PALOS VERDES LANDFILL
REMEDIAL INVESTIGATION REPORT

APPENDIX C.1.2

GEOLOGIC LOGS: RI BORINGS

START DATE: 6-21-90 FINISH DATE: 6-26-90

ELEVATION: 327.30' MSL

EQUIPMENT: 8" Hollow Augers to 50', HQ Rotary Wash Coring 50-175'

LOGGED BY: Hagen, RG #4788, 0 - 67'
Phillips, RG #3718, 67' - 175'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												0	327	
84	23	X		X	2.60	0.65	64	22		47		5	322	
86	56	X			2.35		88	21		64 /11"		10	317	
82	44	X			2.49		NP	NP		38		15	312	
56	59	X			2.46		105	31		54 /10"		20	307	
	17	X			2.25		88	35		41 /10"		25	302	
44	54	X	X		2.78	0.60	96	47		55 /10"		30	297	
30	50			X		0.64	101	58		32 /5"		35	292	
21	99	X	X		2.32	0.76	NP	NP		53		40	287	
20	95	X	X			0.78	110	42		53 /10"		45	282	

GRAY-BROWN GRAVELLY SILT (MH)
dry, some organic debris, contains large blocks of Valmonte diatomite and layers of sandy gravel
(FILL)

color of 2.5Y 5/3, becoming moist

FILL

VALMONTE DIATOMITE

LIGHT TO MEDIUM BROWN WELL LAMINATED SHALY DIATOMITE
moist, highly weathered, fissle, hard to soft (VALMONTE MEMBER OF THE MONTEREY FORMATION)

Tar-filled fractures

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB- 1

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-21-90 FINISH DATE: 6-26-90

ELEVATION: 327.30' MSL

EQUIPMENT: 8" Hollow Augers to 50', HQ Rotary Wash Coring 50-175'

LOGGED BY: Hagen, RG #4788, 0 - 67'
Phillips, RG #3718, 67' - 175'

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
74	85	X					112	36		33		50 377	Thinly laminated, 2.5Y 5/3 color (light olive brown), highly weathered, soft and friable 51-55' alternating layers of light and dark brown shaly diatomite 1/8"-1" thick
												55 372	54 1/2 - 55 is black tar-coated laminated shaly diatomite. Bedding trends 38 degrees to core axis 55-59-1/2' consists of brecciated light brown dolostone, cemented by black tar, abundant tar filling fractures, breccia fragments, from 1/16" to 3-5" across, most 1/2 - 1" across, highly angular edges, weak to moderately strong HCl reaction, moist
												60 367	VALMONTE DIATOMITE ALTAMIRA SHALE PHOSPHATIC FACIES Below 59 1/2 consists of dark brown, very weathered, soft, massive silty diatomite. Assumed contact between Valmonte and Altamira members 61 - 68' poor recovery
												65 362	68' tar matrix with dolostone/siltstone breccia, hard drilling, poor recovery
												70 357	70' dark brown to gray, thinly laminated diatomaceous shale with light gray brown bedding at 20 degrees, fractures along bedding that are closed, clean and smooth 1 foot thick breccia zone at 71.2 72' fracture 70 degrees to core axis, very rough and filled with tar 73' - 73.8', breccia zone 73.8' becomes highly indurated, highly fractured, fractures are along bedding plane and at 70 degrees to core axis, high angle fractures are very rough with some clay infilling and tar
												75 352	brecciated, 76 - 77' 77.7' fracture at 80 degrees, rough and clean, bedding at 25 degrees to core 78.5' - 80.3' highly fractured, narrow, clean along bedding and at 80 degrees normal to the bedding (also closed, filled fracture at 80 degrees) 78.8', 2" thick black, poorly indurated, mudstone with light brown interbeds
									20.0			80 347	80.2' - 83' brecciated zone, loss of core 84.0' becomes intensely fractured and silicified to 85.5'
												85 342	85.5' highly fractured, thinly bedded, moderately indurated, fractures along bedding and normal to bedding, bedding at 25 degrees to core axis, interbeds of light gray diatomite 87.0' becomes brecciated and very poorly indurated mudstone 88.5 - 89.5' well indurated, intensely fractured siltstone/dolostone fractures along bedding at 28 degrees are clean, narrow and smooth, fractures normal to bedding are at 70 degrees, wide and tar filled 90.0' normal high angle fracture, narrow, clean and smooth 90.5' becomes poorly indurated 91.8' becomes silicified
		X			2.37							90 337	92.5' becomes brecciated, observable bedding at about 30 degrees with minor interbeds of light gray diatomite
												95 332	98.0' well bedded at 30 degrees with fractures along bedding 99.0' silicified and intensely fractured; tarry shale

Herzog Associates
Geoscientists

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LOG OF BORING RFB- 1

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-21-90 FINISH DATE: 6-26-90

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EQUIPMENT: 8" Hollow Augers to 50', HQ Rotary Wash Coring 50-175'

LOGGED BY: Hagen, RG #4788, 0 - 67'
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MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100	427	
												105	422	
												110	417	
		X										115	412	
												120	407	
												125	402	
												130	397	
					2.49		62	23	95.3			135	392	
												140	387	
									124			145	382	

101.0' becomes poorly indurated

102.0' becomes highly indurated, silicified, and tarry intensely fractured, very dark gray to black in color

104.0' becomes highly indurated, light gray, very fine grained dolostone, bedding at 30 degrees, fractures along bedding at 80 degrees, high angle fractures are narrow to tight, rough and filled with tar

105.8' fracture approximately 1/2" wide is healed with light gray calcite

107.5' diatomaceous shale, crushed and very thinly laminated

108.5' becomes highly indurated tarry siliceous shale, (very hard with concoidial fracture), intensely fractured, tar healed fractures that are very rough, normal to the bedding and smooth along the bedding (at 30 degrees)

112.5' becomes highly indurated, dolostone with calcite cement, fractures at 80, 30 and 40 degrees are closely spaced, very rough and filled with tar

114.5' becomes poorly indurated dark diatomaceous siltstone, friable bedding at 25 degrees and fractured, normal to bedding

119.0 siliceous shale crushed with tar along very rough, random oriented fractures

121.0' grades to light gray dolostone, highly indurated and highly to moderately fractured, fractures are along bedding at 25 degrees, calcite and some tar fillings

124.5' becomes less indurated diatomaceous shale

125-126' light gray calcareous, very fine sandstone, intensely fractured, highly indurated, tar healed fractures, bedding at 25 degrees,

126 - 127.5' becomes brecciated with abundant tar

127.5-128.5' crushed zone (loss of core)

128.5' dark brown to black silty shale, bedding at 30 degrees, moderately indurated

129.0' becomes poorly indurated (soft)

129.5' becomes crushed (siliceous shale) indurated

132.0' light gray very fine grained dolostone, highly indurated, intensely fractured, fractures along bedding (30 degrees) and normal to bedding (at 80 degrees) are very rough and filled with tar

132.8' becomes highly indurated, thinly bedded shale intensely fractured with abundant tar in-filling

133.2' crushed zone (loss of core)

135.0' becomes poorly indurated, dark brown thinly bedded diatomaceous siltstone (25 degrees). Microfossil data indicates upper middle Miocene (Altamira) (25 degrees)

135.5' crushed zone

136.0' becomes more indurated, dolostone, calcareous, intensely fractured, bedding plane fractures at 20 degrees slickensided and filled with tar

137.5' becomes poorly indurated diatomaceous shale

138.0' loss of core, becomes crushed, highly indurated siliceous shale, tarry

141.2' becomes siliceous

142.0' poorly indurated, intensely fractured

143.0' highly indurated, light gray dolostone, intensely fractured, fractures healed with tar, very rough

145.0' crushed zone, abundant tar along pervasive fractures

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MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet) / Elev.	
		X			1.83							150 / 477	150-151.2' becomes light gray, dolostone, highly indurated, highly fractured, bedding at 30 degrees 152.0' fracture 80 degrees, very rough, tight, clean, no tar, infilling diatomaceous shale, bedding plane fractures at 30 degrees, moderately indurated, thin, discontinuous interbeds of calcareous siltstone 152.5' becomes poorly indurated, friable 153.0' becomes highly indurated, light gray dolostone, highly fractured, calcite infilling and tar along rough fractures 154.5' becomes very poorly indurated, highly fractured diatomaceous siltstone 158 - 163' lost core, hole taking lots of water in this zone, must add small amount of "clear mud", polymer drilling additive
												155 / 472	
												160 / 467	
												165 / 462	167.5' rock becomes hard, fracture at 70 degrees, smooth, wide and infilled with tar, dolostone, highly indurated 168 - 173' loss of circulation, very little return, hole taking large volumes of water, regained circulation after adding small amount of "clear mud" polymer 173 - 175' no recovery
												170	
												175	

BOTTOM OF BORING RFB-1 @ 175 FEET
No free water encountered to 50' (rotary wash coring started).
Caliper, neutron, natural gamma and gamma guard geophysical logs performed to total depth; see Appendix C.
Boring backfilled to surface with Volclay grout.
*Converted to standard penetration blow counts

PIEZOMETER

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Geoscientists

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LOG OF BORING RFB- 1

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-12-90

ELEVATION: 201.40' MSL

EQUIPMENT: 8" Hollow Auger

LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												0 201	LIGHT BROWN SILTY SAND (SM) Damp, (FILL)	
		X			2.65		37	19		31		5 196	DARK BROWN SANDY TO SILTY CLAY WITH OCCASIONAL GRAVEL (CL) gravel is angular, moist with clay binder, gravel consists of chert and light gray diatomaceous siltstone (FILL)	
													Color change to light brown	
	21	X	X		2.64	0.46	63	32		49		10 191	CLAY GRAVEL (GC)	
76	21	X	X		2.65	0.51	54	24		40		15 186	SANDY SILT (MH)	
12	24	X			2.63		55	21		16		20 181		
										35 /2"		25 176	FILL	
													SAN PEDRO SAND	
					2.68					32 /5"		30 171	BROWN SAND (SM) fine to coarse-grained, moist, dense (SAN PEDRO SAND UNIT)	
		X		X		0.42				32 /4"		35 166	becomes streaked with gray	
										32 /4"		40 161		
				X	2.70	0.39				32 /4"		45 156	gray fine to coarse sand (SW)	

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Geoscientists

Job No: 15384.01.00.7
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Date: DEC 1990

LOG OF BORING RFB-2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-12-90
ELEVATION: 201.40' MSL
EQUIPMENT: 8" Hollow Auger
LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
		X								32 /3"		50 151	
										32 /4"		55 146	
					2.68					32 /4"		60 141	
		X		X		0.41				32 /4"		65 136	
										32 /4"		70 131	
												75 126	
										32 /4"		80 121	
												85 116	
					2.67					32 /4"		90 111	
												95 106	

becomes brown gray in color

color change to gray with occasional small rounded gravel

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LOG OF BORING RFB-2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-12-90

ELEVATION: 201.40' MSL

EQUIPMENT: 8" Hollow Auger

LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
		X								32 /4"		100	101	
												105	96	
19	22	X			2.74		NP	NP		32 /6"		110	91	
												115	86	
84	21				2.73		37	8		32 /6"		120	81	
												125	76	
		X								32 /3"		130	71	
										32 /4"		135	66	
5	24		X		2.69	0.50	40	11		32 /6"		140	61	
												145	56	

LIGHT GRAY VERY FINE SANDY SILT/SILTY SAND (ML/SM) moist to wet, stiff to very stiff, clay binder (SAN PEDRO SAND)

115 - 116' possible cemented zone

MOTTLED GRAY ORANGE VERY FINE SANDY SILT (ML) moist to wet, color is 5Y 5/1, stiff to very stiff (SAN PEDRO SAND)

change to olive gray very fine to medium grained sand with occasional shell fragments, moist to wet, color is 5Y 6/1 dry (LOMITA MARL UNIT)

abundant shells and slight organic decomposition odor

very small shells present

SAN PEDRO SAND

VALMONTE DIATOMITE

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Geoscientists

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LOG OF BORING RFB- 2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-12-90
ELEVATION: 201.40' MSL
EQUIPMENT: 8" Hollow Auger
LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
13	39	X								32 /6"		150 51	INTERLAYERED DARK GRAY BROWN AND LIGHT BROWN GRAY DIATOMACEOUS SILTSTONE color of 2.5Y, 4/2 and 2.5Y, 6/2, intensely fractured (closed, clean, slickensided), soft, friable, wet with strong organic decomposition odor (VALMONTE MEMBER OF THE MONTEREY FORMATION)	
20	29		X		2.22	0.67				38		155 46		

BOTTOM OF BORING RFB-2 AT 156.5 FEET
Sparse Water Encountered - No water sample obtained.
No geophysical logging performed.
Boring backfilled to surface with Volclay grout.
*Converted to standard penetration blow counts.

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LOG OF BORING RFB-2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-20-90 FINISH DATE: 6-27-90
ELEVATION: 176.45' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												0	176	
30	28						51	31				5	171	
56	39	X			2.68		53	24				10	166	
22	36	X			2.57		54	25				15	161	
24	43	X	X			0.63						20	156	
18	31	X	X		2.55	0.47	51	21				25	151	
	50		X		2.70	0.60	56	31				35	141	
24	14	X					56	29				40	136	
21	50	X					60	34				45	131	

LIGHT OLIVE BROWN SANDY CLAY (CH)
color of 2.5Y 5/4 color, moist, stiff

becomes gravelly

color is 2.5Y 4/3, moist, very stiff (COLLUVIUM)

GRAVELLY SILTY SAND (SM)

color is 2.5Y 4/3, moist, hard, clasts consist of silicous siltstone

abundant rock fragments of diatomaceous siltstone (COLLUVIUM/ALLUVIUM)

BROWN CLAYEY GRAVEL (GC)
color of 10 YR 5/3, moist, dense

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LOG OF BORING RFB- 3 (RENAMED M50B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-20-90 FINISH DATE: 6-27-90
ELEVATION: 176.45' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)
24	21	X			2.59							50 126
	8	X			2.80		56	32				55 121
25	11	X			2.68		53	31				60 116
26	12	X	X		2.71	0.35	NP	NP				65 111
22	22	X			2.71		49	29				70 106
19	13	X	X		2.65	0.32	43	23				75 101
36	16	X	X		2.73	0.33	39	23				80 96
49	22	X			2.74		42	23				85 91
												90 86
												95 81

gravel content is 90%, consisting of angular clasts of siltstone and highly siliceous siltstone, 10% clay matrix of brown moist, very stiff clay

BROWN SAND (SP) moist, dense, color of 10YR 5/3 (ALLUVIAL TERRACE)

VERY DARK GRAY BROWN GRAVELLY CLAY (CL) color is 2.5Y 3/2, moist, hard, gravel clasts are of angular siliceous siltstone

LIGHT GRAY SILTY SAND (SM) color of 2.5Y 7/2, moist, hard, very fine to medium grained sand, very silty

DARK GRAY BROWN GRAVELLY CLAY (CL) color of 2.5Y 4/2, moist, hard, very hard drilling (quartz fragments)

PIEZOMETER

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Date: DEC 1990

LOG OF BORING RFB-3 (RENAMED M50B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-20-90 FINISH DATE: 6-27-90
ELEVATION: 176.45' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
47	24	X			2.71		52	33				100 76	COLLUVIUM/ALLUVIUM
													SAN PEDRO SAND
28	6	X			2.69		39	23				105 71	DARK GRAY BROWN SILTY SAND (SM) color of 2.5Y 4/2, moist, very stiff with brown clayey siltstone modules (SAN PEDRO SAND UNIT)
												110 66	less fines, sand very clean (SP)
9	20	X			2.73		40	24				115 61	very silty (SM), traces of pebbles
													PALE YELLOW SAND (SP) color of 2.5Y 7/3, moist, dense, very fine to fine grained, micaceous
36	11	X	X	X	2.72	0.39	31	15				120 56	
												125 51	
0	7	X		X	2.40	0.45	NP	NP				130 46	
												135 41	
12	13	X		X	2.68	0.48	NP	NP				140 36	
												145 31	

PIEZOMETER

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LOG OF BORING RFB- 3 (RENAMED M50B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-20-90 FINISH DATE: 6-27-90
ELEVATION: 176.45' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150		
												26		
												155		
												21		
		X			2.68		NP	NP				160		
												16		
												165		
												11		
												170		
												6		
												175		
												1		
12	5				2.69	0.46	NP	NP				180	slight rusty mottling	
												-4		
												185	water level 7-25-90	
												-9		
													water level encountered during drilling 6-27-90 @ 1530 hours	
												190	becomes gray, color 10 YR 5/1, wet, dense, well sorted, very fine to fine grained, micaceous	
												-14		
												195		
												-19	minor very thin clay seams	

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PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-20-90 FINISH DATE: 6-27-90

ELEVATION: 176.45' MSL

EQUIPMENT: Reverse Air Rotary

LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
												200 -24	
												205 -29	

BOTTOM OF BORING RFB-3 AT 205 FEET

Neutron and natural gamma geophysical logging performed to total depth; see Appendix C.

Borehole water sample obtained 6/27/90.

Piezometer RFB-3 constructed in reamed boring on 7/2/90.

*Samples obtained by pushing sampler into soils.

START DATE: 7-10-90 FINISH DATE: 7-17-90

ELEVATION: 217.90' MSL

EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-208'

LOGGED BY: Phillips, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth (feet)	Elev.	Description
												0	218	GRAY-LIGHT BROWN CLAYEY SAND (SC) Stiff, moist to dry with gravel and some cobbles and shell fragments (FILL)
11	11	X	X		2.76	0.41	NP	NP		23		5	213	
														GRAY-GREEN SILTY SAND (SM) Dense, moist with gravel (FILL)
2	12	X								38 /9"		10	208	GRAY-LIGHT BROWN SILTY SAND (SM) Stiff, moist with gravel, (FILL)
			X		2.75	0.50	43	10		41		15	203	becomes orange-brown in color, very stiff, moist with dark brown to black interbeds and some gravel
12	19	X								47		20	198	FILL
														LOMITA MARL
		X					39	9		46		25	193	LIGHT YELLOW-LIGHT BROWN SILTY SAND (SM) Very dense, moist with abundant shell fragments (sand is very fine grained with some gravel that is well rounded and typically sub-spherical) (LOMITA MARL)
2	13	X			2.80		NP	NP		47		30	188	
														becomes more dense
8	13	X	X		2.82	0.45	NP	NP		48		35	183	
														VERY LIGHT GRAY-LIGHT BROWN SANDY CLAY (CL) hard, dry to moist, strong HCl reaction (calcareous) (LOMITA MARL)
										32 /6"		40	178	
														becomes wet (some free water in sample)
6	10				2.77					32 /6"		45	173	

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB- 4

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-17-90

ELEVATION: 217.90' MSL

EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-208'

LOGGED BY: Phillips, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
18	18	X			2.79	0.43	NP	NP		52		50 168	LIGHT YELLOW-LIGHT BROWN SILTY SAND (SM) Becomes very stiff indurated, very dense, highly calcareous, dry (LOMITA MARL)
3	14				2.80					32 /6"		55 163	
12	13	X		X	2.75		NP	NP		51		60 158	
	10	X			2.77		NP	NP		48		65 153	
	16	X			2.82		36	9		42		70 148	LIGHT GRAY-LIGHT BROWN SANDY SILT (ML) stiff, moist to wet, with shell fragments, Lomita Marl
	14	X			2.83		30	7		45		75 143	LIGHT GRAY-LIGHT BROWN SAND (SW) very dense, (some sand-sized clasts are shell fragments) calcareous, Lomita Marl groundwater encountered during drilling
2	27	X			2.79		NP	NP		40		80 138	becomes wet
20	1	X		X	2.79	0.36	28	5		45		85 133	becomes saturated and sand can flow, some silt content and gravel increase in gravel content
1	54	X		X	2.79	0.43	NP	NP		45		90 128	
		X								47		95 123	

PIEZOMETER

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Geoscientists

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LOG OF BORING RFB-4

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-17-90

ELEVATION: 217.90' MSL

EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-208'

