---	---
Nickel	MG/L	0.41	---	---	---
Selenium	MG/L	0.04	---	---	---
Silver	MG/L	0.052	---	---	---
Thallium	MG/L	0.2	---	---	---
Zinc	MG/L	0.036	---	---	---
Cyanide	MG/L	---	<0.02	<0.02	<0.02

EAL Corporation

2030 Wright Avenue
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Thermo Electron Corporation

Report to HARDING LAWSON ASSOCIATES

Well No.		23	21	22
		ANLW-16	ANLW-31	ANLW-35
Analysis	Units	255-84-13	255-84-14	255-84-15
Phenol, Total	MG/L	<0.1	<0.1	<0.1

Results for pesticides, volatile organics, and acid & base/neutrals attached.

Laurence E. Penfold
Program Manager
Environmental Science Dept.

Harding Lawson

Date: September 7, 1983
EAL Lab No.: 255-84-1
Client I.D.: ANLW-15 8-2-83
Well No. 23

PRIORITY POLLUTANT DATA SHEET

ACID COMPOUNDS	ug/L(ppb)
2,4,6-trichlorophenol	< 10
p-chloro-m-cresol	< 10
2-chlorophenol	< 10
2,4-dichlorophenol	< 10
2,4-dimethylphenol	38
2-nitrophenol	< 10
4-nitrophenol	< 10
2,4-dinitrophenol	< 10
4,6-dinitro-2-methylphenol	< 10
pentachlorophenol	< 10
phenol	< 10

BASE/NEUTRAL COMPOUNDS	ug/L(ppb)
acenaphthene	< 2
benzidine	<10
1,2,4-trichlorobenzene	< 2
hexachlorobenzene	< 2
hexachloroethane	< 2
bis(2-chloroethyl)ether	< 2
2-chloronaphthalene	< 2
1,2-dichlorobenzene	< 2
1,3-dichlorobenzene	< 2
1,4-dichlorobenzene	< 2
3,3'-dichlorobenzidine	<10
2,4-dinitrotoluene	< 2
2,6-dinitrotoluene	< 2
2,2-diphenylhydrazine	< 2
(as azobenzene)	< 2
fluoroanthene	< 2
4-chlorophenyl phenyl ether	< 2

BASE/NEUTRAL COMPOUNDS	ug/L(ppb)
4-bromophenyl phenyl ether	< 2
bis(2-chloroisopropyl) ether	< 2
bis(2-chlorethoxy)methane	< 2
hexachlorobutadiene	< 2
hexachlorocyclopentadiene	< 2
isophorone	< 2
napthalene	80
nitrobenzene	< 2
N-nitrosodimethylamine	< 2
N-nitrosodiphenylamine	< 2
N-nitrosodi-n-propylamine	< 2
bis(2-ethylhexyl)phthalate	6
butyl benzyl phthalate	< 2
di-n-butyl phthalate	< 2
di-n-octyl phthalate	< 2
diethyl phthalate	< 2
dimethyl phthalate	< 2
benzo(a)anthracene	< 2
benzo(a)pyrene	< 2
benzo(b)fluoranthene	< 2
benzo(k)fluoranthene	< 2
chrysene	< 2
acenaphthylene	< 2
anthracene	< 2
benzo(ghi)perylene	< 2
fluorene	< 2
phenanthrene	< 2
dibenzo(a,h)anthracene	< 2
indeno(1,2,3-cd)pyrene	< 2
pyrene	< 2