LOGGED BY: Phillips, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
										32 /6"		100 118	abundant shell fragments	
												105 113		
													LOMITA MARL	
													MALAGA MUDSTONE	
												110 108	DARK OLIVE-BROWN TO BLACK MUDSTONE fractured, low hardness, friable, weathered with some interbeds of blue-gray ash (MALAGA MEMBER OF THE MONTEREY FORMATION)	
		X					94	44				115 103	115.5' fracture at 50 degrees to core axis, narrow, clean and smooth	
												120 98	115.8 to 116.2 and 117.8 to 119' intensely fractured to crushed zone 119 - 124' lost core	
												125 93	123.4' fracture at 55 degrees, very rough, clean, some with slickensides 125.4 - 125.9' crushed, several high angle fractures (+/- 75 degrees) smooth to rough 126.5' fracture at 70 degrees slickensided	
												130 88	129' grades to gray-green 129.5' fracture, 50 degrees to core, very rough and slickensided (may be bedding plane fracture) LIGHT GRAY DOLOSTONE hard, strong unfractured, very fine grained	
												135 83	136' grades from gray-green in color to dark olive, light gray very fine sandy interbed at 50 degrees (2" thick) 136.2' fracture at 50 degrees, very rough, slickensided (bedding fracture) 136.2 - 139' crushed zone	
												140 78	DARK GRAY-GREEN DOLOSTONE interbed at 40 degrees to core axis, indurated 141.9' fracture at 35 degrees, very rough, slickensided	
												145 73	143.8' thin interbeds of light gray very fine ash at 40 degrees, distorted bedding	
													146.7' interbed of light gray very fine ash contorted ashy layers	

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LOG OF BORING RFB- 4

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-17-90

ELEVATION: 217.90' MSL

EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-208'

LOGGED BY: Phillips, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150	150.0' some faulted offsets 150.5' grades to light gray dolostone, hard, strong, few fractures 151.5' fracture at 50 degrees rough clean 152.0' grades to dark olive mudstone, low hardness, weak to friable	
										68				
												155	152.6' fractures very narrow to closed, smooth slickensided, bedding plane fractures at 40 degrees 153.8' becomes very highly fractured 154 - 159' thin bedded mudstone with very thin interbeds of fine ash, bedding at 40 degrees, bedding plane fractures and some micro faulting	
										83				
												160	159.5' 1" thick interbed of gray ash laminated light and dark layers (diatomaceous shale) 161.2' becomes crushed, conjugate fractures at 50 and 70 degrees, smooth, slickensided, clean	
										58				
													MALAGA MUDSTONE VALMONTE DIATOMITE	
												165	SHALY DIATOMITE VALMONTE MEMBER OF MONTEREY FORMATION bedding at 40 degrees, alternating beds of massive mudstone, ash and thin interbeds, dark and light diatomaceous shale, core is low density, (diatomite), abundant micro fracturing and bedding deformation 166.3' conjugate fractures, narrow, clean and slickensided at 30 and 40 degrees to core axis	
										53				
												170	170 - 171' highly fractured	
										48				
												175	interbeds of blue-gray ash 176.0' becomes highly indurated and very highly fractured 177.7' becomes very thinly bedded mudstone/diatomite bedding at 45 degrees	
										43				
												180	highly fractured zone 180' very well developed bedding, alternating light gray diatomite with dark blue-brown mudstone, low density, very thinly bedded, little natural fracture, abundant deformation and micro fracturing of all bedding 183' thin blue-gray ash interbed 1/2" thick at 40 degrees	
										38				
												185	fracture very rough, clean at 70 degrees all bedding is offset by micro faulting and fractures are healed with dark brown to black mudstone, many healed fractures are near vertical 187.2' interbed of medium coarse sand with abundant shell fragments (near vertical) offset at low angle 188.5' interbed of medium coarse sand with abundant shell fragments 60 degrees	
										33				
												190	190.7' very narrow lense of dark olive-brown chert (discontinuous) 191.4' thin bed of blue-gray ash at 30 degrees	
										28				
												195	194.5 - 199' intensely fractured zone, may be fault gouge, poor core recovery, mudstone clasts are angular/brecciated	
										23				
													laminated light and dark diatomaceous shale with minor ash component	

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LOG OF BORING RFB-4

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-10-90 FINISH DATE: 7-17-90
ELEVATION: 217.90' MSL
EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-208'
LOGGED BY: Phillips, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
										18		200	laminated diatomaceous shale	
										13		205		

BOTTOM OF BORING RFB-4 AT 208 FEET
Neutron and natural gamma geophysical logs performed to total depth; see Appendix C.
Borehole water sample obtained on 7/11/90.
Boring backfilled to surface with Volclay grout.
Drilled Boring RFB-4B adjacent to RFB-4 for piezometer completion.
*Converted to Standard Penetration Blow Counts

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LOG OF BORING RFB- 4

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-18-90 FINISH DATE: 7-18-90

ELEVATION: 218.00' MSL

EQUIPMENT: 8" Diameter Hollow Augers

LOGGED BY: Phillips, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth (feet) / Elev.		PIEZOMETER
												0 / 218	GRAY-BROWN SANDY GRAVEL (GP) dense, moist to dry with clay and cobbles to 4" diameter (FILL)	
												5 / 213	GRAY-LIGHT BROWN SANDY CLAY (CL) Stiff, dry to moist with gravel (FILL)	
												10 / 208	GRAY BROWN SILTY SAND (SM) dense, moist (FILL)	
													BROWN SANDY CLAY (CL) stiff, moist to wet with some gravels (FILL)	
												15 / 203	BROWN SANDY SILT (ML) stiff, moist (FILL)	
													FILL	
													LOMITA MARL	
												20 / 198	ORANGE BROWN SANDY CLAY (CL) very stiff, moist, highly calcareous (strong HCl reaction) (LOMITA MARL)	
													YELLOW BROWN CLAYEY SAND (SC) Very dense, moist with abundant shell fragments	
												25 / 193		
												30 / 188	becomes hard to drill, angular gravels	
												35 / 183	gravel lense, hard to drill, clasts of indurated marl	
													LIGHT GRAY-BROWN SANDY CLAY (CL) soft, wet, LOMITA MARL	
												40 / 178	becomes wet (free of water on surface of sand grains), gravel clasts of marl and shell fragments and some rounded sub-spherical gravels	
												45 / 173		

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LOG OF BORING RFB- 4B (RENAMED M51B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-18-90 FINISH DATE: 7-18-90

ELEVATION: 218.00' MSL

EQUIPMENT: 8" Diameter Hollow Augers

LOGGED BY: Phillips, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)
												50 168
												55 163
												60 158
												65 153
												70 148
												75 143
												80 138
												85 133
												90 128
												95 123

saturated, highly reactive to HCl

groundwater level 7/26/90

free water on augers

LOMITA MARL

MALAGA MUDSTONE

DARK OLIVE BROWN MUDSTONE
MALAGA MEMBER OF MONTEREY FORMATION

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Date: DEC 1990

LOG OF BORING RFB-4B (RENAMED M51B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-16-90 FINISH DATE: 7-16-90

ELEVATION: 218.00' MSL

EQUIPMENT: 8" Hollow Auger

LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												0 218	BROWN SILTY SAND (SM) with gravel (FILL)	
												5 213	calcareous, strong HCl reaction, loose (FILL)	
												10 208	thin gravel zones encountered	
												15 203		
												20 198		
												25 193		
												30 188	29' slight increase in gravel content	
												35 183	FILL / LOMITA MARL	
													LIGHT BROWN SILTY SAND (SM) moist, moderately well consolidated (pieces up to 2" across), strong HCl reaction on moist sand, fossiliferous, native materials belonging to the LOMITA MARL 38 - 39' less consolidated, becomes wet	
												40 178		
												45 173	less water, wet to moist	

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Date: DEC 1990

LOG OF BORING RFB- 4A

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-16-90 FINISH DATE: 7-16-90

ELEVATION: 218.00' MSL

EQUIPMENT: 8" Hollow Auger

LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
												50 168	
												55 163	
												60 158	
												65 153	
												70 148	
												75 143	
												80 138	
												85 133	
												90 128	

occasional small gravel clasts

moist to wet, some shell fragments to 1/2" across

wet to near saturated

groundwater level 7/18/90

near saturated

LOMITA MARL

MALAGA MUDSTONE

DARK BROWN CLAYEY MUDSTONE
weak petroleum odor, micaceous, massive, (MALAGA MEMBER OF THE MONTEREY FORMATION)

BOTTOM OF BORING RFB-4A AT 90 FEET
No geophysical logging performed.
Boring RFB-4A located 21.5 feet north of RFB-4.
Temporary 2" PVC observation well constructed in boring for use during aquifer testing of piezometer RFB-4B.
Boring RFB-4A later backfilled to surface with Volclay grout.
*No samples obtained, logged drill cuttings.
No borehole water sample obtained.

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Date: JAN 1991

LOG OF BORING RFB- 4A

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	START DATE: 7-18-90 FINISH DATE: 7-18-90 ELEVATION: 218.00' MSL EQUIPMENT: 8" Diameter Hollow Augers LOGGED BY: Phillips, RG #3718	PIEZOMETER
												100 118	BOTTOM OF BORING RFB-4B AT 100 FEET No geophysical logging performed. Constructed piezometer RFB-4B in reamed boring on 7/20/90. *No samples obtained, logged drill cuttings. No borehole water sample obtained.	

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Date: JAN 1991

LOG OF BORING RFB- 4B (RENAMED M51B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-15-90

ELEVATION: 262.20' MSL

EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-174'

LOGGED BY: R. Hagen, RG #4788

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												0 262	
	15	X			2.72		42	11		44 /11"		5 257	LIGHT BROWN SILTY SANDY GRAVEL (GM) Moist, color of 2.5Y 7/3 (FILL)
19	19	X			2.78		31	4		36		10 252	
													FILL
													LOMITA MARL
17	27	X			2.80		45	9		32		15 247	LIGHT BROWN GRAVELLY CALCAREOUS SILTY SAND (SM) Moist, color of 2.5Y 6/2, abundant unbroken sea shells, native materials belonging to the LOMITA MARL
25	20	X	X		2.77	0.48	NP	NP		51 /10"		20 242	
23	18	X		X	2.75	0.45	35	10		63 /10"		25 237	Light reddish brown color, slightly consolidated fine to medium grained sand, abundant sea shell fragments, very strong HCl reaction on sand matrix, 2.5Y 6/4 color, moist to dry
21	23	X	X		2.74	0.55	NP	NP		28		30 232	no gravel present, light reddish brown calcareous silty sand
23	20	X	X		2.74	0.39	NP	NP		38		35 227	
13	22	X	X		2.73	0.50	25	2		38		40 222	becomes mottled red-brown and gray-brown silty sand
11	24	X			2.77		33	8		48 /10"		45 217	slightly more consolidated, increase in cement content

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Geoscientists

Job No: 15384.01.00.7
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Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-6

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-15-90
ELEVATION: 262.20' MSL
EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-174'
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
		X			2.78		42	9		24		50 212		
11	30	X			2.75		36	3		54 /8"		55 207		
6	19	X		X	2.77	0.50	40	5		52		60 202	becomes unconsolidated, color is 2.5Y 6/6, increase in moisture	
	30	X		X	2.79	0.51	43	8		58 /10"		65 197	66 - 67' driller noted slow drilling	
2	13						NP	NP		32 /4"		70 192		
3	6	X								32 /3"		75 187	LIGHT BROWN SAND (SP) moderately consolidated, tough drilling to get to 75', strong HCl reaction, sand grains are angular, medium to coarse grained, abundant shell fragments, moist, color is 2.5Y 8/3 (LOMITA MARL)	
3	17	X			2.78		NP	NP		38		80 182	BROWN SILTY SAND (SM) strong HCl reaction, unconsolidated, moist, abundant shell fragments, color is 2/5Y 5/3	
													LOMITA MARL	
55	25	X	X		2.50	0.57	110	60		47 /11"		85 177	MALAGA MUDSTONE DARK OLIVE GRAY MICACEOUS MUDSTONE color is 5Y 2.5/2, no free water seen at contact, MALAGA MEMBER OF THE MONTEREY FORMATION	
51	17									32 /4"		90 172	strong petroliferous odor, locally silicified (?)	
												95 167		

START DATE: 6-12-90 FINISH DATE: 6-15-90

ELEVATION: 262.20' MSL

EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-174'

LOGGED BY: R. Hagen, RG #4788

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
88	7						109	51		44 /10"		100 182	slickensided on broken surfaces, color is 5Y 2.5/1
												105 157	
												110 152	very dark gray micaceous mudstone, strong petroleum odor
												115 147	massive, color is 5Y 2.5/1, conjugate sets of fractures at approximately 30 degrees to core axis, spaced approximately 6-10" apart, contorted bedding at 116 - 119
												120 142	increased drilling rate at 122', unfractured, varies from finely laminated to massive bedding
													122.0' light gray ash layer 1/8-1/4" thick, trends 50 degrees to core axis, numerous slickensided surfaces on fractures
												125 137	124' - 125' fractured core, no preferred fracture orientation, gray ash blebs seen occasionally, minor laminations
													fracture zone with slickensides
												130 132	129' faint laminations, otherwise massive, color is 5Y 2.5/1 (black) 130' gray ash layers highly distorted, approximately 1/4" thick, discontinuous
												135 127	134' dense cemented dolostone approximately 6" thick, weak to moderate HCl reaction
									0.11				137 1/2' to 138' sandstone with platy cleavage, laminations nearly parrallel to core axis
												140 122	mudstone with minor ash
													142-147' fracture zone, fractures 30 degrees to core axis
													143' thick laminated layers with light brown specks (diatomite) in crude layers, 70 degrees to core axis
		X					96	39	0.16			145 117	147' discontinuous stringers of light brown cemented siltstone (weak HCl reaction) in irregular shaped stringers, remainder has light brown specks (in crude laminations) and distinct ash layers

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Job No: 15384.01.00.7
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LOG OF BORING RFB- 6

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-15-90

ELEVATION: 262.20' MSL

EQUIPMENT: 6" Hollow Auger to 110', HQ Rotary Wash Coring 110-174'

LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150		
												112		
													151', 1/2" wide layer of light brown dolostone clasts approximately 1/16" to 1/4" across in siltstone matrix, layer trends 30 degrees to core axis, weak HCl reaction	
													153' dense, hard cemented dolostone, weak to medium HCl reaction	
												155	154', 1/2" wide contorted layer of gray ash trends 65 degrees to core axis	
												107	155.5', 1" thick layer of gray ash trends 30 degrees to core axis	
													157' consists of thinly laminated ash layer overlying approximately 3/4" layer of dark gray clay/silt, overlying approximately 1" layer of light brown thinly laminated diatomaecous mudstone, all 3 layers offset by small imbricate micro faults, bedding trends 55 degrees to core axis, microfossil analysis indicates stichocorys Peregrina Assemblage 5 - 6 m.y.	
												160	159', 3/4" and 1 1/2" wide layers of gray ash layer in disjointed layer, many small offsets with straight edges	
												102	159 - 161' highly fractured	
		X			2.41		112	28				165	161 - 163' fracture zone	
												97	163' alternating layers of very dark gray and gray brown diatomaceous shale and mudstone, layers trends 80 degrees to core axis	
													164 - 169' color change to 5Y 4/2 (olive gray), consists of alternating layers of olive gray-brown diatomaceous shale with darker gray-brown mudstone and gray ash layers (all show deformation), layers approximately 1" thick, trending 55-60 degrees to core axis, strong petroleum odor, material consists of micaceous mudstone	
												170		
												92	169 - 174' alternating layers of dark and light brown diatomaceous shale, abundant sediment deformation, gray ash layers also, layers trend 30 degrees to core axis	

BOTTOM OF BORING RFB-6 @ 174 FEET

No free water encountered to 112' prior to rotary wash coring.

Performed neutron, natural gamma, resistivity/spontaneous potential and caliper geophysical logs to total depth; see Appendix C.

Boring backfilled to surface with Volclay grout.

*Converted to standard penetration blow counts.

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Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB- 6

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-26-90 FINISH DATE: 7-2-90
ELEVATION: 297.40' MSL
EQUIPMENT: 6" Hollow Auger to 30', HQ Rotary Wash Coring 30-295'
LOGGED BY: D. Brown, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												0 297	PIEZOMETER
52	43	X			2.61					22		5 292	CLAYEY SILT (MH) black (10 YR 2/1), 95% moderately plastic fines, less than 5% very fine sand, very stiff, slightly damp, hydrocarbon odor (FILL)
71	43						100	31		54		10 287	FILL
													MALAGA MUDSTONE
80	34	X	X		2.43	0.64				32 /6"		15 282	BLACK MUDSTONE bedding 20 degrees to core axis, MALAGA MEMBER OF THE MONTEREY FORMATION
89	38	X			2.36	0.62	167	52		32 /6"		20 277	becomes well bedded 21 - 24' hard drilling, well rounded pebbles coming up in cuttings
61	29	X	X			0.62				54		25 272	thinly bedded, approximately 25 degrees to core axis, weak hydrocarbon odor in cuttings
70	40		X			0.61	77	31		47 /11"		30 267	bedding approximately 30 degrees to core axis, slightly micaceous siltstone, bedding poorly defined
									0.12			35 262	30 - 35' moderately to highly fractured, slickensides, closed, clean, slight hydrocarbon odor Microfossil analysis indicates Stichocorys Peregrina Assemblage; 5 - 6 m.y.
												40 257	35 - 40' poorly defined bedding, approximately 35 degrees to core axis, slightly fractured, hydrocarbon odor, minor disturbed blue-gray ash beds
												45 252	Microfossil analysis - Stichocorys Peregrina Assemblage; 5 - 6 m.y.

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Job No: 15384.01.00.7
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Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB- 7

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-26-90 FINISH DATE: 7-2-90
ELEVATION: 297.40' MSL
EQUIPMENT: 6" Hollow Auger to 30', HQ Rotary Wash Coring 30-295'
LOGGED BY: D. Brown, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
		X			2.31		152	36				50 247	49.5' silty clasts dark gray brown 2.5Y 4/2 45 - 50' bedding approximately 20 degrees to core axis MALAGA MUDSTONE	
									0.26			55 242	VALMONTE DIATOMITE brown diatomaceous siltstone	
												60 237	57 - 58.5' sandy siltstone, more granular, approximately 30 degrees to core axis, very dark brown color 10 YR 2/2 diatomaceous siltstone	
												65 232		
												70 227	70 - 71' gray silty ash interbeds, color of 10 YR 5/1, bedding trends approximately 60 degrees to core axis, bedding is faulted, offsets less than 10 mm	
												75 222	well bedded with ash interbeds as above, approximately 50 degrees to core axis, hydrocarbon odor	
												80 217	moderately fractured at approximately 60 degrees to core axis, fractures slickensided closed and clean	
												85 212	becoming well laminated and layered	
		X			2.43		128	43				90 207	90.5 - 91.8' zone of well indurated dolostone, intensely fractured, closed, very narrow, clay-healed, bedding, 75 - 80 degrees to core axis 93.0' soft zone, core wash out	
												95 202	laminated diatomaceous mudstone and ash layers, microfaulted	

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LOG OF BORING RFB- 7

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-26-90 FINISH DATE: 7-2-90

ELEVATION: 297.40' MSL

EQUIPMENT: 6" Hollow Auger to 30', HQ Rotary Wash Coring 30-295'

LOGGED BY: D. Brown, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												100 197	thinly bedded, hydrocarbon odor
									0.20			105 192	minor ash component
		X			2.56		66	14					
												110 187	
												115 182	bedding approximately 70 degrees to core axis
									0.07				
												120 177	119 - 120' contorted bedding siltstone 120 -121' slightly higher sand content (sandy siltstone) dolostone
													120 - 125' well indurated dolostone, intensely fractured and broken, laminated silver ash beds
												125 172	siltstone
													becoming diatomaceous
		X			2.51		54	13				130 167	129.5 - 130' well indurated dolostone, bedding approximately 70 degrees to core axis 130' siltstone, poorly indurated
												135 162	diatomaceous mudstone with contorted bedding
												140 157	massive diatomaceous mudstone
												145 152	Microfossil analysis - Stichocorys Delmontensis Assemblage; 6 - 10 m.y.

PIEZOMETER

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LOG OF BORING RFB- 7

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-26-90 FINISH DATE: 7-2-90

ELEVATION: 297.40' MSL

EQUIPMENT: 6" Hollow Auger to 30', HQ Rotary Wash Coring 30-295'

LOGGED BY: D. Brown, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
		X			2.37		110	40				150 147	151' thinly bedded (70-80 degrees to core axis), silty diatomite to diatomaceous mudstone with ash layers	
													153 - 153.5' very fissile, poorly indurated	
													154' small concretions 10 YR 7/4, scattered fish scales on bedding planes	
												155 142		
													157' drilling is soft, intensely fractured	
												160 137	160 - 163' well bedded, fossils along bedding planes, scattered gray ashy interbeds, bedding approximately 70 degrees to core axis, slight hydrocarbon odor	
													163 - 163.5' very soft zone, no structure	
													thinly bedded silty diatomite	
												165 132	165' becoming more sandy (sandy siltstone), color is very dark gray-brown (2.5Y, 3/2)	
													167.5 168' soft drilling, intensely fractured, closed slight clay infilling, poorly indurated, bedding orientation as above	
												170 127	diatomaceous mudstone, as above	
		X			2.20		141	45					172' zone of microfaulting with offset of approximately 1 mm, concordant and approximately 60 degrees to core axis	
												175 122		
												180 117	180' slight hydrocarbon odor	
													184 - 184.8' zone of intensely fractured, sandy siltstone, clay healed fractures	
												185 112	185' more indurated and black, tar in fractures 185 - 186' well indurated, dolostone/siltstone, concordant fractures 60 degrees to core, highly fractured, tar infilling fractures, light gray (color 2.5Y 0/7)	
												190 107	190 - 195' thinly bedded, parallel layers approximately 1 - 1.5 mm thick, dark gray brown (2.5Y 4/2) bedded with 2.5Y, 3/2, approximately 70 degrees to core axis	
												195 102	195' well indurated, less sand content than above, slightly to highly fractured, closed, clean fractures at approximately 30 degrees to core axis	

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LOG OF BORING RFB- 7

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-26-90 FINISH DATE: 7-2-90
ELEVATION: 297.40' MSL
EQUIPMENT: 6" Hollow Auger to 30', HQ Rotary Wash Coring 30-295'
LOGGED BY: D. Brown, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		
												200	97	200' thinly bedded diatomite and siltstone
												205	92	205' moderately fractured, fractures are closed, clean and approximately 30 degrees to core axis
		X					NP	NP				210	87	
												215	82	216 - 218' diatomite, thinly laminated
												220	77	
												225	72	Microfossil analysis - Stichocorys Delmontensis; 6 - 10 m.y.
		X			2.11		120	42						
		X			2.32		NP	NP				230	67	229' more massive diatomaceous siltstone, poorly bedded, dark olive gray (5Y 3/2) 230' diatomite/siltstone, thinly bedded, moderately to highly fractured, closed
												235	62	237' massive diatomaceous siltstone
												240	57	240' diatomite/siltstone, thinly bedded, highly fractured, closed (60 degrees/30 degrees) 242' massive siltstone, some very thin bedding, siltstone
												245	52	245' grading into more massive siltstone 247' moderately hard

PIEZOMETER

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LOG OF BORING RFB- 7

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-26-90 FINISH DATE: 7-2-90
ELEVATION: 297.40' MSL
EQUIPMENT: 6" Hollow Auger to 30', HQ Rotary Wash Coring 30-295'
LOGGED BY: D. Brown, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												250	47	
													251.5' thinly bedded diatomite/siltstone	
													254' highly fractured zone	
		X			2.09		NP	NP				255	42	
													255' diatomite/siltstone, thinly bedded, some micro fracturing (closed)	
												260	37	
													260' siltstone, thinly bedded with diatomite, some micro fracturing	
												265	32	
													265' highly fractured zone, diatomite/siltstone, thinly bedded, very dark gray brown (2.5Y, 3/2)	
												270	27	
		X			2.14		NP	NP					270' diatomite/siltstone, fish scales along bedding planes	
													272' more massive	
												275	22	
													277' bedding less well defined and very steep, approximately 20 degrees to core axis	
												280	17	
													281' thin (2-3mm) ash beds 2.5Y 0/6, gray, some microfaulting, moderately fractured (closed, clean)	
												285	12	
													288' drilling harder, well indurated sandy siltstone, no apparent bedding,	
												290	7	
													diatomite/siltstone, as above	
													293' phosphate nodules	
												295	2	

BOTTOM OF BORING RFB-7 AT 295 FEET
No free water encountered to 30' prior to rotary wash coring.
Performed neutron, natural gamma, caliper and gamma guard geophysical logs to total depth; see Appendix C.
Boring backfilled to surface with Volclay grout.
*Converted to Standard Penetration Blow Counts

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Date: DEC 1990

LOG OF BORING RFB- 7

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-28-90 FINISH DATE: 7-5-90

ELEVATION: 211.10' MSL

EQUIPMENT: 8" Hollow Auger 0-161', HQ Rotary Wash Core 52-75'

LOGGED BY: Phillips, RG #3718, 0 - 52'
Hilmer, RG #3947, 52 - 161'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth (feet)	Elev.	Description
												0	211	GRAY-LIGHT BROWN SANDY CLAY (CL) Soft to medium stiff, moist with occasional gravel and small cobbles (3") (FILL)
		X					61	25		15		5	206	
														becomes yellow-brown color
	27	X	X		2.65	0.42	57	33		28		10	201	CLAYEY SAND (SC)
												15	196	YELLOW GRAY-LIGHT BROWN CLAYEY GRAVEL (GM) Dense, moist (FILL)
6	14	X			2.71		28	11		36				YELLOW BROWN SANDY CLAY (CL) Stiff, moist (FILL)
														DARK GRAY-BROWN CLAYEY SAND (SC) Loose, moist to wet (FILL)
0	24	X	X		2.75	0.43	37	9		33		20	191	
														becomes yellow tan
5	39	X			2.54		105	51		36		25	186	DARK BROWN TO BLACK SILT (MH) Medium stiff, moist to wet with shell fragments and minor amount of fine sand (FILL)
	58	X	X		2.64	0.62	75	47		60		30	181	YELLOW-GRAY SANDY CLAY (CH) stiff to hard, moist with gravel (FILL)
														becomes dark mottled and sandy
										41		35	176	DARK BLUE GRAY CLAYEY SAND (SC) Dense to very dense, moist with some gravel (FILL)
														DARK BROWN TO BLACK SILT (MH) Soft, moist (FILL)
15	30		X		2.73	0.55	58	39		15		40	171	
														FILL
														ALLUVIUM/COLLUVIUM
												45	166	BLUE GRAY MOTTLED SANDY CLAY (CH) Soft to medium stiff, moist with gravel sized angular clasts of gray mudstone
10	43	X	X		2.72	0.53	73	42		28				becomes dark olive green

PIEZOMETER

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Job No: 15384.01.00.7
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Date: DEC 1990

LOG OF BORING RFB- 8

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-28-90 FINISH DATE: 7-5-90

ELEVATION: 211.10' MSL

EQUIPMENT: 8" Hollow Auger 0-161', HQ Rotary Wash Core 52-75'

LOGGED BY: Phillips, RG #3718, 0 - 52'
Hilmer, RG #3947, 52 - 161'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
										32 /6"		50 161	becomes blue-gray, green-gray, brown and black, moist, wet, with occasional gravel	
												55 156	little to no structure and/or fracturing, occasional small sub-rounded gravel, moist and occasional cobble (calcified/silicified shale) locally with odor (organic decay)	
												60 151		
													locally fine to coarse sand with strong odor	
												65 146		
												70 141		
													abundant coarse sand in cuttings	
												75 136	dark brown sandy and clayey silt, wet	
0	23						64	38		28				
												80 131	same as above, with lenses of light brown medium to coarse sand	
										38 /6"			ALLUVIUM/COLLUVIUM	
													SAN PEDRO SAND LIGHT BROWN AND LIGHT GRAY SAND (SP) Moist to dry, locally dense, very fine to coarse (SAN PEDRO SAND UNIT)	
38	1	X			2.68		NP	NP		38		85 126		
													dry	
		X								38 /6"		90 121		
					2.68		NP	NP		32 /6"		95 116	LIGHT GRAY-ORANGE SAND (SP) damp, moist, very fine to fine grained, mottled	

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Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB- 8

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-28-90 FINISH DATE: 7-5-90
ELEVATION: 211.10' MSL
EQUIPMENT: 8" Hollow Auger 0-161', HQ Rotary Wash Core 52-75'
LOGGED BY: Phillips, RG #3718, 0 - 52'
Hilmer, RG #3947, 52 - 161'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
18	14	X			2.73		NP	NP		48 /9"		100 111	becomes silty sand (SM), with coarse sand
0	13	X					NP	NP		53 /10"		105 106	
		X								32 /4"		110 101	moist
							NP	NP		35 /6"		115 96	
					2.69					32 /5"		120 91	moist to wet
50	17	X			2.79		38	12		48		125 86	LIGHT GRAY MOTTLED ORANGE SANDY SILT (ML) damp, moist, with carbonized wood fragments, some very fine sand (SM)
64	16	X			2.78		35	7		48		130 81	
34	21	X		X	2.78	0.41	36	11		42		135 76	occasional shell fragments
		X			2.73					55 /10"		140 71	BROWN-ORANGE SILTY SAND (SM) Moist to wet, mottled, fine to coarse grained sand
		X			2.68					32 /5"		145 66	becomes very fine to fine sand (SP), moist
													SAN PEDRO SAND
													MALAGA MUDSTONE
													DARK OLIVE BROWN MUDSTONE BEDROCK highly sheared, contorted slickensided fractured planes.

PIEZOMETER

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LOG OF BORING RFB- 8

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-28-90 FINISH DATE: 7-5-90

ELEVATION: 211.10' MSL

EQUIPMENT: 8" Hollow Auger 0-161', HQ Rotary Wash Core 52-75'

LOGGED BY: Phillips, RG #3718, 0 - 52'
Hilmer, RG #3947, 52 - 161'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
		X					84	36		32 /4"	■	150 61	highly fractured, moist (MALAGA MEMBER OF THE MONTEREY FORMATION) color is 5Y 3/2 moist, highly fractured (closed, slickensided, contorted and clean), thinly laminated, soft to firm, plastic/friable (shears spaced less than 3/4")	
39	32	X								32 /6"	■	155 56		
												160 51	strong organic odor	
							96	41		58	■			
	36	X			2.47		103	43		/9"			thin lenses of fine siltstone	

BOTTOM OF BORING RFB-8 AT 161.75 FEET

Performed neutron and natural gamma geophysical logging to total depth; see Appendix C.
Borehole water sample obtained 6/29/90.
Borehole backfilled to surface with Volclay grout.
*Converted to Standard Penetration Blow Counts

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Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB- 8

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-7-90 FINISH DATE: 6-11-90
ELEVATION: 171.00' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	IEZOMETER
												0 171	
												GRAY ORANGE-YELLOW SILTY SAND (SM) moist, color is 7.5 YR 7/5, medium dense (FILL)	
3	9	X		X	2.71	0.50	NP	NP				5 166	
												becomes dense	
7	9	X		X	2.70	0.51	NP	NP				10 161	
2	7	X			2.72		NP	NP				15 156	
3	11	X		X	2.68	0.65	NP	NP				20 151	
												RED-YELLOW SAND (SP) dense, poorly sorted, very fine to coarse grained sand, subangular to subround grains, color of 7.5Y 7/5 (FILL)	
1	3	X			2.69		NP	NP				25 146	
												becomes slightly gravelly	
7	7	X			2.73		NP	NP				35 136	
1	6	X			2.72		NP	NP				40 131	
												becomes very fine to medium grained, slight oxidation mottling and steaking	
3	6	X			2.71		NP	NP				45 126	

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Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB- 9

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-7-90 FINISH DATE: 6-11-90
ELEVATION: 171.00' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
6	3											50 121	color of 7.5Y 7/3, moist, dense, angular to subrounded sandy grains (FILL?)	
1	68													
												55 116		
												60 111		
												65 106		
												70 101	very moist	
3	15	X										75 96	color of 7.5YR 7/3, moist, dense, very fine to medium grained, poorly sorted, angular to subround	
												80 91		
												85 86		
												90 81		
												95 76		

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Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB- 9

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-7-90 FINISH DATE: 6-11-90

ELEVATION: 171.00' MSL

EQUIPMENT: Reverse Air Rotary

LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)			PIEZOMETER
		X			2.70		NP	NP				100	71	color of 7.5YR 7/8, moist, dense, very fine and medium grained, moderately well sorted (FILL?)	
												105	66		
												110	61		
												115	56		
												120	51		
2	8	X			2.68		NP	NP				125	46		
												130	41		
												135	36		
												140	31		
												145	26		
3	8	X			2.68		NP	NP						moist, dense	

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LOG OF BORING RFB- 9

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-7-90 FINISH DATE: 6-11-90
ELEVATION: 171.00' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

METRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150	color of 7.5YR 7/8, reddish-yellow, moist, dense	
												21		
												155		
												16		
												160		
												11		
												165		
												6		
												170		
												1	FILL	
4	2	X			2.76		NP	NP				175	SAN PEDRO SAND	
												-4	RED-YELLOW SANDY GRAVEL (GP) color of 7.5YR 7/8, moist, dense, clasts rounded to subround, to 1" diameter, clasts are predominantly chert (SAN PEDRO SAND UNIT)	
												180	RED-YELLOW SAND (SP) color of 7.5YR 7/6, wet, dense	
												-9		
												185		
												-14		
												190	groundwater encountered during drilling 6/11/90	
												-19		
												195		
												-24		
3	19	X			2.71		NP	NP						

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LOG OF BORING RFB- 9

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-7-90 FINISH DATE: 6-11-90

ELEVATION: 171.00' MSL

EQUIPMENT: Reverse Air Rotary

LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)			PIEZOMETER
												200	-29		
												205	-34	pebbles to small cobbles, sand flowing up into casing, push HQ core barrel 206' to 215'	
												210	-39		
		X			2.72		NP	NP				215	-44	becomes light red (6/8), saturated, dense	

BOTTOM OF BORING RFB-9 AT 215 FEET Performed neutron geophysical log to total depth; see Appendix C.
Borehole water sample obtained 6/11/90.
Boring backfilled to surface with Volclay grout on 6/11/90.
*Samples obtained by pushing sampler into soils.

START DATE: 6-19-90 FINISH DATE: 6-20-90
ELEVATION: 268.00' MSL
EQUIPMENT: 8" Hollow Auger 0-21', HQ Rotary Wash Coring 21-75'
LOGGED BY: R. Hagen, RG #4788

...TRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	Description	PIEZOMETER
												0	268	MALAGA MUDSTONE	
					2.53		112	63		63 /9"		5	263	VERY DARK GRAY-OLIVE GRAY MICACEOUS MUDSTONE color of 5Y 2.5/1 natural and wetted, slight petroleum odor (MALAGA MEMBER OF THE MONTEREY FORMATION)	
42	28	X	X			0.63	105	44		56 /11"		10	258	moderate petroleum odor, color of 5Y 2.5/1, natural and wetted, moist	
48	44	X	X			0.67	139	58		45 /11"		15	253	some fine laminations, bedding trends, approximately 20 degrees to core axis	
70	43	X			2.31		120	44		56 /9"		20	248	dry to moist, abundant microfossils along bedding planes 21 - 25' consists of well laminated siltstone, laminations of white micro-fossils and dark gray siltstone, constant dip (apparent) of 60 degrees to core axis, very dark olive gray (5Y 3/2) color, slight petroleum odor, bedding plane fractures 24 - 25' crenulated bedding/soft sediment deformation 25 - 26' becomes more massive, micaceous mudstone (color of 5Y 2.5/2), very soft to friable	
												25	243		
												30	238	numerous fractures trending 30 to 50 degrees to core axis, abundant slickensided surfaces, no filled fractures 31 - 32' highly disturbed, massive bedding	
												35	233	36 - 39' massive bedding, numerous fractures 30 to 40 degrees to core axis, most with slickensides, clay/silt brown gray layer 1/2" wide, slightly calcareous	
		X					119	65				40	228	39 - 44' massive bedding, moderately heavy petroleum odor, predominantly unfractured core	
												45	223	44 - 49' few fractures, slickensided where present	
														49 - 54' massive bedding, numerous fractures 30 to 40	

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Date: DEC 1990

LOG OF BORING RFB-10

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-19-90 FINISH DATE: 6-20-90
ELEVATION: 268.00' MSL
EQUIPMENT: 8" Hollow Auger 0-21', HQ Rotary Wash Coring 21-75'
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												50 218	degrees to core, spaced at 3-6" intervals, nearly all fractured surfaces have slickensides, moderate petroleum odor on freshly broken surfaces	
												55 213	54 - 59' massive bedding, very dark olive gray color (5Y 2.5/2) few fractures, slickensided where present, moderate petroleum odor	
		X	X			0.58	110	53				60 208	61' weak laminations 50 to 60 degrees to core axis 61 - 62' very soft clayey micaceous siltstone	
												65 203	64 - 66' highly fractured, massive bedding, weak to moderate petroleum odor, fractured faces slickensided, no fracture filling, parallel fractures not conjugate, slickensided surfaces minor ash layers diatomaceous at 66'	
												70 198	massive bedding, (color is 5Y 2.5/2), some thin (less than 1 mm) layers of diatomite seen occasionally, some disrupted layers 1/4-1/2" thick of gray-brown clay/silt, few fractures seen, slickensided fracture surfaces	
												75 193	BOTTOM OF BORING RFB-10 AT 75 FEET No free water encountered to 21' prior to rotary wash drilling. No geophysical logging performed. Boring backfilled to surface with Volclay grout. * Converted to Standard Penetration Blow Counts	

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LOG OF BORING RFB-10

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-22-90 FINISH DATE: 6-27-90

ELEVATION: 297.90' MSL

EQUIPMENT: 6" Hollow Auger 0-21', HQ Rotary Wash Coring 21-175'

LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
							82	42		49 /10"		0 298	
												5 293	
	31				2.67		77	33		24		10 288	
	87		X		2.44	0.70	131	61		26		15 283	
86	74		X		2.43	0.65	125	58		25		20 278	
									0.17			25 273	
												30 268	
												35 263	
												40 258	
												45 253	
		X					120	47					

LIGHT BROWN SANDY SILT (ML)
very moist, semicompact/compact (FILL)

DARK BROWN SILTY CLAY/CLAYEY SILT (CL/ML)
abundant gravel, moist with saturated seams (FILL)

water level 7/11/90

SILTY SAND (SM)
color of 5Y 3/2 wetted and 5Y 5/2 dry, moist, wet, with occasional sub-rounded shale fragments to 1" diameter, contorted layers (very closely laminated)

FILL

MALAGA MUDSTONE

DARK OLIVE GRAY MUDSTONE BEDROCK
color of 5Y 3/2 wetted and 5Y 5/2 dry, locally becoming sandy (micaceous), very closely laminated, local laminations indistinct, soft locally firm, plastic/friable, weathering not distinct, typically highly fractured, (fractures are closed to very narrow, clean, with slickensided surfaces, random orientation with predominant fractures dipping approximately 40 to 60 degrees), typically moist to wet, generally a high to moderate natural organic odor, occasional shells, (MALAGA MEMBER OF THE MONTEREY FORMATION)

23 - 24' very soft/plastic zone without structure with apparent filtration voids to 1/4"

MALAGA MUDSTONE

VALMONTE DIATOMITE

27' estimated contact between Malaga Mudstone and underlying Valmonte Diatomite

27' Microfossil analysis - Stichocorys Delmontensis Assemblage; 6 - 10 m.y.

color change to olive gray (5Y 4/2 wetted) streaked gray (5Y 2.5/1), layers approximately 10 degrees (apparent)

32 - 35' zone of dark gray (5Y, 3/1 wetted and 5Y, 5/1 dry), dolostone (slight HCl reaction) hard/very hard, strong, and diatomaceous shale

36 - 37' color change to dark olive gray (5Y 3/2 wetted), apparent very close laminations, micaceous

fractures have apparent dip of approximately 40 degrees to near vertical

41' thin 2" zone of calcified dolostone and silicified shale

42' local abundant small shell fragments

48' highly fractured zone, poor recovery, fractures have apparent dip of 20 to 40 degrees (fractures primary dip greater than 60 - 80 degrees)

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LOG OF BORING RFB-11

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-22-90 FINISH DATE: 6-27-90
ELEVATION: 297.90' MSL
EQUIPMENT: 6" Hollow Auger 0-21', HQ Rotary Wash Coring 21-175'
LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth (feet) / Elev.	
												50 248	58 - 58.5' dolostone
												55 243	61' occasional large shells to approximately 1/2" across
												60 238	63.5 - 64' open fractures (1/4"), filled with drilling fluid, disturbed ash layers
												65 233	68.5 - 69' ashy and disturbed
		X			2.39		109	40				70 228	73' color change to olive gray (5Y 4/2 wetted)
												75 223	74' color change back to dark olive gray (5Y 3/2 wetted, 5Y 6/1 dry), locally mottled olive gray (5Y 4/2 wetted)
												80 218	79' very close laminations dip at approximately 20 degrees to core axis
												85 213	82 - 84' ashy layers
		X			2.43		110	47				90 208	86 - 92' disturbed ash layers
												95 203	91' locally streaked gray (approximately 20 degree dip) and local zones of small shells

PIEZOMETER

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LOG OF BORING RFB-11

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-22-90 FINISH DATE: 6-27-90
ELEVATION: 297.90' MSL
EQUIPMENT: 6" Hollow Auger 0-21', HQ Rotary Wash Coring 21-175'
LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
									0.91			100	100' local zones of occasional large shells	
												98		
		X			2.58		95	47				105 193		
												110 188	110' very close laminations dipping at approximately 20 degree dip	
												115 183	ashy	
												120 178	121 - 123' local stringers/pods of gray dolostone	
												125 173		
													127-1/2" zone (approximately 20 degree dip) of rust colored silt and organic (woody?) nodules	
													128 - 129' dolostone, material becoming firm and friable	
												130 168	131 - 132' less fracturing	
												135 163	134.5 - 138' slightly contorted laminations	
													136 - 137' scattered shells	
													138' thin lense of gray ash	
													139 - 141' local zone of slightly contorted gray ash	
									0.11			140 158		
													142 - 143' dolostone	
												145 153		
													146.5 - 147.5' intensely fractured	

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LOG OF BORING RFB-11

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-22-90 FINISH DATE: 6-27-90

ELEVATION: 297.90' MSL

EQUIPMENT: 6" Hollow Auger 0-21', HQ Rotary Wash Coring 21-175'

LOGGED BY: E. Hilmer, RG #3947

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												150	
												148	150' few to no laminations noted, material is massive, minor ash component
												155	
												143	
												160	
												138	disturbed ashy layers
													163' local zones of very close laminations
												165	
												133	
													167 - 172' occasional stringers and lenses of gray ash (approximately 1/4 - 1/2" thick)
													169 - 171' abundant small fossil fragments
												170	
												128	
													175' local zones of apparent very close laminations
		X			2.39		110	39				175	
												123	

BOTTOM OF BORING RFB-11 AT 175 FEET

Caliper, neutron, natural gamma and gamma guard, geophysical logs performed to total depth; see Appendix C.