Harding Lawson

Date: September 7, 1983

EAL Lab No.: 255-84-2

Client I.D.: ANLW-30 8-2-83
Well No. 21

PRIORITY POLLUTANT DATA SHEET

ACID COMPOUNDS	ug/L(ppb)	BASE/NEUTRAL COMPOUNDS	ug/L(ppb)
2,4,6-trichlorophenol	< 10	4-bromophenyl phenyl ether	< 2
p-chloro-m-cresol	< 10	bis(2-chloroisopropyl) ether	< 2
2-chlorophenol	< 10	bis(2-chlorethoxy)methane	< 2
2,4-dichlorophenol	< 10	hexachlorobutadiene	< 2
2,4-dimethylphenol	< 10	hexachlorocyclopentadiene	< 2
2-nitrophenol	< 10	isophorone	< 2
4-nitrophenol	< 10	napthalene	104
2,4-dinitrophenol	< 10	nitrobenzene	< 2
4,6-dinitro-2-methylphenol	< 10	N-nitrosodimethylamine	< 2
pentachlorophenol	< 10	N-nitrosodiphenylamine	< 2
phenol	< 10	N-nitrosodi-n-propylamine	< 2
BASE/NEUTRAL COMPOUNDS	ug/L(ppb)	bis(2-ethylhexyl)phthalate	10
acenaphthene	< 2	butyl benzyl phthalate	< 2
benzidine	<10	di-n-butyl phthalate	< 2
1,2,4-trichlorobenzene	< 2	di-n-octyl phthalate	< 2
hexachlorobenzene	< 2	diethyl phthalate	< 2
hexachloroethane	< 2	dimethyl phthalate	< 2
bis(2-chloroethyl)ether	< 2	benzo(a)anthracene	< 2
2-chloronaphthalene	< 2	benzo(a)pyrene	< 2
1,2-dichlorobenzene	< 2	benzo(b)fluoranthene	< 2
1,3-dichlorobenzene	< 2	benzo(k)fluoranthene	< 2
1,4-dichlorobenzene	< 2	chrysene	< 2
3,3'-dichlorobenzidine	<10	acenaphthylene	< 2
2,4-dinitrotoluene	< 2	anthracene	< 2
2,6-dinitrotoluene	< 2	benzo(ghi)perylene	< 2
2,2-diphenylhydrazine	< 2	fluorene	< 2
(as azobenzene)	< 2	phenanthrene	< 2
fluoroanthene	< 2	dibenzo(a,h)anthracene	< 2
4-chlorophenyl phenyl ether	< 2	indeno(1,2,3-cd)pyrene	< 2
2-methylnaphthalene	16	pyrene	< 2

Harding Lawson

Date: September 7, 1983

EAL Lab No.: 255-84-3

Client I.D.: ANLW-34 8-2-83
Well No. 22

PRIORITY POLLUTANT DATA SHEET

ACID COMPOUNDS	ug/L(ppb)
2,4,6-trichlorophenol	< 10
p-chloro-m-cresol	< 10
2-chlorophenol	< 10
2,4-dichlorophenol	< 10
2,4-dimethylphenol	< 10
2-nitrophenol	< 10
4-nitrophenol	< 10
2,4-dinitrophenol	< 10
4,6-dinitro-2-methylphenol	< 10
pentachlorophenol	< 10
phenol	< 10

BASE/NEUTRAL COMPOUNDS	ug/L(ppb)
acenaphthene	< 2
benzidine	< 10
1,2,4-trichlorobenzene	< 2
hexachlorobenzene	< 2
hexachloroethane	< 2
bis(2-chloroethyl)ether	< 2
2-chloronaphthalene	< 2
1,2-dichlorobenzene	< 2
1,3-dichlorobenzene	< 2
1,4-dichlorobenzene	< 2
3,3'-dichlorobenzidine	< 10
2,4-dinitrotoluene	< 2
2,6-dinitrotoluene	< 2
2,2-diphenylhydrazine	< 2
(as azobenzene)	< 2
fluoroanthene	< 2
4-chlorophenyl phenyl ether	< 2
4-bromophenyl phenyl ether	< 2
bis(2-chloroisopropyl) ether	< 2
bis(2-chlorethoxy)methane	< 2
hexachlorobutadiene	< 2
hexachlorocyclopentadiene	< 2
isophorone	< 2
napthalene	< 2
nitrobenzene	< 2
N-nitrosodimethylamine	< 2
N-nitrosodiphenylamine	< 2
N-nitrosodi-n-propylamine	< 2
bis(2-ethylhexyl)phthalate	< 2
butyl benzyl phthalate	< 2
di-n-butyl phthalate	< 2
di-n-octyl phthalate	< 2
diethyl phthalate	< 2
dimethyl phthalate	< 2
benzo(a)anthracene	< 2
benzo(a)pyrene	< 2
benzo(b)fluoranthene	< 2
benzo(k)fluoranthene	< 2
chrysene	< 2
acenaphthylene	< 2
anthracene	< 2
benzo(ghi)perylene	< 2
fluorene	< 2
phenanthrene	< 2
dibenzo(a,h)anthracene	< 2
indeno(1,2,3-cd)pyrene	< 2
pyrene	< 2

Harding Lawson

Date: September 7, 1983
EAL Lab No.: 255-84-4
Client I.D.: ANLW 13 & 14 8-2-83
Well No. 23