Borehole water sample obtained on 7/16/90.

Borehole backfilled to surface with Volclay grout on 7/18/90.

*Converted to Standard Penetration Blow Counts

PIEZOMETER

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LOG OF BORING RFB-11

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90
ELEVATION: 237.50' MSL
EQUIPMENT: 6" Hollow Auger to 50', HQ Rotary Wash Coring 50-175'
LOGGED BY: M. Einarson, RG#4621

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												0	238	MALAGA MUDSTONE
73	40	X			2.48		109	60		29		5	233	DARK OLIVE BROWN MUDSTONE BEDROCK color of 5Y 3/2, resinous luster, locally micaceous, damp, stiff, moderate heavy petroleum odor (MALAGA MEMBER OF THE MONTEREY FORMATION)
72	32	X			2.51		109	56		36		10	228	less mottling, firm, damp, faint petroleum odor
76	39	X			2.33		111	56		29		15	223	
73	31	X			2.50	0.61	113	60		58		20	218	becomes dark olive gray (5Y 3/2), greasy, resinous luster, truncated thin laminae of light colored particles, parts along horizontal planes, stiff, damp
72	43	X	X		2.53	0.58	114	56		48		25	213	
73	25	X	X		2.54	0.59	92	50		59 /10"		30	208	very dark gray (5Y 3/1), very poorly bedded to massive, rough horizontal parting, micaceous with flakes oriented horizontal to sub-horizontal, locally diatomaceous, no fractures noted, damp, stiff, moderate hydrocarbon odor
68	24	X	X		2.51	0.63	106	62		65		35	203	cuttings very moist
73	42	X	X		2.58	0.61	92	50		53		40	198	as above but not diatomaceous, micaceous
78	26	X	X			0.58	105	53		48		45	193	very micaceous, strong petroleum odor, stiff, massive, damp

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Date: DEC 1990

LOG OF BORING RFB-12

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90

ELEVATION: 237.50' MSL

EQUIPMENT: 6" Hollow Auger to 50', HQ Rotary Wash Coring 50-175'

LOGGED BY: M. Einarson, RG#4621

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
79	24	X	X		2.52	0.67	105	53		51		50 188	SILTY CLAYSTONE black (5Y 2.5/1), micaceous, massive bedding, common tight fractures (1' spacing) with polished surfaces, 30-70 degree fracture dips, abundant microfossils (forams), stiff, damp, strong petroleum odor
												55 183	58 - 59' while drying, core parted along planes dipping 20 degrees (bedding planes)
													57.5' closed fracture dipping 50 degrees to core axis
												60 178	CLAYEY MUDSTONE black (5Y 2.5/1), micaceous, massive bedding, moderate-highly fractured, fractures tight with polished surfaces, fractures dipping 30 - 40 degrees, abundant radiolaria(?), very stiff, moist, moderate-strong petroleum odor
												65 173	
													abundant mica, decrease in radiolaria(?)
		X			2.16		100	53				70 168	
													72.5' conjugate fractures dipping at 60 degrees and 50 degrees, respectively, light gray, very fine grained ash, lense (1/4" thick) parallel to lower fracture (injection feature?) fractures closed with polished surfaces moderate-highly fractured with planar conjugate sets, fractures closed with polished surfaces, strong petroleum odor
												75 163	
												80 158	black (5Y 2.5/2), locally micaceous, massive bedding, highly fractured with well-defined closed conjugate sets dipping 50-60 degrees, closed and polished surface, locally abundant radiolaria, stiff-very stiff, more consolidated than above, fractures dry
									1.54		85 153	85-90' slightly fractured
													86' light gray fine ash laminae dipping approximately 10 degrees, trace organic fragments, strong petroleum odor
		X			2.44		107	44				90 148	
													92' localized blue-green mottling and very fine ashy laminae
												95 143	94.5' closed fracture, dipping 60 degrees with striations 10 degrees from true dip of fracture 95-100' slightly fractured, very stiff to hard, fractures dry, occasional microfossils, common mica, very strong petroleum odor

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LOG OF BORING RFB-12

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90
ELEVATION: 237.50' MSL
EQUIPMENT: 6" Hollow Auger to 50', HQ Rotary Wash Coring 50-175'
LOGGED BY: M. Einarson, RG#4621

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100		
												138	highly fractured with preferred strike of 45-50 degrees dipping fractures, secondary fracture set striking 90 degrees to 1st set, all fractures closed and dry with polished surfaces, strong petroleum odor minor ash component	
									0.63			105 133		
													108-110' abundant hair-like organic fragments and 1/4" diameter wood fragments, fragments oriented at 20 degrees dip (bedding) to core axis	
		X			2.36		107	43				110 128		
												115 123	very fine grained mica, massive bedding, slightly fractured with tight fractures as above, fractures dry with polished surfaces, occasional hair-like fibrous plant fragments, very stiff, dry, strong petroleum odor 118' common forams, very strong hydrocarbon odor	
												120 118	120-130 moderately to highly fractured	
												125 113	126-127' abundant 1/8" long tabular white fossils, core parts along 20 degree dipping fossil-coated plane 127.5' light gray, very fine grained ash bed (1/8" thick)	
												130 108	moderately-highly fractured, conjugate fracture sets common, dipping at 45-55 degrees, fractures closed and dry, common tabular white fossils as above, fossils form approximate bedding plane dipping 20 degrees, very stiff, damp, strong petroleum odor	
												135 103	ashy 136' abundant fossils as described above	
												140 98	disturbed ash layers at 142'	
									0.29			145 93	locally micaceous and sandy, very dirty, moderately fractured fractures as above, locally abundant white tabular fossils (1/16" to 1/8" long), very stiff, damp, strong petroleum odor	
													disturbed ash layers	

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LOG OF BORING RFB-12

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90
ELEVATION: 237.50' MSL
EQUIPMENT: 6" Hollow Auger to 50', HQ Rotary Wash Coring 50-175'
LOGGED BY: M. Einarson, RG#4621

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
		X			2.52		94	52				150 88	slightly fractured	
												155 83	minor ash component 155-157' very fractured, fracture spacing 4-6", fractures dry and dipping 30-40 degrees, polished surfaces with striations plunging down dip of fractures	
												160 78	slightly to moderately fractured with tight, dry, fractures and polished surfaces, strong petroleum odor	
													ashy between 161 - 164'	
												165 73	166.5' very abundant 1/32" to 1/16" long white fossils	
		X			2.41		91	36				170 68		
													173' gray very fine ash laminations dipping at 20 degrees to core axis	
												175 63		

BOTTOM OF BORING RFB-12 AT 175 FEET
No free water encountered to 50' prior to rotary wash coring.
Neutron, natural gamma, caliper, E-logs performed to total depth; see Appendix C.
Boring backfilled with Volclay grout to surface on 6/22/90.
* Converted to Standard Penetration Blow Counts

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Lic No: 3488
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Date: DEC 1990

LOG OF BORING RFB-12

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90
ELEVATION: 180.60' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												0 181	DARK RED-BROWN SILTY CLAY (CH) color of 5YR 3/2, moist, stiff (FILL)
33	70	X	X		2.50	0.56	70	42				5 176	very stiff
29	31	X	X		2.65	0.47	70	40				10 171	very sandy
												15 166	DARK RED-BROWN SANDY GRAVEL (GP) color of 5YR 3/2, with silt, wet, dense, (pipeline backfill)
51	24						48	25					BROWN SANDY, CLAYEY GRAVEL (GC) color of 7.5YR 5/3, wet, dense, clasts to 2" diameter (FILL)
												20 161	cobbles
													clasts greater than 2" diameter consisting of thinly bedded siltstone and chert, subangular
	17	X					55	31				25 156	
13	37	X	X		2.72	0.53	53	28				30 151	
		X			2.67							35 146	light gray sandstone clasts
		X					52	27				40 141	
23	10	X			2.68		53	28				45 136	

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-13 (RENAMED M52B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90

ELEVATION: 180.60' MSL

EQUIPMENT: Reverse Air Rotary

LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)
	25	X			2.70		57	36				50 131
		X			2.60		46	25				55 126
	33	X			2.69		59	39				60 121
16	20	X			2.66		49	28				65 116
												70 111
												75 106
15	25	X			2.69		40	23				80 101
												85 96
												90 91
												95 86

saturated zone - let hole stand overnight

FILL / COLLUVIUM

DARK BROWN GRAVELLY CLAY (CL)
color of 7.5YR 3/3, wet, very stiff

becomes olive brown, color of 2.5Y 4/4, moist, very stiff, sandy and silty gravel, angular clasts, approximately 20% gravel

OLIVE BROWN SILTY SAND (SM) Moist, dense, fine to medium grained, subangular to subround

OLIVE BROWN SILTY CLAY (CL)
color of 2.5Y 4/4, moist very stiff

YELLOW SAND (SP)
color of 2.5Y 7/6, moist, very dense, fine grained

LIGHT OLIVE BROWN CLAYEY SAND (SC)
color of 2.5Y 5/4, moist, very dense, gravelly

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Date: DEC 1990

LOG OF BORING RFB-13 (RENAMED M52B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90

ELEVATION: 180.60' MSL

EQUIPMENT: Reverse Air Rotary

LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
11	13	X			2.68		NP	NP				100 81	COLLUVIUM SAN PEDRO SAND YELLOW SAND (SP) color of 2.5Y 5/4, moist, very dense, fine grained (SAN PEDRO SAND)	
												105 76		
												110 71	shell fragments	
												115 66		
12	6	X			2.70		NP	NP				120 61	1% pebbles, rounded 1" diameter	
												125 56		
												130 51		
												135 46		
												140 41		
												145 36		

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Date: DEC 1990

LOG OF BORING RFB-13 (RENAMED M52B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90
ELEVATION: 180.60' MSL
EQUIPMENT: Reverse Air Rotary
LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												150 31	very fine to fine grained, moderately well sorted, subangular to subround, micaceous
												155 26	
8	5	X			2.69		NP	NP				160 21	
												165 16	
												170 11	
												175 6	
9	3	X			2.68	0.48	NP	NP				180 1	becomes light gray sand, color of 10YR 7/1, moist, very dense, very fine to fine grained, micaceous, 90% quartzite pebbles
												185 -4	
												190 -9	
												195 -14	water level 7/9/90
													water level 6/19/90

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-13 (RENAMED M52B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-12-90 FINISH DATE: 6-18-90

ELEVATION: 180.60' MSL

EQUIPMENT: Reverse Air Rotary

LOGGED BY: J. Mattey, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
	14											200 -19	becomes olive yellow sand, color of 5Y 6/6, fine to medium grained, slightly gravelly, saturated, dense	
												205 -24	becomes light gray sand, color of 5Y 7/1, very fine to coarse grained, saturated, dense, poorly sorted, angular to subrounded, abundant quartzite, micaceous	
2	15	X			2.67		39	15				210 -29		
												215 -34	BOTTOM OF BORING RFB-13 AT 215 FEET	

Boring geophysically logged using neutron and natural gamma probes.
Borehole water sample obtained on 6/15/90.
Piezometer RFB-13 completed in reamed boring on 6/20/90.
*Samples obtained by pushing sampler into soil.

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-13 (RENAMED M52B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-8-90
ELEVATION: 205.70' MSL
EQUIPMENT: 8" Hollow Auger
LOGGED BY: D. Ristau, RG #3634

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet) / Elev.	PIEZOMETER
71	13	X X			2.67		NP 66	NP 46		62		0 / 206 5 / 201	
38	17 18	X	X		2.67	0.33	61 58 NP	38 34 NP		52		10 / 196	
28	10 5	X X X	X	X	2.66 2.68 2.70	0.36 0.47	46 NP 44	26 NP 21		33		15 / 191	
3	9									78 /10"		20 / 186	
										60 /11"		25 / 181	
		X			2.68					49 /11"		30 / 176	
												35 / 171	
												40 / 166	
5	10	X			2.64		NP	NP		44		45 / 161	

BROWN GRAVELLY SILT (ML)
gravels of decomposed sandstone, stiff to very stiff, moist (FILL)

very stiff, gravel fragments of silicous shale

FILL

SAN PEDRO SAND
MOTTLED GRAY BROWN ORANGE SILTY SAND (SM)
abundant quartz fragments, dense, moist (SAN PEDRO SAND UNIT)

ORANGE BROWN SAND (SP)
with near vertical 1/4" thick silt layers, moderately dense to dense, moist

poor recovery, some sand in sampler tip

becomes light gray to orange, dense, moist, sand tends to be loose in tubes, bedding approximately 30 degrees

medium dense to dense, moist

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-14

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-8-90
ELEVATION: 205.70' MSL
EQUIPMENT: 8" Hollow Auger
LOGGED BY: D. Ristau, RG #3634

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
	4	X								102	X	50 156	dense, moist	
												55 151		
47	3	X		X	2.68	0.43	NP	NP		90	■	60 146	very fine to coarse grained sand	
												65 141		
6	4	X		X	2.61	0.39	NP	NP		80	■	70 136	moist, dense, well-sorted, very fine to coarse, micaceous	
												75 131		
2	19	X		X	2.68	0.43	53	32		76	■	80 126		
												85 121		
5	3	X		X	2.71	0.41				64 /9"	■	90 116	becomes white to orange brown sand, dense, moist	
												95 111		

Kerzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-14

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-8-90
ELEVATION: 205.70' MSL
EQUIPMENT: 8" Hollow Auger
LOGGED BY: D. Ristau, RG #3634

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												100 106	
												105 101	
												110 96	color change to light gray, fine to very fine sand in cuttings
28	19	X			2.73	0.41				93 /9"	■	115 91	MOTTLED GRAY BROWN SILTY SAND (SM) TO SANDY SILT (ML) very dense, very stiff, moist
3	19									77 /9"	☒		117' change in drilling stiffness, mottled gray brown sandy silt (ML), very stiff, moist
												120 86	
												125 81	
75	20	X		X	2.74	0.37	31	9		62	■	130 76	becomes dark gray silt (ML) to brown silty sand (SM), stiff to very stiff, moist
												135 71	
												140 66	
												145 61	

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-14

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-8-90
ELEVATION: 205.70' MSL
EQUIPMENT: 8" Hollow Auger
LOGGED BY: D. Ristau, RG #3634

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150	56	
										65 /9"	■	155	51	
												160	46	
												165	41	
		X			2.66	0.41	45	15		62 /10"	■	170	36	
9	8	X		X	2.69									
												175	31	
												180	26	
11	4	X		X	2.67	0.42	NP	NP		63 /9"	■	185	21	
												190	16	
												195	11	

Dark gray silt (ML) with brown silty sand inclusions (possible slough), very stiff, moist

GRAY WHITE SAND (SP) Coarse-grained, abundant quartz and granitic pebbles, medium dense to dense, wet (SAN PEDRO SANDS)

becomes brown white sand (SP), medium grained, very dense, wet

cuttings becoming wetter

medium grained, moderately dense to dense, wet

cuttings damp, still medium grained sand

Herzog Associates
Geoscientists

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Date: DEC 1990

LOG OF BORING RFB-14

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-8-90

ELEVATION: 205.70' MSL

EQUIPMENT: 8" Hollow Auger

LOGGED BY: D. Ristau, RG #3634

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												200	6	
												205	1	
												210	-4	
												215	-9	
												220	-14	
												225	-19	

medium-grained sand

BOTTOM OF BORING RFB-14 @ 225 FEET
No free water encountered in borehole.
Boring geophysically logged using neutron and natural gamma probes; see Appendix C.
Borehole backfilled with Volclay grout to surface.
*Converted to Standard Penetration Blow Counts

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-14

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-11-90
ELEVATION: 282.40' MSL
EQUIPMENT: 6" Hollow Auger
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												0 282		
12	4	X		X	2.70	0.44	NP	NP		11		5 277	LIGHT BROWN SILTY SAND (SM) fine-medium grained, color of 2.5Y 6/3 dry, 2.5Y 5/3 wetted, dry, loose (FILL and/or ALLUVIAL TERRACE DEPOSITS)	
16	3	X		X	2.71	0.41	NP	NP		17		10 272	color of 2.5Y 7/2 dry, 2.5Y 5/3 wetted	
3	3	X			2.64		NP	NP		35		15 267	medium to coarse grained, unconsolidated, moist sand	
11	4						NP	NP		20		20 262		
													FILL/ALLUVIUM	
14	37	X		X	2.77	0.41	51	25		15		25 257	MALAGA MUDSTONE contact between FILL/ALLUVIUM and weathered bedrock, bedrock material is moist mudstone, heavily weathered, 2.5Y 5/3, no free water seen at contact	
70	35	X			2.74		62	35		11		30 252	DARK GRAY MICACEOUS MUDSTONE color of 5Y 3/2, moist, weakly weathered, (MALAGA MEMBER OF THE MONTEREY FORMATION)	
												35 247		
72	53						109	59		46 /11"		40 242	finely laminated texture, friable, color of 5Y 2.5/1, moderate petroleum odor	
85	52	X			2.58					32 /5"		45 237	slightly stronger odor	

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-15

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-11-90
ELEVATION: 282.40' MSL
EQUIPMENT: 6" Hollow Auger
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												50 232	
90	58	X	X		2.60	0.49	102	59		29		55 227	moist, massive, moderate petroleum odor, natural color is 5Y 2.5/2, same color wetted, small white patches erratically distributed in mudstone, not calcareous (no HCl reaction)
												60 222	
86	46	X	X		2.57	0.57	103	58		32 /5"		65 217	
												70 212	
56	25		X			0.58	70	31		32 /5"		75 207	
												80 202	
												85 197	
59	63	X	X		2.60	0.58	95	45		50		90 192	moist, strong petroleum odor
												95 187	

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-15

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-11-90

ELEVATION: 282.40' MSL

EQUIPMENT: 6" Hollow Auger

LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
73	104	X			2.32		143	32		32 /4"	■	100 182	drier than previous samples, strong petroleum odor	

BOTTOM OF BORING RFB-15 @ 101.5 FEET
No free water encountered in borehole.
No geophysical logging performed.
Boring backfilled to surface with Volclay grout.
*Converted to Standard Penetration Blow Counts

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-15

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-18-90

ELEVATION: 303.10' MSL

EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'

LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth (feet) / Elev.	
												0 / 303	SILTY SAND (SM) yellow (2.5Y 7/6), 75-80% medium plastic fines, 20-25% fine sand, dry, hard (FILL)
68	44	X	X		2.44	0.70	82	45		26		5 / 298	
88	30	X	X		2.67	0.51	57	32		8		10 / 293	SANDY SILTY CLAY (CH) mottled, color of 2.5Y 4/2 and 2.5Y 3/2, 90-95% low-medium plastic fines, 5-10% fine sand, dry, stiff (FILL)
71	68	X			2.34		115	59		21		15 / 288	SANDY SILT (MH), as above low plasticity fines
31	26	X			2.67		64	36				20 / 283	SANDY CLAY (CH), as above
52	21	X			2.76		70	38		26		25 / 278	CLAYEY SAND (SC) 30-40 % moderately plastic fines, 60-70 % fine sand, medium dense, moist
61	28	X			2.70		59	30		15		30 / 273	FILL
60	29	X			2.72		49	26		28		35 / 268	ALLUVIUM/COLLUVIUM SANDY CLAY (CL) light olive brown (2/5Y 5/4), 50-60%, moderately plastic fines, 40-50% fine sands, dry, dense, hard drilling, no cobbles, ALLUVIUM/COLLUVIUM
										3		40 / 263	CLAY (CH) very dark gray brown (2.5Y 3/2), 90-95% moderate to high plastic fines, 5-10% fine sand, angular to subangular
72	58	X	X			0.60	97	50		23		45 / 258	
													groundwater encountered during drilling

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-16

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-18-90

ELEVATION: 303.10' MSL

EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'

LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth (feet)	Elev.	Description	PIEZOMETER
7	71	X					93	51		26		50	253	CLAYEY SAND (SC) dark brown (10 YR 3/3), 40 - 50% high plastic fines, 50 - 60% fine-medium sand, angular-subangular, moist-wet, hard	
28	65	X	X		2.59	0.63				40		55	248	dark brown (10 YR 3/3), more plastic than above, scattered angular pebbles, moist-very moist	
												60	243	angular pebbles more common than above (approximately 5%), color as above, slightly mottled with 2.5Y 5/4 ALLUVIUM/COLLUVIUM MALAGA MUDSTONE 62' drilling much slower	
												65	238		
												70	233		
												75	228	mudstone on augers from 61-73' MUDSTONE BEDROCK black (5Y 2.5/2), thinly laminated, 30-35 degrees to core axis, slightly-massive fractured, fractures have slickensided surfaces, fractures at 35-45 degrees to core axis, fractures are closed and have no infilling, dry-damp (MALAGA MEMBER OF THE MONTEREY FORMATION)	
												80	223	thinly bedded, fossiliferous	
												85	218	85-1/2' parallel laminations @ 30 degrees to the core axis, slightly micaceous, slight organic odor	
												90	213		
														92.5-95' contorted bedding, no coherent structure, very dark gray (10 YR 3/1), mottled with dark gray (2.5Y N4/0)	
												95	208	96.2-99 zone of highly-intensely fractured, fractures closed, clean and dry, 30-40 degrees to core axis	
														99.5-99.7' intensely fractured, slightly moist (from drill fluid)	

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-16

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-18-90

ELEVATION: 303.10' MSL

EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'

LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100	203	
												105	198	
												110	193	
												115	188	
												120	183	
												125	178	
												130	173	
												135	168	
									0.15					
												140	163	
												145	158	

101' contorted bedding
101-105' slightly fossiliferous

103', 8 mm thick, dark gray (2.5Y N4/0) ash bed, 90 degrees to core axis

massive

106' fracture, 10-15 degrees to core axis, dry, closed, slickensides

111.8-112.6' zone of fossils
112-113' - 3-5 mm thick ash beds, dark gray (2.5Y N4/0), 70-80 degrees to core axis (10-20 degrees apparent dip)

116' sandy dolostone and chert pebbles and single cobble at 117.8', pebbles are well rounded

117.8' well indurated, dolostone, approximately 80 degrees to core axis
estimated contact

MALAGA MUDSTONE
VALMONTE DIATOMITE

122-123.5' fracture zone, approximately 60 degrees to core axis, closed, no infilling, highly fractured

massive diatomaceous siltstone

135' blocky mudstone-highly fractured, closed, no infilling, slightly more silty, more well indurated, slight color change, very dark gray brown (10 YR 3/2)

ashy

145' bedding still 70 - 85 degrees to core axis, slightly sandy, color is same (10 YR 3/2), more fissle

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-16

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-18-90
ELEVATION: 303.10' MSL
EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'
LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth ft Elev. (feet)		PIEZOMETER
												150 153		
												155 148		
												160 143		
													163' core blocked, hard drilling, well indurated, calcareous dolostone, similar to 117 1/2-119'	
												165 138		
												170 133		
													173' very fissile	
		X			2.40		94	26				175 128		
												180 123	ashy layers	
													183.5 - 184' hard drilling, dolostone, well indurated	
												185 118	approximate lower extent of ashy zone	
													187.8' - 15 cm dolostone, highly-moderate fractured, closed, dry, bedding contorted, 70-75 degrees to core axis	
												190 113		
												195 108	195-197' highly fractured, closed dry, some slickensides	
													198' - 10 cm thick well indurated dolostone	

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LOG OF BORING RFB-16

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-18-90

ELEVATION: 303.10' MSL

EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'

LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												200	higher clay content than above, color same, almost vertical bedding approximately 8 cm apparent offset, clean, closed, dry
												103	
												205	205' - 13 cm thick zone, well indurated dolostone, broken core
												98	becoming laminated light and dark diatomaceous shale, silty diatomite from 206' - 226'
												210	
												93	
		X					NP	NP				215	215' very blocky and fissile bedding, 80-85 degrees to core axis
												88	
													218.5-219' hard drilling, dolostone, well indurated, carbonate cement, no fractures
												220	
												83	
													224' very silty partings
												225	siltstone
												78	226.75' drilling very slow, blocking in bit, core block
												230	
												73	
		X			2.36		101	27				235	235 - 236.5' slow drilling, well indurated dolostone as 218', blocky and fractured, closed fractures
												68	
												240	240' very blocky and highly fractured, closed and clean, oil shows in mud pit from 242'
												63	242 - 244' slight oil show (heavy tar)
												245	245 - 250' poor recovery, moderately fractured, fractures approximately 60 degrees to core axis
												58	

PIEZOMETER

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LOG OF BORING RFB-16

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 6-6-90 FINISH DATE: 6-18-90

ELEVATION: 303.10' MSL

EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'

LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												250	53	
		X			2.08		NP	NP				255	48	
												260	43	
												265	38	
		X			2.07		NP	NP				270	33	
												275	28	
												280	23	
												285	18	
		X			2.35		NP	NP				290	13	
												295	8	

256' slight tar in fractures, fractures 70-80 degrees to core axis, closed

256-257.5' well indurated, lower 0.5' blocky and fractured, narrow open with oil tar and clay infilling, calcite cement
257.5' poorly indurated

260.5-262.5' well indurated dolostone, shear at 10-20 degrees to core axis, 10 cm wide, infilled with clay gouge and angular fractures of well indurated dolostone

265-266' well indurated dolostone, moderately fractured, slight filling and carbonate cement

266' clayey siltstone, well bedded approximately 70 degrees to core axis

279-280' well indurated dolostone, tar in fractures, highly fractured
280-281.7' well indurated dolostone

281.7' tar filling fractures, highly fractured and blocky, approximately 85 degrees to core axis, very narrow-closed

289.5' well indurated dolostone, carbonate cement

291' lost circulation, hole caving approximately 3'

295' approximately 50% circulation return, angular fine-medium size grains, diatomite sand

298 - 300' poor circulation, siltstone

START DATE: 6-6-90 FINISH DATE: 6-18-90

ELEVATION: 303.10' MSL

EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'

LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												300	300 - 304' broken siltstone, intensely fractured, clay infilling (gouge zone?), scattered angular clasts up to 0.5 inches, mottled, color (10YR 3/2 and 2.5Y 4/2)
												3	303' slightly harder drilling
												305 -2	306.5' very well indurated, change in odor, very strong, oil/tar smear on outside of core, strong shean in core, well indurated dolostone, slight reaction in acid, moderately fractured, infilled with clay and tar
												310 -7	311' highly fractured, friable to poorly indurated, fractures are narrow, clay filled and smooth. Rock is slightly to moderately weathered and very thinly bedded (light gray interbeds) dipping at 40 degrees to core axis, fractures are 30 degrees subnormal to bedding
												315 -12	313.5' becomes more indurated and very fine ash (gradational contact) 314.5' becomes very dark gray-brown, friable 315.5' fracture set at 30 degrees and near vertical, very narrow, clay filled and smooth, rock is intensely fractured, 3rd set at 60 degrees that is closed, smooth to moderately rough
												320 -17	318.5' becomes moderately indurated, fractures at 50 degrees closed, clean slickensided, and at 20 degrees closed to very narrow, rough slickensided 320.5-321.5 tar sands (indurated)
													321.5' becomes friable, bedding plane fractures at 30 degrees, core is crushed after handling (sub-normal to core axis)
		X			2.12		NP	NP				325 -22	325' alternating light gray to dark gray-brown moderately indurated (very thinly bedded) very fine gray ash to dark siltstone, bedding at 25 degrees, closely fractured 325.5' fracture, very rough and clean at 60 degrees 327' fracture, rough, clean at 20, 80 and 70 degrees
												330 -27	332' bedding plane fracture at 30 degrees 332.5' becomes crushed and fracture set at 70 degrees and 20 degrees
												335 -32	335' gypsum? (thin beds) and closely fractured and moderately indurated microfossil analysis - Prunopyle titan and Theocorys redondoensis assemblage 10-12 my 337.5' fracture at 60 and 80 degrees, very rough, narrow, clean 338.8' calcareous dolostone inclusion 339 - 339.1' bedding plane fractures at 30 degrees, very narrow, clean and smooth
												340 -37	340' becomes very closely fractured at 40 degrees normal to bedding, along bedding and at 60 degrees ,and friable Microfossil analysis - early Theocorys redondoenis, about 12-14 my 343.5' becomes more indurated
		X					NP	NP				345 -42	344' fracture, 50 degrees narrow, tar filled, smooth 345.5' bedding plane fracture, filled with gray sandy clay, narrow, smooth, slickensided 346' fracture at 50 degrees, slickensided, rough clean 347.3' fracture set at 50 degrees (conjugate) 348' fracture, rough, clean, narrow

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-16

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth & Elev. (feet)	
												350 -47	

START DATE: 6-6-90 FINISH DATE: 6-18-90

ELEVATION: 303.10' MSL

EQUIPMENT: 6" Hollow Auger to 73', HQ Rotary Wash Coring 73-350'

LOGGED BY: Brown, RG #4557, 0 - 307'
Phillips, RG #3718, 307 - TD

PIEZOMETER

348.5 - 349.5' bedding plane fractures, filled with gray fine sandy clay, smooth

BOTTOM OF BORING RFB-16 AT 350 FEET
Borehole water sample obtained on 6/6/90.
Boring geophysically logged using caliper, E-log, neutron and natural gamma probes; see Appendix C.
Boring backfilled to surface with Volclay grout.
Drilling Boring RFB-16A adjacent to RFB-16 for piezometer completion.
*Converted to Standard Penetration Blow Counts

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT #	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												0	304	
												5	299	
												10	294	
												15	289	
												20	284	
												25	279	
												30	274	
												35	269	
												40	264	
												45	259	

START DATE: 7-3-90 FINISH DATE: 7-3-90

ELEVATION: 304.00' MSL

EQUIPMENT: Air Rotary Drilling

LOGGED BY: E. Hilmer, RG #3947

NOTE: second borehole drilled for piezometer installation

LIGHT BROWN SANDY SILT (ML)
with occasional gravel, damp, semi-compact (FILL)

13 - 15' locally clayey

15 - 17' locally orange brown silty sand

occasional clay balls and gravel material, becoming compact, damp

occasional rare cobbles/boulders approximately 1-2' diameter, damp

33 - 35' gravelly zone (GM)

FILL

ALLUVIUM/COLLUVIUM

gravel is mostly angular, some round

water level 7/19/90
material is more moist at approximately 40', change to gray brown mottled orange slightly clayey silt (ML), with occasional rare gravel up to approximately 1-2"
change to brown color

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
RG.:
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Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-16A (RENAMED M53B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER

START DATE: 7-3-90 FINISH DATE: 7-3-90

ELEVATION: 304.00' MSL

EQUIPMENT: Air Rotary Drilling

LOGGED BY: E. Hilmer, RG #3947

50 254

50 - 58' moist, locally wet
groundwater encountered during drilling

55 249

ALLUVIUM/COLLUVIUM

MALAGA MUDSTONE

60 244

DARK GRAY MUDSTONE
with brown layering, moist (MALAGA MEMBER OF THE MONTEREY FORMATION)

65 239

BOTTOM OF BORING RFB-16A AT 66 FEET
*Logged cuttings, no samples obtained
Boring reamed to 10 inch diameter then converted to Piezometer RFB-16A.
Boring not geophysically logged.

START DATE: 7-5-90 FINISH DATE: 7-9-90
ELEVATION: 195.40' MSL
EQUIPMENT: 6" Hollow Auger
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER	
												0	195		
57	12	X	X		2.69	0.29	45	23		15		5	190		DARK BROWN-GRAY PEBBLY SAND (SC) color of 5Y 5/3 (olive), moist, mottled colorations (FILL) 7 - 8' coarse fill, some brick seen in cuttings
21	15	X	X		2.78	0.41	43	23		41 /10"		10	185		BROWN SILTY SAND (SM) color of 5Y 5/3 (olive), damp to dry, very micaceous, fine grained sand, well sorted moderately consolidated (FILL)
54	17	X	X		2.79	0.44	42	13		50		15	180		mottled brown and gray, dry, no pebbles or coarse sand, well sorted, moderately consolidated
65	16	X			2.77		35	11		49		20	175		FILL
17	7	X			2.71	0.50	NP	NP		32 /5"		25	170		SAN PEDRO SAND BROWN SAND (SP) Native color is 5Y 5/3, dry color is 5Y 7/3, moist, fine to medium grained, unconsolidated (SAN PEDRO SAND UNIT)
2	8	X			2.69		NP	NP		42 /11"		30	165		becomes light brown, fine to medium grained, moist to dry, better sorted
1	8	X			2.70		NP	NP		48 /10"		35	160		
4	3				2.72					32 /5.5"		40	155		
1	2	X								32 /5"		45	150		becomes light red-brown, some iron stained color zones, medium to coarse grained, dry

Herzog Associates
Geoscientists

Job No: 15384.01.00.7
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Date: DEC 1990

LOG OF BORING RFB-17

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-5-90 FINISH DATE: 7-9-90
ELEVATION: 195.40' MSL
EQUIPMENT: 6" Hollow Auger
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												50	145	
9	7						NP	NP		32 /5"		55	140	becomes light brown, medium to fine grained, dry, well sorted (SW)
										32 /5"		60	135	
9	5	X			2.69					32 /5"		65	130	
												70	125	
0	3	X			2.69		NP	NP		32 /5"		75	120	
												80	115	
	13									32 /5"		85	110	very unconsolidated, dry, medium to fine grained
												90	105	
19	4	X			2.68					32 /5"		95	100	

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LOG OF BORING RFB-17

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-5-90 FINISH DATE: 7-9-90
ELEVATION: 195.40' MSL
EQUIPMENT: 6" Hollow Auger
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100 95		
13	5	X		X	2.71	0.45	NP	NP		38		105 90	loose, dry, medium to fine grained	
												110 85		
6	7	X		X		0.45	NP	NP		32 /4.5"		115 80	fine to medium grained, dry to moist, very loose and unconsolidated, some rust colored sand in small patches	
												120 75		
0	4	X		X		0.48	NP	NP		32 /4"		125 70	reddish stained patches approximately 1/4" in diameter, hardened (cemented?) balls of sand, breaks up with fingers	
												130 65	SAN PEDRO SAND	
													MALAGA MUDSTONE	
76	31	X			2.73		86	43		32 /5"		135 60	DARK GRAY MUDSTONE moderate-strong petroleum odor, moist to damp, massive, no water, dry contact, (MALAGA MEMBER OF THE MONTEREY FORMATION)	
												140 55		
	38	X			2.39		106	46		96		145 50		

BOTTOM OF BORING RFB-17 @ 146 FEET
No Free Water Encountered to total depth.
Boring geophysically logged using neutron and natural gamma probes; see Appendix C.
Boring backfilled to surface using Volclay grout.
*Converted to Standard Penetration Blow Counts

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Geoscientists

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LOG OF BORING RFB-17

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-2-90 FINISH DATE: 7-2-90
ELEVATION: 189.40' MSL
EQUIPMENT: 8" diameter hollow augers
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												0	189	
8	5	X			2.69		87	59		31		5	184	
8	5	X		X	2.68	0.39				48 /11"		10	179	
3	3	X			2.69					38 /11"		15	174	
										45 /11"		20	169	
8	3	X								49 /9"		25	164	
												30	159	
5	3	X			2.70					56 /9"		35	154	
												40	149	
9	6	X								32 /5"		45	144	

DARK BROWN SILTY SAND (SM)
medium dense, moist (FILL)

FILL

SAN PEDRO SAND

LIGHT BROWN SAND (SP) color of 2.5Y 7/3, moist, medium to very coarse grained, unconsolidated (SAN PEDRO SAND UNIT)

moist, medium to very coarse grained, rare pebbles, angular to subround, unconsolidated sand, color is 5Y 7/3 (pale yellow), same color when wetted

medium to coarse grained, rare pebbles, becoming wet 85% quartzite, 5% feldspars, 10% other rock fragments, color change to 5Y 6/3 - pale olive, same color wetted

Herzog Associates
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Job No: 15384.01.00.7
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Lic No: 3488
Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-40

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-2-90 FINISH DATE: 7-2-90

ELEVATION: 189.40' MSL

EQUIPMENT: 8" diameter hollow augers

LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
												50 139	
0	9	X		X	2.68	0.37				60 /9"	■	55 134	
												60 129	
2	4	X			2.69					32 /5"	■	65 124	
												70 119	
												75 114	
												80 109	
7	4									32 /5"	■	85 104	
												90 99	
												95 94	

wet, medium to very coarse grained, approximately 2% pebbles, (predominantly metamorphic)

wet, medium to very coarse grained

color is 5Y 6/3, pale olive, wet to moist, medium to very coarse grained, rare pebbles, some up to 1.5" across (very rare), unconsolidated sands

SILTY SAND (SM)
coarse grained, predominantly very coarse sand to fine pebbles, silty binder, wet, color of 5Y 5/3 (olive), same color wetted

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Geoscientists

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Date: DEC 1990

LOG OF BORING RFB-40

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-2-90 FINISH DATE: 7-2-90

ELEVATION: 189.40' MSL

EQUIPMENT: 8" diameter hollow augers

LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL. SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-8 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												100	89	
2	10	X			2.70					32 /5"		105	84	
												110	79	
3	13									32 /5"		115	74	
												120	69	
												125	64	
												130	59	
0	4	X			2.70					32 /5"		135	54	
												140	49	
												145	44	

OLIVE BROWN SAND (SP) similar to material at 85', wet to moist, medium to coarse grained, rare pebbles

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LOG OF BORING RFB-40

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-2-90 FINISH DATE: 7-2-90
ELEVATION: 189.40' MSL
EQUIPMENT: 8" diameter hollow augers
LOGGED BY: R. Hagen, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX E	CONSOL, SEE APNDX E	DIRECT SHEAR SEE APNDX E	SPECIFIC GRAVITY	POROSITY	LIQUID LIMIT %	PLASTICITY INDEX %	FIELD PERM. E10-6 CM/SEC	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150		
												39		
9	3			X		0.38				32 /5"	■	155 34	slight color change to 2.5Y 6/6 (olive yellow), same color wet, medium to very coarse grained, rare pebbles, unconsolidated	
												160 29		
												165 24		
												170 19		
13	3	X			2.71					32 /5"	■	175 14	moist to wet, very loose	

BOTTOM OF BORING RFB-40 @ 176.5 FEET
No Free Water Encountered (boring set open overnight)
Performed neutron and natural gamma geophysical logs; see Appendix C.
Boring backfilled to surface with Volclay grout.
*Converted to Standard Penetration Blow Counts

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RG.:
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Drwn: CLM
Date: DEC 1990

LOG OF BORING RFB-40

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-6-90

ELEVATION: 421.90' MSL

EQUIPMENT: Air Rotary Tricone

LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet) Elev.		PIEZOMETER
												0 422	SANDY SILT (ML) yellowish brown (10YR 5/4), occasional gravel fragments (TERRACE DEPOSITS)	
												5 417	TERRACE DEPOSITS	
													VALMONTE DIATOMITE	
												10 412	grading to DIATOMITE	
												15 407		
												20 402	becoming SILTY DIATOMITE white (2.5Y 8/2)	
												25 397	very pale brown (10YR 7/3) with rounded cobbles at 27', 2" diameter	
												30 392	DIATOMITE pale yellow (2.5Y 8/3) becoming white (5Y 8/1)	
												35 387		
													pale yellow (5Y 8/3)	
												40 382	white (10YR 8/2)	
												45 377	very pale brown (10YR 8/3)	