PRIORITY POLLUTANT DATA SHEET

VOLATILES	ng/mL(ppb)	VOLATILES	ng/mL(ppb)
acrolein	<25	trans-1,3-dichloropropene	< 5
acrylonitrile	<25	cis-1,3-dichloropropene	< 5
benzene	< 5	ethylbenzene	< 5
carbon tetrachloride	< 5	methylene chloride	<50
chlorobenzene	< 5	chloromethane	< 5
1,2-dichloroethane	< 5	bromomethane	< 5
1,1,1-trichloroethane	< 5	bromoform	< 5
1,1-dichloroethane	< 5	bromodichloromethane	< 5
1,1,2-trichloroethane	< 5	fluorotrichloromethane	< 5
1,1,2,2-tetrachloroethane	< 5	dichlorodifluoromethane	< 5
chloroethane	< 5	chlorodibromomethane	< 5
2-chloroethylvinyl ether	< 5	tetrachloroethene	< 5
chloroform	< 5	toluene	235
1,1-dichloroethene	< 5	trichloroethene	< 5
trans-1,2-dichloroethene	< 5	vinyl chloride	< 5
1,2-dichloropropane	< 5		

NON-PRIORITY POLLUTANTS

tetrahydrofuran	25	diethylether	25
diethylacetate	25	1-ethyl-4-methylbenzene	22
ozulene	22		

Harding Lawson

Date: September 7, 1983
EAL Lab No.: 255-84-5
Client I.D.: ANLW 28 & 29
Well No. 21

PRIORITY POLLUTANT DATA SHEET

VOLATILES	ng/mL(ppb)	VOLATILES	ng/mL(ppb)
acrolein	< 5	trans-1,3-dichloropropene	< 1
acrylonitrile	< 5	cis-1,3-dichloropropene	< 1
benzene	6	ethylbenzene	5
carbon tetrachloride	< 1	methylene chloride	<10
chlorobenzene	31	chloromethane	< 1
1,2-dichloroethane	< 1	bromomethane	< 1
1,1,1-trichloroethane	< 1	bromoform	< 1
1,1-dichloroethane	< 1	bromodichloromethane	< 1
1,1,2-trichloroethane	< 1	fluorotrichloromethane	< 1
1,1,2,2-tetrachloroethane	< 1	dichlorodifluoromethane	< 1
chloroethane	< 1	chlorodibromomethane	< 1
2-chloroethylvinyl ether	< 1	tetrachloroethene	< 1
chloroform	< 1	toluene	7
1,1-dichloroethene	< 1	trichloroethene	< 1
trans-1,2-dichloroethene	< 1	vinyl chloride	< 1
1,2-dichloropropane	< 1	acetone	620
		o-xylene	11

Harding Lawson

Date: September 7, 1983
EAL Lab No.: 255-84-6
Client I.D.: ANLW 32 & 33 8-2-83
Well No. 22

PRIORITY POLLUTANT DATA SHEET

VOLATILES	ng/mL(ppb)	VOLATILES	ng/mL(ppb)
acrolein	< 5	trans-1,3-dichloropropene	< 1
acrylonitrile	< 5	cis-1,3-dichloropropene	< 1
benzene	< 1	ethylbenzene	< 1
carbon tetrachloride	< 1	methylene chloride	<10
chlorobenzene	< 1	chloromethane	< 1
1,2-dichloroethane	< 1	bromomethane	< 1
1,1,1-trichloroethane	< 1	bromoform	< 1
1,1-dichloroethane	< 1	bromodichloromethane	< 1
1,1,2-trichloroethane	< 1	fluorotrichloromethane	< 1
1,1,2,2-tetrachloroethane	< 1	dichlorodifluoromethane	< 1
chloroethane	< 1	chlorodibromomethane	< 1
2-chloroethylvinyl ether	< 1	tetrachloroethene	< 1
chloroform	< 1	toluene	< 1
1,1-dichloroethene	< 1	trichloroethene	< 1
trans-1,2-dichloroethene	< 1	vinyl chloride	< 1
1,2-dichloropropane	< 1		

Harding Lawson

Date: September 7, 1983
EAL Lab No.: 255-84-1
Client I.D.: ANLW-15
Well No. 23

PRIORITY POLLUTANT DATA SHEET

PESTICIDES	ug/L (ppb)	PESTICIDES	ug/L (ppb)
a-BHC	<0.1	pp-DDT (4,4')	0.7
g-BHC (lindane)	<0.1	Endrin Aldehyde	0.1
B-BHC	<0.1	Endosulfan Sulfate	0.5
Heptachlor	<0.1	Chlordane	<0.1
D-BHC	0.2	Toxaphene	<3
Aldrin	<0.1	PCB's	
Heptachlor Epoxide	<0.1	PCB-1016	<0.2
a-Endosulfan	<0.1	PCB-1221	<0.2
p,p-DDE (4,4')	<0.1	PCB-1232	<0.2
Dieldrin	<0.1	PCB-1242	<0.2
Endrin	<0.1	PCB-1254	<0.2
p,p-DDD (4,4')	<0.1	PCB-1260	<0.2
B-Endosulfan	<0.1	PCB-1262	<0.2
1,2,3,4-TCDD	<0.1		