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Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-18

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-6-90
ELEVATION: 421.90' MSL
EQUIPMENT: Air Rotary Tricone
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
												50 372	

DIATOMITE; moist with minor dolostone layer at 52'
pale yellow (2.5Y 7/4)

55 367

DIATOMITE

60 362

65 357

70 352

very pale brown (10YR 8/3); moist

light yellowish brown (10YR 6/4)

75 347

becoming SILTY to SANDY DIATOMITE at 77'

80 342

DOLOSTONE at 80'

DIATOMITE
light yellowish brown (10YR 6/4)

85 337

grading between SILTY to SANDY DIATOMITE

90 332

DOLOSTONE layer at 93'

DIATOMITE
yellowish brown (10YR 5/4); moist

95 327

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LOG OF BORING RFB-18

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-6-90
ELEVATION: 421.90' MSL
EQUIPMENT: Air Rotary Tricone
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100 322	becoming interbedded with SILTY SHALE brown (10YR 5/3) to dark yellowish brown (10YR 4/4)	
												105 317	SILTY SHALE, as above	
												110 312	DIATOMITE very pale brown (10YR 8/3)	
												115 307	SILTY SHALE yellowish brown (10YR 5/4)	
												120 302	grading to SILTY DIATOMITE	
												125 297	grading to DIATOMACEOUS SHALE strong brown (7.5YR 4/6)	
												130 292	grading to SILTY SHALE yellowish brown (10YR 5/4)	
												135 287	DIATOMACEOUS SHALE	
												140 282	SILTSTONE dark brown (7.5YR 3/3)	
													becoming dark reddish brown (5YR 2.5/2) with slight hydrocarbon odor	
												145 277		

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LOG OF BORING RFB-18

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-6-90
ELEVATION: 421.90' MSL
EQUIPMENT: Air Rotary Tricone
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE

Depth (feet)	Elev.	
150	272	grading to DIATOMACEOUS SHALE
		pronounced color change to very dark grayish brown (2.5Y 3/2) at 153'
155	267	SILTSTONE, as above
		DIATOMACEOUS SHALE very dark brown (10YR 3/2)
160	262	SILTSTONE dark olive gray (5Y 3/2)
		grading to DIATOMACEOUS SILTSTONE
165	257	
		as above, hydrocarbon odor
		color change to dark olive brown (2.5Y 3/3)
170	252	
		as above, stronger hydrocarbon odor
		grading to SILTY DIATOMITE
175	247	
		DIATOMACEOUS SILTSTONE olive brown (2.5Y 4/3), hydrocarbon odor
180	242	
		DOLOSTONE
		SILTSTONE olive brown (2.5Y 4/4) grading to DIATOMACEOUS SILTSTONE, very dark grayish brown (2.5Y 3/2) with hydrocarbon odor
185	237	
		slightly micaceous
190	232	
195	227	decreasing hydrocarbon odor

PIEZOMETER

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LOG OF BORING RFB-18

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-6-90
ELEVATION: 421.90' MSL
EQUIPMENT: Air Rotary Tricone
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												200		
												222	becoming less diatomaceous	
												205 217	very dark grayish brown (2.5Y 3/2)	
													becoming more diatomaceous olive brown (2.5Y 4/3)	
												210 212	less diatomaceous at 209 to 211'	
													more diatomaceous at 212' strong hydrocarbon odor	
												215 207		
												220 202		
												225 197	becoming very dark brown (10YR 2/2)	
												230 192		
													grading between SILTY DIATOMITE, DIATOMACEOUS SILTSTONE, and SILTSTONE	
												235 187		
												240 182	groundwater encountered at 240.2'	
												245 177		

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LOG OF BORING RFB-18

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-6-90
ELEVATION: 421.90' MSL
EQUIPMENT: Air Rotary Tricone
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
												250 172	
												255 167	
												260 162	
												265 157	
												270 152	
												275 147	
												280 142	
												285 137	
												290 132	
												295 127	

no cuttings return

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LOG OF BORING RFB-18

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												300 122	BOTTOM OF BORING RFB-18 AT 300 FEET *Logged cuttings, no samples collected. Borehole water sample collected on 8/6/90. Geophysical logs run on 8/7/90. Backfilled with sand to 250 feet on 8/8/90 250' of 2-1/2" ID Sch. 40 PVC blank casing set, hole then backfilled with sand to surface prior to cross hole geophysical survey. After crosshole geophysical survey run, sand backfill and PVC casing reamed out and boring backfilled to surface with Volclay grout.	

START DATE: 7-31-90 FINISH DATE: 8-6-90

ELEVATION: 421.90' MSL

EQUIPMENT: Air Rotary Tricone

LOGGED BY: HAGEN, RG #4788

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LOG OF BORING RFB-18

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-30-90 FINISH DATE: 8-7-90
ELEVATION: 419.70' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 101', Air Rotary Coring 101 - 211', Rotary Wash Coring 211 - 251'
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												0 420	SILTY SAND (SM) dark brown (10YR 3/3), minor gravel, loose, dry
18	8	X	0.79	2.66	127.5	NP	NP			53		5 415	SILTY SAND (SM) dark reddish brown (5YR 3/2)
6	3	X		2.67		NP	NP			42		10 410	SILTY SAND (SM) TO SAND (SP) light brown (7.5YR 6/3), loose, dry, (TERRACE DEPOSITS)
													SILTY SAND, as above
72	49	X		2.62		38	15			22		15 405	SANDY GRAVEL (GP) reddish brown (5YR 6/4), well-rounded clasts in loose, sandy matrix
													TERRACE DEPOSITS / VALMONTE DIATOMITE
	75	X	0.63	2.36	128.5	NP	NP			24		20 400	DIATOMITE thinly laminated
													color ranges from white to very pale brown (10YR 8/3), very fissile, soft, thinly laminated
75	17	X	0.80	2.68	126.4	50	4			18		25 395	
		X		2.54		82	2			23		30 390	
												35 385	
												40 380	
												45 375	

PIEZOMETER

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Date: JAN 1991

LOG OF BORING RFB-19

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-30-90 FINISH DATE: 8-7-90
ELEVATION: 419.70' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 101', Air Rotary Coring 101 - 211', Rotary Wash Coring 211 - 251'
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/FOOT *	SAMPLE	Depth (feet) / Elev.		PIEZOMETER
80	16	X	0.34	2.71	111.1	50	12			46		50 / 370	DIATOMITE, as above	
												55 / 365		
												60 / 360		
												65 / 355		
	50	X		2.26		NP	NP			33		70 / 350	DIATOMITE, becoming light gray (10 YR 7/1)	
												75 / 345		
													DOLOSTONE harder drilling at 77 - 80 feet	
												80 / 340		
												85 / 335		
	52	X	0.41	2.40	89.0	108	58			33		90 / 330	grading to DIATOMACEOUS SILTSTONE pale brown (10YR 6/3)	
												95 / 325		

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LOG OF BORING RFB-19

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-30-90 FINISH DATE: 8-7-90
ELEVATION: 419.70' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 101', Air Rotary Coring 101 - 211', Rotary Wash Coring 211 - 251'
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
		X				108	35			45		100 320	DIATOMACEOUS SILTSTONE light brownish gray (10YR 6/2) to grayish brown (10YR 5/2), thinly laminated, bedding 10 to 20 degrees to core axis	
												105 315	grading to SILTY DIATOMITE bedding typically 1/8" to 1/2" thick, gypsum crystallization at 106'	
												110 310		
												115 305	grading to SILTSTONE	
												120 300	DIATOMACEOUS SILTSTONE	
												125 295	fractures 1/8" - 1/4" wide with white (gypsum?) fracture filling	
													interbedded SILTSTONE and DIATOMACEOUS SHALE with secondary gypsum crystallization, bedding varies from 50 to 70 degrees to core axis	
												130 290	grading to SILTSTONE	
												135 285	DOLOSTONE with tar-filled fractures, highly fractured	
													becoming more diatomaceous	
												140 280	DIATOMACEOUS SILTSTONE well indurated, with tar-filled fractures	
													grading to SILTSTONE	
												145 275	bedding very steep, dips approach 10 degrees to core axis	
													brecciated SILTSTONE, DOLOSTONE, and DIATOMACEOUS SILTSTONE, intensely fractured, tar-filled fractures	

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LOG OF BORING RFB-19

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-30-90 FINISH DATE: 8-7-90
ELEVATION: 419.70' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 101', Air Rotary Coring 101 - 211', Rotary Wash Coring 211 - 251'
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
	87	X	0.48	2.13	69.0	NP	NP					150	270	
	3		0.27	2.78	126.0			33.2	179			155	265	
	4		0.28	2.78	125.7			18.8						
												160	260	
												165	255	
												170	250	
												175	245	
												180	240	
												185	235	
												190	230	
												195	225	
									0.11					

polished slickensided surface, dip 15 degrees to core axis (FAULT PLANE)

DOLOSTONE
becoming moderately to highly fractured, tar-filled fractures, strong

DIATOMACEOUS SHALE
distinct color change to dark gray (10YR 4/1) to black (10YR 2/1), with contorted bedding, soft, friable

slight hydrocarbon odor

DOLOSTONE
with tar-filled fractures; becoming brecciated and tarry at 178'

becoming ashy DIATOMACEOUS SHALE AT 179'

bedding 60 to 75 degrees to core axis

slightly contorted laminations

ash layer at 184.5'

becoming ashy at 190'

DOLOSTONE and DIATOMACEOUS SHALE
brecciated, intensely fractured, tar-filled fractures

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LOG OF BORING RFB-19

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-30-90 FINISH DATE: 8-7-90
ELEVATION: 419.70' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 101', Air Rotary Coring 101 - 211', Rotary Wash Coring 211 - 251'
LOGGED BY: HAGEN, RG #4788

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												200		
												220	DOLOSTONE, tar filled fractures DARK GRAY DIATOMACEOUS SHALE	
	58		0.66	2.63	56.1			4.9					grading to DIATOMACEOUS MUDSTONE more massive, less defined laminations, bedding approximately 50 degrees to core axis	
												205 215		
												210 210	becoming more massive	
												215 205		
												220 200		
	95		0.73	2.65	44.9			1.32					ashy layers between 223' to 226'; contorted bedding/laminations	
												225 195	DIATOMACEOUS MUDSTONE, as above	
													bedding 40 degrees to core axis	
												230 190		
												235 185		
	46	X	0.54	2.51	72.7	57	10	0.57				240 180		
												245 175	grading to DIATOMACEOUS SHALE bedding from 10 to 25 degrees to core axis, "microfaulted" offset of laminations and bedding range from 1/8" to 1/2"	

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LOG OF BORING RFB-19

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	START DATE: 7-30-90 FINISH DATE: 8-7-90 ELEVATION: 419.70' MSL EQUIPMENT: 8" Hollow Stem Auger 0 - 101', Air Rotary Coring 101 - 211', Rotary Wash Coring 211 - 251' LOGGED BY: HAGEN, RG #4788	PIEZOMETER
												250 170		

BOTTOM OF BORING RFB-19 AT 251 FEET
Geophysical logging run on 8/9/90.
Hole caved to 225 feet. 225 feet of 2" ID Schedule 40 PVC blank casing set, hole then backfilled with sand to surface prior to cross hole geophysical survey.
After crosshole geophysical survey run, sand backfill and PVC casing reamed out and boring backfilled to surface with Volclay grout.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-19

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-28-90 FINISH DATE: 8-29-90
ELEVATION: 278.22' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 12', Air Rotary Coring 12 - 90'
LOGGED BY: GLOMB, RG #3773, 0 - 52'
MATTEY, RG #3832, 52 - 90'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												0 278	CLAYEY SAND (SC) dark brown, with abundant shale fragments, loose to medium dense, dry (TOPSOIL)
	53	X	0.46	2.66	89.5	104	64			23		5 273	SILTY CLAY (CH) dark brown, stiff, moist (COLLUVIUM)
												10 268	COLLUVIUM ALTAMIRA SHALE PHOSPHATIC FACIES
										32 /2"			DOLOSTONE gray, massive, strong, highly to moderately fractured at 6" to 8" spacing
												15 263	SILICEOUS SHALE gary brown, thinly bedded, intensely fractured, bedding near vertical
												20 258	
												25 253	DIATOMACEOUS SILTSTONE gray, thinly bedded, friable, moderately fractured
												30 248	color change to yellow-brown, becoming clayey (bentonite), steeply dipping beds
												35 243	becoming more diatomaceous
													SILICEOUS SHALE dary gray brown, thinly bedded, highly fractured, bedding steeply dipping approximately 15 degrees to core axis
												40 238	DOLOSTONE gray, moderately fractured, strong
												45 233	RED GRAY BROWN DIATOMACEOUS SILTSTONE with slickensided fractures water level 9/5/90

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-20 (RENAMED M54B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-28-90 FINISH DATE: 8-29-90
ELEVATION: 278.22' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 12', Air Rotary Coring 12 - 90'
LOGGED BY: GLOMB, RG #3773, 0 - 52'
MATTEY, RG #3832, 52 - 90'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												50	228	
	5		0.17	2.88	149.5			0.83				55	223	
												60	218	
												65	213	
												70	208	
42	50	X	0.42	2.37	85.8	95	42					75	203	
												80	198	
												85	193	
												90	188	

groundwater encountered

DOLOSTONE
light olive brown (2.5Y 5/3), highly fractured, slickensides on some fracture surfaces

brecciated zone at 58'

DIATOMACEOUS SILTSTONE
dark olive brown (2.5Y 3/3), highly to intensely factured, friable

DOLOSTONE
gray

DIATOMACEOUS SILTSTONE, as above
generally massive but with few, thinly bedded layers, bedding dips approximately 15 degrees to core axis

becoming more indurated

DOLOSTONE
with thin sand lense, dipping approximately 10 degrees to core axis

DIATOMACEOUS MUDSTONE
dark gray, massive, friable

BOTTOM OF BORING RFB-20 AT 90 FEET
Borehole water sample collected on 8/29/90.
Geophysical logging run on 8/29/90.
Piezometer RFB-20 installed in reamed boring on 8/31/90.
* Converted to standard penetration blow counts.

START DATE: 7-26-90 FINISH DATE: 7-27-90
ELEVATION: 301.83' MSL
EQUIPMENT: 8" Hollow Stem Auger
LOGGED BY: EINARSON, RG #4621

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	PIEZOMETER
												0	302	
	45	X	0.68	2.59	51.2			16.2		44		5	297	
												10	292	
	42		0.55	2.63	73.8	95	31	1.19		33		15	287	
	0	X			73.1					18 /8"		20	282	
										32 /4"		25	277	
										32 /6"		30	272	
										32 /6"		35	267	
												40	262	

GRAVELLY SILT (ML)
brown, loose, dry (FILL)

FILL

ALTAMIRA SHALE
PHOSPHATIC FACIES
interbedded SILTY DIATOMITE and SILICEOUS SHALE
light yellowish brown (2.5y 6/3), friable to weak, moist

no recovery between 8 - 10'

DIATOMACEOUS SILTSTONE
light yellowish brown (2.5Y 6/3) with minor siliceous shale, closed fractures

DIATOMACEOUS SITLSTONE, as above

hard drilling at 21-23'
DOLOSTONE
gray, strong, moderately fractured
SILTY DIATOMITE
friable

becoming moist to wet at 26'
water level 8/1/90
groundwater encountered at 27 feet during drilling

SILICEOUS SHALE
SILTY DIATOMITE

becoming well indurated and strong

BOTTOM OF BORING RFB-21 AT 42 FEET
Borehole water sample collected in 7/26/90.
Piezometer RFB-21 installed in reamed boring on 7/27/90.
No geophysical logging performed.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-21 (RENAMED M55B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-16-90 FINISH DATE: 8-21-90

ELEVATION: 405.65' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 10', Water Coring 10 - 98', Air Tricone 98 - 110', Water Coring 110-115'

LOGGED BY: COFFEY, RG #4297, 0 - 98'
PHILLIPS, RG #3718, 98 - 115'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth (feet) / Elev.		PIEZOMETER
												0 406	ASPHALT and GRAVEL BASE ROCK	
													SAND CLAY (CL) dark gray, medium stiff, wet (FILL)	
18	34	X	0.53	2.60	75.5	80	57	0.11		13		5 401		
													FILL	
													ALTAMIRA SHALE PHOSPHATIC FACIES	
	76	X	0.57	2.61	69.8	79	32			8		10 396	SILTSTONE light brownish gray (2.5Y 6/2), moist, vertical fractures	
14	68	X	0.51	2.56	78.6	83	51						SILTY DIATOMITE pale yellow (2.5Y 8/3), friable to weak, moderately well indurated	
												15 391		
	66		0.55	2.45	68.2							20 386	SILTSTONE yellow (2.5Y 7/6), friable, massive	
												25 381	no recovery	
													drilling harder	
												30 376	no recovery, log cuttings interbedded CHERT, SILICEOUS SHALE and SILTSTONE	
													SILTSTONE	
													SILICEOUS SHALE	
												35 371	SILTSTONE, as above	
													SILICEOUS SHALE	
													PHOSPHATIC FACIES	
													CHERTY FACIES	
												40 366	CHERT olive brown (2.5Y 4/3), moderately to highly fractured, strong	
													with minor beds of SILICEOUS CLAYSTONE white (10YR 8/1)	
												45 361	CHERT with vertical to high angle fractures	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-22

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-16-90 FINISH DATE: 8-21-90

ELEVATION: 405.65' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 10', Water Coring 10 - 98', Air Tricone 98 - 110', Water Coring 110-115'

LOGGED BY: COFFEY, RG #4297, 0 - 98'
PHILLIPS, RG #3718, 98 - 115'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												50 356	no recovery	
		X		2.49								55 351	SANDY SILTSTONE light yellow brown CHERT gray brown interbedded with SILTSTONE	
									1.08			60 346	CHERTY FACIES	
													TUFFACEOUS FACIES DOLOSTONE gray, strong, moderately to highly fractured, near vertical fractures	
												65 341	SILTSTONE light gray (10YR 7/2) to light yellowish brown (10YR 6/4), thinly bedded, dips between 70 and 80 degrees to core axis	
												70 336	DOLOSTONE gray, thinly bedded, beds dip 60 to 70 degrees to core axis, fractures 80 degrees to core axis SILTSTONE olive brown, friable	
												75 331		
													SILICEOUS SHALE yellowish brown, highly fractured, thinly bedded, bedding approximately 70 degrees to core axis	
												80 326	CHERT and SILICEOUS SHALE gray	
									0.36				SILTSTONE yellowish brown, dipping at 70 degrees to core axis	
												85 321		
												90 316	DOLOSTONE dark brown, strong, moderately to highly fractured, fractures dip 10 degrees to core axis	
												95 311	microfossil analysis - no preserved siliceous microfossils SILTSTONE dark brown to black, weak, massive	
	39	X	0.52	2.49	83.9	68	26	0.008					grading to MUDSTONE, well indurated	

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Geoscientists

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LOG OF BORING RFB-22

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-16-90 FINISH DATE: 8-21-90

ELEVATION: 405.65' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 10', Water Coring 10 - 98', Air Tricone 98 - 110', Water Coring 110-115'

LOGGED BY: COFFEY, RG #4297, 0 - 98'
PHILLIPS, RG #3718, 98 - 115'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
									0.21			100 306 105 301 110 296 115 291	MUDSTONE, as above highly fractured with tar in-filling at 110' MUDSTONE well indurated	
						84	38							

BOTTOM OF BORING RFB-22 AT 115 FEET
Geophysical logging run on 8/20/90.
Boring backfilled to surface with volclay grout.
No free water encountered.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Date: JAN 1991

LOG OF BORING RFB-22

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-15-90 FINISH DATE: 8-15-90
ELEVATION: 503.90' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 35', Air Rotary Tricone 35 - 95'
LOGGED BY: PHILLIPS, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												0 504	SILT (ML) light gray with cobbles and siltstone, stiff, dry (FILL)
													FILL
													ALTAMIRA SHALE PHOSPHATIC FACIES
										42		5 499	SILTSTONE and interbedded DOLOSTONE light gray, very thinly bedded, friable, moderately indurated
	30	X	0.46	2.68	91.0								SILTSTONE, as above
													CHERT/SILICEOUS SHALE gray brown, intensely fractured, strong, with iron staining along fractures
						34	11			32 /5"		10 494	
													SILTSTONE and SANDSTONE yellow gray, friable, moist
	29	X	0.40	2.69	100.6	74	40			24		15 489	
													CHERT strong, very closely fractured
	30	X	0.44	2.60	91.4	92	53	0.03		38		20 484	SILTSTONE yellow gray, friable, with thin interbeds of chert
													MUDSTONE orange gray, friable
	65	X	0.63	2.63	60.5	92	48	1.82		42		25 479	SILTSTONE yellow gray, friable, with minor sandstone beds, poorly to moderately indurated
	0	X			98.3					42		30 474	
													PHOSPHATIC FACIES
													CHERTY FACIES
										32 /6"		35 469	cuttings logged, no samples obtained CHERT strong, moderately to highly fractured, minor beds of siltstone
												40 464	
												45 459	DOLOSTONE interbeds

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-23

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-15-90 FINISH DATE: 8-15-90
ELEVATION: 503.90' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 35', Air Rotary Tricone 35 - 95'
LOGGED BY: PHILLIPS, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE

Depth (feet)	Elev.	Description	PIEZOMETER
50	454	CHERT, as above	
		CHERTY FACIES	
55	449	TUFFACEOUS FACIES	
		DOLOSTONE dark gray, very strong SILTSTONE yellow gray, moderately strong	
60	444	DOLOSTONE light gray, very strong SILTSTONE yellow gray	
65	439	DOLOSTONE MUDSTONE dark yellow brown, friable, very thinly bedded	
70	434		
75	429	DOLOSTONE light gray, strong	
		SANDSTONE dark yellow brown, very fine grained, friable to weak	
80	424	DOLOSTONE gray	
		SANDY SILTSTONE to SANDSTONE dark yellow brown	
85	419	DOLOSTONE	
		MUDSTONE dark brwon, soft DOLOSTONE, gray MUDSTONE dark yellow brown, soft to plastic, clayey	
90	414		
95	409		

BOTTOM OF BORING RFB-23 AT 95 FEET
Geophysical logging run on 8/15/90.
Boring backfilled to surface with Volclay grout.
No free water encountered.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-23

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-31-90 FINISH DATE: 9-11-90

ELEVATION: 522.11' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 33', Air Rotary Coring 33 - 160'

LOGGED BY: GLOMB, RG #3773, 0 - 33'
BROWN, RG #4557, 33 - 160'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												0 522	ASPHALT SILTY SAND (SM) dark brown, moist, medium dense (FILL) SILTY CLAY (CL) dark brown, moist, soft (FILL)
20	22	X		2.41						14		5 517	SANDY GRAVEL (GW) brown, medium dense, moist (FILL) FILL COLLUVIUM
66										59		10 512	SANDY CLAY (CL) light brown, medium dense, moist, with shale and chert fragments COLLUVIUM VALMONTE DIATOMITE
14	27	X	0.36	2.76	109.9	102	51	1.13		21		15 507	SILICEOUS SHALE light gray (2.5Y 7/2) to white (5YR 8/1) SILTSTONE light yellowish brown (2.5Y 6/4) SANDSTONE orange brown
10	62	X	0.62	2.74	62.7	96	56	10.6		11		20 502	SILTY CLAYSTONE to SILTSTONE light yellowish brown (2.5Y 6/4), very moist, friable color change to light gray, closely laminated to very thinly bedded, very moist
										32 /5"		25 497	
20	24	X	0.44	2.69	94.7					42		30 492	SANDSTONE pale yellow (2.5Y 7/3), ashy, friable, highly fractured
												35 487	DOLOSTONE light gray (10YR 7/1), highly fractured, thinly bedded, bedding 75 to 80 degrees to core axis SILTY SHALE SILICEOUS SHALE reddish brown (5Y 4/3), very thinly bedded, highly fractured, fractures closed and iron stained
												40 482	SILTSTONE dark yellowish brown (10YR 4/6), medium bedded to massive, friable, moist
												45 477	Interbedded CHERT, SILICEOUS SHALE and SILTSTONE thinly bedded, highly to moderately fractured, fractures closed, no in-filling

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.: [illegible]
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-24 (RENAMED M56B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-31-90 FINISH DATE: 9-11-90

ELEVATION: 522.11' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 33', Air Rotary Coring 33 - 160'

LOGGED BY: GLOMB, RG #3773, 0 - 33'
BROWN, RG #4557, 33 - 160'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												50 472	SILTSTONE, as above
	11		0.25	2.80	130.8							55 467	DOLOSTONE light gray (10YR 7/1), thinly bedded, 85 - 90 degrees to core axis, strong DOLOSTONE and CHERT intensely fractured, fractures 20 degrees to core axis, quartz filling fractures SILICEOUS SHALE
												60 462	
									1.52			65 457	SILTY DIATOMITE grayish brown (2.5Y 5/2), very thinly bedded to closely laminated, bedding near horizontal, moderately to slightly fractured
												70 452	DIATOMITE yellowish red (5YR 4/6) to light gray (10YR 7/1), moderately fractured, fractures 5 degrees to axis, friable to weak with thin light gray (2.5Y 7/0) ASH beds Microfossil Analysis at 72 feet; few diagnostic radiolarians, most likely upper Stichocorys delmontensis or lower Stichocorys peregrina age, estimated at 6 - 7 m.y.
	67	X	0.60	2.21	55.1	NP	NP					75 447	DOLOSTONE DIATOMACEOUS SILTSTONE light gray (2.5Y 7/0) to grayish brown (2.5Y 5/2)
												80 442	ASHY grading to SILTY DIATOMITE intensely fractured, fractures 30 degrees to core axis ASHY grading to DIATOMACEOUS SILTSTONE, as above
												85 437	moderately fractured, fractures 25 to 30 degrees to core axis
												90 432	SILTY DIATOMITE CHERT very dark gray (10YR 3/1) VALMONTE DIATOMITE / ALTAMIRA SHALE PHOSPHATIC FACIES
	109	X		2.28					1.67			95 427	DIATOMACEOUS SILTSTONE bedding 70 to 90 to core axis, fractures 60 degrees to core axis, phosphate nodules, slight hydrocarbon odor interbedded SILICEOUS SHALE and SILTSTONE with phosphate nodules DOLOSTONE strong, bedding 80 to 90 degrees to core axis, highly fractured

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Date: JAN 1991

LOG OF BORING RFB-24 (RENAMED M56B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-31-90 FINISH DATE: 9-11-90

ELEVATION: 522.11' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 33', Air Rotary Coring 33 - 160'

LOGGED BY: GLOMB, RG #3773, 0 - 33'
BROWN, RG #4557, 33 - 160'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100	422	
													SILTSTONE black (5Y 2.5/2), bedding 85-90 degrees to core axis, moderately fractured with slickensides, fractures 50 - 60 degrees to core axis, strong hydrocarbon odor	
												105	417	
													SILICEOUS SHALE dark olive gray (5Y 3/2), very thinly laminated, well indurated, highly fractured, fractures 0 - 40 degrees to core axis	
													grading to SHALE, as above	
												110	412	
													grading to SILTY SHALE	
													SILICEOUS SHALE highly fractured, as above, iron stained	
	39	X	0.40	2.60	97.2							115	407	
													interbedded SILTSTONE and SILTY SHALE becoming indurated	
													DOLOSTONE, gray	
												120	402	
													ASHY SANDY SILTSTONE well indurated, thinly bedded	
													PHOSPHATIC SHALE and SHALY DIATOMITE closely laminated, friable	
												125	397	
													ASHY SILTSTONE	
													interbedded SILICEOUS SHALE and SILTSTONE very dark gray (2.5Y 3/0), well indurated, thinly bedded, bedding near horizontal, slight hydrocarbon odor	
												130	392	
													SILTSTONE SILICEOUS SHALE DOLOSTONE SILICEOUS SHALE SILTSTONE highly fractured, fractures 5 to 10 degrees to core axis, slight iron staining in fracture surfaces, slight hydrocarbon sheen on core	
												135	387	
	5		0.15	2.77	141.7			1.72						
												140	382	
													SILICEOUS SHALE, as above	
													water level 10/3/90 groundwater encountered during drilling	
												145	377	
													SILICEOUS SHALE SILTSTONE well indurated, with phosphate nodules	

Herzog Associates
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LOG OF BORING RFB-24 (RENAMED M56B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-31-90 FINISH DATE: 9-11-90

ELEVATION: 522.11' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 33', Air Rotary Coring 33 - 160'

LOGGED BY: GLOMB, RG #3773, 0 - 33'
BROWN, RG #4557, 33 - 160'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150 372	grading to SILTY SHALE DOLOSTONE strong, well indurated, fractures 5 to 15 degrees to axis, quartz fracture filling SILICEOUS SHALE	
												155 367		
													SILTSTONE intensely fractured, fractures as above, occasional phosphate nodules	
												160 362		

BOTTOM OF BORING RFB-24 AT 160 FEET
Borehole water sample collected on 9/11/90.
Geophysical logging run on 9/12/90.
Piezometer RFB-24 installed in reamed boring on 9/20/90.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

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Date: JAN 1991

LOG OF BORING RFB-24 (RENAMED M56B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-28-90 FINISH DATE: 9-13-90
ELEVATION: 500.89' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 20', Air Rotary Coring 20 - 120', Rotary Wash Coring 120 - 158.5'
LOGGED BY: GLOMB, RG #3773, 0 - 80'
HILMER, RG #3947, 80-158.5'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												0	501	
													CLAY (CH) dark brown to black, very stiff, dry, with occasional gravel fragments (FILL)	
													becomes moist at 4'	
	24			2.66	94.5	76	49			32		5	496	
22	30	X		2.54						41		10	491	
													SANDY CLAY (CH) light grayish brown, stiff, moist	
79	29	X		2.52	105.7	71	42			38		15	486	
													FILL	
												20	481	
													VALMONTE DIATOMITE	
		X		2.53						32			DOLOSTONE white (2.5Y 8/2), thinly bedded, strong, moderately fractured	
													DIATOMACEOUS SILTSTONE pale yellow (2.5Y 7/3), very thinly bedded, dips 45 to 85 degrees to core axis, highly fractured, fractures with iron oxide staining, slickensided	
												25	476	
												30	471	
													becoming clayey (bentonite?) and microfaulted at 30 - 31'	
													DIATOMITE light gray, closely laminated	
												35	466	
													SILTY SANDSTONE light grayish brown (2.5Y 6/2)	
													DIATOMACEOUS SILTSTONE light gray (2.5Y 7/2), moderately fractured	
												40	461	
													becoming sandier	
													VALMONTE DIATOMITE	
													ALTAMIRA SHALE PHOSPHATIC FACIES	
												45	456	
													SANDSTONE olive brown (2.5Y 4/3), friable	
													DOLOSTONE interbedded SILTSTONE with minor DOLOSTONE	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-25 (RENAMED M57B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-28-90 FINISH DATE: 9-13-90

ELEVATION: 500.89' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 20', Air Rotary Coring 20 - 120', Rotary Wash Coring 120 - 158.5'

LOGGED BY: GLOMB, RG #3773, 0 - 80'
HILMER, RG #3947, 80-158.5'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												50 451	SILTSTONE pale yellow (2.5Y 7/3)
												55 446	SANDY SILTSTONE light gray (2.5Y 7/2), friable to weak, thinly bedded
													minor sandstone beds
												60 441	ASHY SILTSTONE with phosphate nodules, friable
												65 436	SILTY DIATOMITE
													DIATOMACEOUS SHALE brown (10YR 5/3), thinly laminated, friable
	93	X		2.22	64.3	NP	NP						SILTSTONE brown (10YR 5/3), friable, thinly bedded, bedding dips 80 to 85 degrees to core axis, highly fractured
												70 431	CHERT DIATOMACEOUS SILTSTONE
												75 426	water level 10/1/90
													CHERT black (5Y 2.5/2), closely fractured, strong SILICEOUS SHALE
												80 421	DOLOSTONE laminated, strong, highly fractured, bedding dips at 70 degrees to core axis
													MUDSTONE dark gray, thinly bedded, highly to intensely fractured, weak
									14.5			85 416	DOLOSTONE SILICEOUS SHALE and SILTSTONE interbedded DOLOSTONE, SILTSTONE, CHERT and SILICEOUS SHALE
	2				156.2								groundwater encountered during drilling
												90 411	
												95 406	SILTSTONE
													SILICEOUS SHALE MUDSTONE DOLOSTONE highly fractured with iron oxide staining

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-25 (RENAMED M57B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-28-90 FINISH DATE: 9-13-90

ELEVATION: 500.89' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 20', Air Rotary Coring 20 - 120', Rotary Wash Coring 120 - 158.5'

LOGGED BY: GLOMB, RG #3773, 0 - 80'
HILMER, RG #3947, 80-158.5'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		
									0.42			100 401	SILTSTONE dark gray, weak	IEZOMETER
												105 396	CHERT DOLOSTONE light gray, strong, thinly laminated, intensely fractured, bedding dips 60 to 70 degrees to core axis	
	5			2.78	151.6			0.25					indurated SILTSTONE	
	6	X			131.3								SILICEOUS SHALE and CHERT	
												110 391	grading to SILTY SHALE/SILTSTONE thinly laminated, friable	
													SILICEOUS SHALE/CHERT SILTSTONE	
												115 386	interbedded SILICEOUS SHALE and SILTSTONE highly fractured, fractures clean, bedding contorted	
													DOLOSTONE	
												120 381	SILTSTONE olive gray (5Y 7/1)	
25	30	X		2.58	99.7	60	21							
													DOLOSTONE light gray (5Y 7/1), massive, strong	
												125 376	interbedded SILTSTONE and SILICEOUS SHALE	
												130 371	DOLOSTONE SILTSTONE friable	
									1.10				becoming ASHY	
												135 366	indurated and slightly dolotomized DOLOSTONE	
													interbedded SILTSTONE and DOLOSTONE dolostone with near vertical fractures, carbonate fracture filling	
												140 361		
													SHALE weak to moderately strong, indurated	
												145 356	SILTSTONE highly to moderately fractured, fractures are clean	
42	32	X												

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-25 (RENAMED M57B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-28-90 FINISH DATE: 9-13-90

ELEVATION: 500.89' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 20', Air Rotary Coring 20 - 120', Rotary Wash Coring 120 - 158.5'

LOGGED BY: GLOMB, RG #3773, 0 - 80'
HILMER, RG #3947, 80-158.5'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150 351	DOLOSTONE interbedded SILICEOUS SHALE and SILTSTONE friable to weak	
												155 346		

BOTTOM OF BORING RFB-25 AT 158.5 FEET
Borehole water sample collected on 9/11/90.
Geophysical logging run on 9/13/90.
Piezometer RFB-25 installed in reamed boring on 9/27/90.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-25 (RENAMED M57B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-11-90 FINISH DATE: 9-12-90
ELEVATION: 424.61' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 60', Air Rotary Coring 60 - 72'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	Description	PIEZOMETER
												0	425	SILTY CLAY (CL) light yellowish brown (2.5Y 6/3), moist, stiff (FILL)	
	20	X	0.36	2.67	106.9					44		5	420		
												10	415	FILL	
	32	X	0.29	2.75	121.3	71	32			51		15	410	ALTAMIRA SHALE PHOSPHATIC FACIES SILTSTONE pale yellow (2.5Y 8/3), friable, thinly bedded, bedding 20 degrees to core axis	
	55	X	0.63	2.72	63.7	56	24			42 /10"		20	405		
34	55	X	0.65	2.78	51.5	91	36			24		25	400		
	61	X	0.65	2.73	60.6	109	59			14		30	395	becoming olive brown (2.5Y 4/3), clayey, softer and wet	
42	60	X	0.63	2.75	63.4	95	43			17		35	390	softer easy drilling	
6	58	X		2.72						27		40	385	DOLOSTONE	
1	44	X		2.78						27		45	380	easy drilling	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-26 (RENAMED M58B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-11-90 FINISH DATE: 9-12-90
ELEVATION: 424.61' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 60', Air Rotary Coring 60 - 72'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
38	67	X	0.64	2.56	56.9	109	60			26		50 375	dip still approximately 20 degrees to core axis	
	101	X	0.73	2.54	43.4	69	42			32		55 370	water level 9/14/90 groundwater encountered at 56 feet, hard drilling	
												60 365	SILTSTONE very dark gray (2.5Y N3/0), moderately fractured, strong, with interbedded siliceous shale	
												65 360	fractures dipping approximately 50 degrees to core axis, closed, secondary mineralization	
												70 355	interbedded hard and soft zones, poor recovery	

BOTTOM OF BORING RFB-26 AT 72 FEET
Borehole water sample collected on 9/12/90.
Geophysical logging run on 9/13/90.
Piezometer RFB-26 installed in reamed boring on 9/17/90.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-26 (RENAMED M58B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-25-90 FINISH DATE: 7-30-90

ELEVATION: 283.16' MSL

EQUIPMENT: 8" Auger 0 - 36.5', Air Rotary Coring 36.5 - 50', 8" Auger 50 - 75', Rotary Wash Coring 75 - 100'

LOGGED BY: GLOMB, RG #3773

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												0 283	ASPHALT	
													CLAYEY SAND (SC) gray (5Y 5/1), moist, medium dense, (FILL)	
68	14	X	0.32	2.66	113.9	38	20			40		5 278	SANDY CLAY (CL) very dark gray (2.5Y N3/0), medium stiff, very moist (FILL)	
													FILL	
4	26	X	0.33	2.32	97.1	47	30			40		10 273	ALLUVIUM SILTY SAND (SM) brown, siltstone fragments, medium dense to dense, moist	
2	17		0.34	2.73	113.1	101	53			32		15 268		
													grading to SAND (SW) becoming dense, with gravel	
	11	X	0.27	2.69	123.1	33	17			17		20 263		
													CLAYEY SAND (SC) dark grayish brown (2.5Y 4/2), dense, moist, with medium to coarse-grained gravels	
													ALLUVIUM	
	50	X	0.58	2.62	68.5	82	40			35		25 258	MALAGA MUDSTONE SILTSTONE light gray, friable to weak	
	39	X	0.53	2.74	80.2	76	39			27		30 253	CLAYEY SILTSTONE light yellowish brown (2.5Y 6/3), very moist, friable, intensely fractured, fractures closed	
													olive gray (5Y 5/2), poorly defined bedding	
17	44	X	0.57	2.75	74.7	80	40			32		35 248	DIATOMACEOUS SILTSTONE olive gray (5Y 5/2), highly fractured, closed, with iron oxide staining and gypsum crystals filling some fractures	
												40 243	olive brown (2.5Y 4/3)	
													becoming very wet at 42'	
													grading to SILTY DIATOMITE	
												45 238	water level 8/3/90	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-27 (RENAMED M59B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-25-90 FINISH DATE: 7-30-90
ELEVATION: 283.16' MSL
EQUIPMENT: 8" Auger 0 - 36.5', Air Rotary Coring 36.5 - 50', 8" Auger 50 - 75', Rotary Wash Coring 75 - 100'
LOGGED BY: GLOMB, RG #3773

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
	95	X	0.67	2.70	46.4	93	38	0.23		13		50 233	SILTSTONE grayish brown (2.5Y 5/2), highly to intensely fractured, closed, massive	
	59	X	0.63	2.49	57.3	87	43	0.23		20		55 228	groundwater encountered at 56 feet during drilling DOLOSTONE	
	61	X	0.37	2.50	98.1	110	55			29		60 223	SILTSTONE black (5Y 2.5/1), massive, closed fractures becoming clayey, with slight hydrocarbon odor	
	98	X	0.70	2.42	44.9	113	52	0.33		35		65 218		
	53	X	0.56	2.44	66.4	114	50	0.07		38		70 213	MALAGA MUDSTONE	
												75 208	VALMONTE DIATOMITE grading to DIATOMACEOUS SILTSTONE	
												80 203	gray ash layers at 81', bedding dips 60 to 80 degrees to core axis	
												85 198	microfaulted at 84', offsets 1/8" to 1/4", ash layers	
	63	X	0.40		91.6	114	52					90 193	CLAYSTONE very dark gray (5Y 3/1), plastic	
													thin gray ash laminations with slickensided fractures, 30 to 80 degrees to core axis	
												95 188	SILTSTONE with minor soft clay seams	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Date: JAN 1991

LOG OF BORING RFB-27 (RENAMED M59B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)
												100 183

START DATE: 7-25-90 FINISH DATE: 7-30-90

ELEVATION: 283.16' MSL

EQUIPMENT: 8" Auger 0 - 36.5', Air Rotary Coring 36.5 - 50', 8" Auger 50 - 75', Rotary Wash Coring 75 - 100'