Harding Lawson

Date: September 7, 1983

EAL Lab No.: 255-84-2

Client I.D.: ANLW-31
Well No. 21

PRIORITY POLLUTANT DATA SHEET

PESTICIDES	ug/L (ppb)	PESTICIDES	ug/L (ppb)
a-BHC	0.2	pp-DDT (4,4')	<0.1
g-BHC (lindane)	<0.1	Endrin Aldehyde	<0.1
B-BHC	<0.1	Endosulfan Sulfate	0.1
Heptachlor	0.4	Chlordane	<0.1
D-BHC	<0.1	Toxaphene	<3
Aldrin	<0.1	PCB's	
Heptachlor Epoxide	<0.1	PCB-1016	<0.2
a-Endosulfan	<0.1	PCB-1221	<0.2
p,p-DDE (4,4')	<0.1	PCB-1232	<0.2
Dieldrin	<0.1	PCB-1242	<0.2
Endrin	<0.1	PCB-1254	<0.2
p,p-DDD (4,4')	<0.1	PCB-1260	<0.2
B-Endosulfan	<0.1	PCB-1262	<0.2
1,2,3,4-TCDD	<0.1		

Harding Lawson

Date: September 7, 1983

EAL Lab No.: 255-84-3

Client I.D.: ANLW-34
Well No. 22

PRIORITY POLLUTANT DATA SHEET

PESTICIDES	ug/L (ppb)	PESTICIDES	ug/L (ppb)
a-BHC	<0.1	pp-DDT (4,4')	<0.1
g-BHC (lindane)	0.3	Endrin Aldehyde	<0.1
B-BHC	<0.1	Endosulfan Sulfate	<0.1
Heptachlor	0.2	Chlordane	<0.1
D-BHC	<0.1	Toxaphene	<0.6
Aldrin	0.1	PCB's	
Heptachlor Epoxide	<0.1	PCB-1016	<0.1
a-Endosulfan	<0.1	PCB-1221	<0.1
p,p-DDE (4,4')	<0.1	PCB-1232	<0.1
Dieldrin	<0.1	PCB-1242	<0.1
Endrin	<0.1	PCB-1254	<0.1
p,p-DDD (4,4')	<0.1	PCB-1260	<0.1
B-Endosulfan	<0.1	PCB-1262	<0.1
1,2,3,4-TCDD	<0.1		

APPENDIX E

DHS COMMENTS TO WORK PLAN AND PRC RESPONSE

DHS Comments on the Monitor Well
Decommissioning Plan: 1943-1956 Disposal Area
and West Beach Landfill
January 24, 1991

Pg	Sec	Pgph	Comment
5	2.1	2	Title 22, is called the California Code of Regulations (CCR), not the California Administrative Code. The statement "Concentrations below the TTLC concentrations (sic) are defined as nonhazardous." is incorrect. Either clarify or remove the statement.
9	2.2	2	Recommend the addition of **Oil and Grease** as components identified in the groundwater samples. DHS also recommends editing "Heavy metal concentrations...." to, **Individual** heavy metal concentrations were less than 1 part per million **for each well sampled.**
10	3.0	4	Propose an approach to verify that the fill material and Merritt sands are "hydraulically connected."
13	4.0	3	Submit the method and specifications to be used for well abandonment to the DHS for review prior to initiating work.

ENCL-1

PRC response to DHS Comments on the
Monitoring Well Decommissioning Plan: 1943-1956 Disposal Area
and West Beach Landfill
January 24, 1991

Pg	Sec	Pgph	Response
5	2.1	2	"California Administrative Code" has been replaced with "California Code of Regulations". The statement " Concentrations below the TTLC concentrations are defined as nonhazardous" has been deleted from the text.
9	2.2	2	Oil and grease has been added to the list of components identified in ground water samples. The statement " Heavy metal concentrations were less than 1 part per million" has been changed to "Individual heavy metal concentrations were less than 1 part per million for each well sampled".
10	3.0	4	A fifth paragraph was added to Section 3.0. This paragraph presents an approach to verify that the fill material and the Merritt sand are hydraulically connected. This approach is to conduct an aquifer test. Although an aquifer test will not be conducted for this project (CTO 95), more than one aquifer test will be conducted in this area for Phase 5 (CTO 107) of the Remedial Investigation/Feasibility Study.
13	4.0	3	The method and specifications, submitted by the subcontractor who will be performing the well abandonment, will be submitted to the DHS before field work is initiated. The statement "The method and specifications to be used for well abandonment will be submitted to the DHS for review prior to initiating work" was added to the 4th paragraph in Section 4.0.