LOGGED BY: GLOMB, RG #3773

PIEZOMETER

BOTTOM OF BORING RFB-27 AT 100 FEET
Borehole water sample obtained on 7/30/90.
Boring not geophysically logged.
Piezometer RFB-27 constructed in reamed boring on 8/1/90.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-27 (RENAMED M59B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-7-90 FINISH DATE: 8-8-90
ELEVATION: 479.47' MSL
EQUIPMENT: 8" Hollow Stem Auger
LOGGED BY: SEELEY, RG #1014

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.	DESCRIPTION	PIEZOMETER
												0	479	ASPHALT (fill)	
														FILL	
														ALTARMIRA SHALE PHOSPHATIC FACIES	
	43	X	0.24	2.55	120.3					61 /11"		5	474	DIATOMITE white (5Y 8/2), friable, thinly laminated	
														SILTY DIATOMITE light yellowish brown (10YR 6/4)	
58	49	X	0.62	2.59	61.0	75	19			44		10	469	DIATOMACEOUS SILTSTONE pale yellow (2.5Y 7/3), friable, thinly bedded	
	83	X	0.71	2.66	47.9	85	29			45		15	464		
	115	X		2.39		132	29			51		20	459	DIATOMITE white (10YR 8/1), ashy, with bentonite clay, friable	
32	94	X	0.72	2.29	40.7	NP	NP			32		25	454	color change to pale yellow (2.5Y 7/3), partly dolomitized, moderately well indurated, weak	
										32 /4"		30	449		
														DIATOMACEOUS SILTSTONE light olive brown (2.5Y 5/4)	
22	74	X	0.52	2.57	77.6	104	35			47		35	444		
														grading to more massive mudstone	
										32 /4"		40	439	DIATOMITE brown (10YR 5/3) ashy, friable, with minor chert, white (10YR 8/1)	
		X								32 /5"		45	434	becoming more sandy	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-28

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-7-90 FINISH DATE: 8-8-90
ELEVATION: 479.47' MSL
EQUIPMENT: 8" Hollow Stem Auger
LOGGED BY: SEELEY, RG #1014

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
										32 /5"		50 429		
24	131	X	0.79	2.37	30.7	NP	NP			32 /6"		55 424	grading between DIATOMITE and SILTSTONE brown (10YR 5/3)	
										32 /5"		60 419		
20	23	X		2.29						32 /4"		65 414	pale yellow (10YR 6/3) to white (10YR 8/1) with minor amounts of fine sand interbeds	
31	134	X	0.74	2.13	34.6	NP	NP	2.87		56		70 409	cuttings becoming moist to wet	
26	146	X	0.79	2.41	32.5	NP	NP	8.52		56 /10"		75 404	SANDSTONE olive gray (5Y 6/2), with strong brownish yellow (10YR 6/8) mottling	
52	147	X	0.79	2.43	32.0			7.56		58 /9"		80 399	ASHY TO SILTY DIATOMITE	

BOTTOM OF BORING RFB-28 AT 83 FEET
Boring geophysically logged on 8/7/90.
Boring backfilled to surface with volclay grout.
No free water encountered.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-28

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-20-90 FINISH DATE: 8-28-90

ELEVATION: 438.97' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 34', Air Rotary Tricone 34 - 134', Rotary Wash Coring 134 - 334'

LOGGED BY: PERKINS RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	PIEZOMETER
												0 439	
		X		2.72						8		5 434	
	45	X		2.44		NP	NP			10		10 429	
										19		15 424	
	30	X	0.29	2.62	115.7	70	37						
										17		20 419	
26	33	X	0.06	2.59	152.2	76	36						
										20		25 414	
	34	X	0.26	2.58	118.9	68	33						
										45		30 409	
	74	X	0.69	2.51	49.7	88	24						
										26/ 3"		35 404	
												40 399	
												45 394	

GRAVELLY SILT (ML)
light olive brown (2.5Y 5/4), soft, dry (FILL)

rock fragments of chert and siltstone

fragments of white diatomite, becoming moist

becoming medium stiff to stiff

glass fragments (Dr. Pepper)

FILL

SOIL HORIZON

GRAVELLY SILT to SILTY GRAVEL (GM)
light yellowish brown (2.5Y 6/4), dense, wet

GRAVELLY CLAY (CL)
olive brown (2.5Y 4/3), stiff to very stiff, moist to wet

SOIL HORIZON

ALTAMIRA SHALE
PHOSPHATIC FACIES

CHERT
black, strong

SILTY DIATOMITE
gray

grading to DIATOMACEOUS SHALE

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.: [illegible]
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-29 (RENAMED M60B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-20-90 FINISH DATE: 8-28-90

ELEVATION: 438.97' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 34', Air Rotary Tricone 34 - 134', Rotary Wash Coring 134 - 334'

LOGGED BY: PERKINS RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth (feet) Elev.		PIEZOMETER
									236			50 389	DIATOMACEOUS SHALE	
												55 384	PHOSPHATIC FACIES CHERTY FACIES	
													CHERT black	
												60 379		
													interbedded with minor DIATOMACEOUS SILTSTONE	
												65 374		
													drilling harder CHERT fragments in cuttings black	
												70 369		
												75 364		
												80 359		
												85 354		
													with tar/vitreous asphalt cuttings black	
												90 349		
													DOLOSTONE dark gray	
												95 344		
													water level 10/10/90	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.: [illegible]
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-29 (RENAMED M60B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-20-90 FINISH DATE: 8-28-90

ELEVATION: 438.97' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 34', Air Rotary Tricone 34 - 134', Rotary Wash Coring 134 - 334'

LOGGED BY: PERKINS RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100 339	drilling easier - DIATOMACEOUS SHALE	
												105 334	groundwater encountered at 104 feet	
												110 329	hard drilling CHERT	
													DOLOSTONE	
													CHERT	
									0.72			115 324	SHALE/SILTSTONE	
													CHERT and minor DOLOSTONE black and gray	
													CHERTY FACIES	
												120 319	TUFFACEOUS FACIES SHALE	
													GRAY DOLOSTONE and BLACK CHERT	
												125 314		
													SHALE very dark grayish brown (2.5Y 3/2)	
												130 309		
												135 304	DIATOMACEOUS SILTSTONE massive, friable, with minor ash layers	
													DOLOSTONE	
													DIATOMACEOUS SHALE very dark grayish brown (2.5Y 3/2), thinly laminated, contorted bedding	
												140 299		
													DIATOMACEOUS SILTSTONE massive, with ash layers, bedding dips 55 degrees to core axis	
	67	X	0.64	2.50	55.7	71	20					145 294		
													DOLOSTONE	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-29 (RENAMED M60B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-20-90 FINISH DATE: 8-28-90

ELEVATION: 438.97' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 34', Air Rotary Tricone 34 - 134', Rotary Wash Coring 134 - 334'

LOGGED BY: PERKINS RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												150 289	dark gray, strong, thickly bedded
									143			155 284	interbedded DIATOMACEOUS SILTSTONE and SILTY DIATOMITE thinly laminated to thinly bedded, bedding dips 80 degrees to core axis, moderately to highly fractured, loss of drilling fluid 130 -160'
												160 279	
	116	X		2.23		NP	NP					165 274	
													bedding dips 50 degrees to core axis
	50	X	0.52	2.55	75.9	83	31					170 269	SILTY DIATOMITE very dark grayish brown (2.5Y 3/2), thinly laminated, bedding dips 45 degrees to core axis
												175 264	
													DOLOSTONE
													SILTY DIATOMITE
78	63	X	0.61	2.50	60.4	73	19	3.25				180 259	DOLOSTONE gray (2.5Y N5/0) to dary gray (2.5Y N4/0), strong, medium bedded
													DIATOMACEOUS SILTSTONE
												185 254	ASHY SILTSTONE altered to bentonite
													DIATOMACEOUS SILTSTONE very dark grayish brown (2.5Y 3/2), very thinly bedded, bedding dips 50 degrees to core axis
												190 249	SILTY DIATOMITE very dark grayish brown (2.5Y 3/2), friable
													interbedded CHERT and SILICEOUS SHALE black, with vitrified asphalt, weak to moderately strong, highly fractured, tar-filled
												195 244	
													DOLOSTONE gray, strong, moderately fractured, bedding dips 50 degrees to core axis

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-29 (RENAMED M60B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-20-90 FINISH DATE: 8-28-90
ELEVATION: 438.97' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 34', Air Rotary Tricone 34 - 134', Rotary Wash Coring 134 - 334'
LOGGED BY: PERKINS RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												200 239	DOLOSTONE	
	2	X	0.06	2.60	152.7			0.05					becoming brecciated, with tar-filled fractures	
	2		0.11	2.76	153.2							205 234		
													CHERT with tar-filled fractures	
													SHALE, well indurated, moderately strong, healed fractures	
													CHERT with tar-filled fractures	
												210 229	grading to SILICEOUS SHALE	
													SILTSTONE weak to moderately strong, highly to intensely fractured, becoming brecciated with tar-filled fractures	
													CHERT, brecciated, with tar-filled fractures	
												215 224	SILTSTONE and SILICEOUS SHALE, brecciated, tarry	
													grading to CHERT	
													SILTSTONE, brecciated, tar filled fractures	
													DOLOSTONE	
												220 219	gray, tar filled fractures	
1	37	X	0.49	2.47	78.1	85	33	31.3					SILTSTONE very dark grayish brown (2.5Y 3/2), with ash layers, bedding dips 45 degrees to core axis, slickensided surfaces on fractures	
												225 214		
													CHERT black, tar filled fractures	
													SILTSTONE and SILICEOUS SHALE brecciated	
												230 209		
													SHALE, brecciated with tar	
													SILTSTONE with minor SILICEOUS SHALE and CHERT	
												235 204		
													ASHY SILTSTONE	
													DOLOSTONE	
													SILICEOUS SHALE/CHERT	
													SILTY SHALE very dark grayish brown (2.5Y 3/2), friable to weak, slight tar	
												240 199	interbedded SILICEOUS SHALE and SILTSTONE	
													CHERT in cuttings	
												245 194		
													interbedded DOLOSTONE and CHERT in cuttings from 248 - 257'	

Herzog Associates
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LOG OF BORING RFB-29 (RENAMED M60B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-20-90 FINISH DATE: 8-28-90

ELEVATION: 438.97' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 34', Air Rotary Tricone 34 - 134', Rotary Wash Coring 134 - 334'

LOGGED BY: PERKINS RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												250	189	
													interbedded DOLOSTONE and CHERT	
												255	184	
													SILTSTONE very dark grayish brown (2.5Y 3/2), very thinly bedded, minor contorted bedding	
10	38	X	0.28	2.44	109.8	58	18					260	179	
													SILICEOUS SHALE SILTSTONE thinly bedded	
												265	174	
													becoming ASHY, altered to bentonite grading back to SILTSTONE thinly laminated, dipping 50 degrees to core axis	
												270	169	
													SILICEOUS SHALE black SILTSTONE and ASH very dark grayish brown (2.5Y 3/2)	
													distinct ASH layer, 0.5' thick at 273 feet, gray	
												275	164	
													SILTSTONE very dark grayish brown (2.5Y 3/2), bedding 60 degrees to core axis	
6	31	X	0.46	2.69	91.5	79	38	0.44				280	159	
													DOLOSTONE ASH layer at 279 feet, as above SILTSTONE with minor CHERT	
													CHERT and SILICEOUS SHALE	
												285	154	
													SILTY SHALE gray brown (2.5Y 3/2), thinly laminated, bedding dips 85 degrees to core axis CHERT SILTY ASH grading to ASHY SILTSTONE gray, bedding 60 degrees to core axis	
												290	149	
													ASH at 289.5 feet, coarse-grained	
													grading back to ASHY SILTSTONE bedding dips 60 degrees to core axis	
												295	144	
													dips changing to 70 degrees to core axis	
													DOLOSTONE SHALY ASH	

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LOG OF BORING RFB-29 (RENAMED M60B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-20-90 FINISH DATE: 8-28-90

ELEVATION: 438.97' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 34', Air Rotary Tricone 34 - 134', Rotary Wash Coring 134 - 334'

LOGGED BY: PERKINS RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												300 139	grading to ASHY SILTSTONE	
76	30	X	0.46	2.79	93.5	69	35	0.01						
	30	X	0.44	2.75	96.4	69	34							
												305 134	grading to SILTY ASH, fine to coarse fragments, friable	
													DOLOSTONE SHALE, ashy	
												310 129	grading to SILTSTONE ashy, friable, massive, moderately fractured	
													DOLOSTONE	
												315 124	SILTSTONE very dark grayish brown (2.5Y 3/2), scattered ash layers	
24	31	X	0.47	2.71	90.4	68	29							
												320 119		
													DOLOSTONE gray, strong, thickly bedded, moderately to slightly fractured	
												325 114	hard drilling	
												330 109	DOLOSTONE in cuttings	

BOTTOM OF BORING RFB-29 AT 334 FEET

Borehole water sample collected on 8/22/90.

Geophysical logging run on 8/28/90.

Piezometer RFB-29 installed in reamed borehole on 10/8/90.

* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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LOG OF BORING RFB-29 (RENAMED M60B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-8-90

ELEVATION: 390.62' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 26', Air Rotary Coring 26 - 203'

LOGGED BY: EINARSON, RG #4621, 0 - 75'
PERKINS, RG #3364, 75 - 203'

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												0 391	ASPHALT BROWN GRAVELLY SILT (ML) soft to medium stiff, dry (FILL) FILL VALMONTE DIATOMITE
72	61	X	0.69	2.72	53.3	94	55			17		5 386	SILTSTONE olive brown (2.5Y 4/3), with black mottling, ashy, natural glass shards up to 1/8" diameter, friable
													DOLOSTONE strong
45	52	X	0.62	2.74	64.5	92	54			20		10 381	SILTSTONE olive gray (5Y 5/2), as above
72	57	X	0.62	2.72	63.7	85	48			25		15 376	clasts of tar up to 1/2" diameter at 15 feet
													grading to SILTY DIATOMITE thinly laminated, friable, bedding dips at 45 degrees to axis
													DOLOSTONE
	61	X	0.64	2.68	59.9	97	51			19		20 371	DIATOMACEOUS SILTSTONE olive gray (5Y 5/2) to brown 10Y 5/3)
													ASH light gray
46	70	X	0.66	2.63	56.0	87	40			28		25 366	DOLOSTONE
													grading between SILTY DIATOMITE and DIATOMACEOUS SILTSTONE brown (10YR 5/3), ash
												30 361	
													DIATOMITE
												35 356	DIATOMACEOUS SILTSTONE olive (5Y 5/4), thinly bedded, moderately fractured, fractures closed and polished, friable to weak
												40 351	DOLOSTONE gray, quartz filled fractures
													DIATOMITE pale olive (5Y 6/3), thinly laminated, convoluted bedding dips 10 to 20 degrees to core axis, staining in fractures, becoming ashy from 45 to 46 feet, ash bed 1/2" thick
												45 346	DOLOSTONE brecciated, with tar fracture filling, minor chert

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Date: JAN 1991

LOG OF BORING RFB-30

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-8-90
ELEVATION: 390.62' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 26', Air Rotary Coring 26 - 203'
LOGGED BY: EINARSON, RG #4621, 0 - 75'
PERKINS, RG #3364, 75 - 203'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												50 341	interbedded SILTSTONE and DIATOMACEOUS SILTSTONE	
												55 336	DOLOSTONE	
													DIATOMACEOUS SHALE black (5Y 2.5/2), thinly laminated, fissile, beds dip 25 degrees, slightly fractured, fractures dipping 60 to 80 degrees to axis, fractures closed, moderate hydrocarbon odor	
												60 331	SANDY SILTSTONE brown (10YR 5/3), common chert and shale fragments	
													DOLOSTONE strong, highly fractured, fractures are healed (closed)	
													groundwater encountered during drilling at 64 feet	
												65 326	SHALY DIATOMITE and PHOSPHATIC SHALE black, very thinly bedded to closely laminated, convulted bedding and microfaulting (offsets 1/4" to 1/2"), friable to weak, hydrocarbon odor	
												70 321	DIATOMACEOUS SHALE	
													DIATOMITE	
													SILTSTONE and DOLOSTONE, siltstone is indurated with silica	
												75 316	DOLOSTONE tar-filled fractures	
													SILTSTONE brown, weak, highly to intensely fractured	
	53	X		2.39								80 311		
													interbedded CHERT and SILICEOUS SHALE intensely fractured, tar-filled fractures	
													SILTY SHALE	
												85 306	CHERT black, strong, highly fractured	
													SILTSTONE	
												90 301	DOLOSTONE	
													SILTY SHALE dark brown, thinly laminated, bedding dips 55 degrees to core axis ASH at 92 feet	
												95 296	DIATOMACEOUS SHALE/PHOSPHATIC SHALE brecciated with tar-filled fractures at 95 - 96 feet	
													fractured from 95 - 96 feet	
													DOLOSTONE with tar-filled fractures	
	58	X	0.38	2.39	91.4	95	26						DIATOMACEOUS MUDSTONE grading to DIATOMACEOUS SHALE and SHALY DIATOMITE	

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LOG OF BORING RFB-30

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-8-90

ELEVATION: 390.62' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 26', Air Rotary Coring 26 - 203'

LOGGED BY: EINARSON, RG #4621, 0 - 75'
PERKINS, RG #3364, 75 - 203'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												100 291	SHALY DIATOMITE	
												105 286	DIATOMITE gray	
													DIATOMACEOUS SHALE, well indurated	
													DOLOSTONE and DIATOMACEOUS SHALE brecciated, with tar-filled fractures, bedding dips 40 degrees	
												110 281	SHALY DIATOMITE dark brown (10YR 3/3) to yellowish brown (10YR 5/4)	
													DIATOMITE	
												115 276	DIATOMACEOUS SHALE	
													grading to DIATOMITE bedding contorted, dips 5 to 75 degrees to core axis, microfaulted	
												120 271	DOLOSTONE grayish brown (10YR 5/2), strong, very thinly bedded, dips 72 degrees to core axis	
												125 266	no recovery 122 - 130 feet, siltstone in cuttings	
												130 261	DOLOSTONE	
	64	X	0.18		126.0								DIATOMACEOUS SILTSTONE dark olive gray (5Y 3/2), friable, medium bedded	
													DOLOSTONE, dips 60 degrees to core axis	
												135 256	grading between DIATOMACEOUS SILTSTONE and DIATOMACEOUS SHALE very thinly bedded to very thinly laminated	
													SHALY DIATOMITE dark grayish brown (2.5Y 4/2), silty, thinly laminated	
												140 251		
													thin ASH beds at 144 to 145 feet	
												145 246	DOLOSTONE dips near horizontal	
													MUDSTONE olive gray (5Y 5/2), silty, dip near horizontal	

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LOG OF BORING RFB-30

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-8-90
ELEVATION: 390.62' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 26', Air Rotary Coring 26 - 203'
LOGGED BY: EINARSON, RG #4621, 0 - 75'
PERKINS, RG #3364, 75 - 203'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												150		
												241	MUDSTONE, as above	
	87	X	0.27	2.35	106.7							155		
												236		
												160		
												231		
													DIATOMACEOUS SHALE dark olive gray (5Y 3/2), thinly laminated, bedding dips 70 degrees to core axis	
												165		
												226	ASH at 165.5 feet, gray microfossil analysis at 166 feet, few diagnostic fossils, but most likely Stichocorys peregrina assemblage, 6+ m.y.	
												170		
												221	thin ASH layers between 170 - 180 feet	
													DIATOMACEOUS SHALE	
												175		
												216		
	122	X	0.73	2.20	36.8	NP	NP	0.46						
												180		
												211	VALOMONTE DIATOMITE	
													ALTAMIRA SHALE PHOSPHATIC FACIES	
	2		0.12	2.78	152.8			764					DOLOSTONE dark grayish brown (2.5Y 4/2), strong, thinly laminated	
													DIATOMACEOUS SHALE dark olive gray (5Y 3/2), friable, thinly laminated, dipping at 75 degrees to core axis microfossil analysis at 185 feet, poor perservation but one common species suggests Botryocyritis sp. assemblage (14 m.y.); but may be Theocorys redondoensis (10-14 m.y.)	
												185		
												206	CHERT/SILICEOUS SHALE, black	
													DIATOMACEOUS SHALE	
												190		
												201		
													DOLOSTONE gray, with contorted laminations, strong, highly fractured, fractures calcite-filled, dips 85 degrees to core axis	
												195		
												196		
	38			2.45									SILICEOUS SHALE black (5Y 2.5/1), strong, intensely fractured	
	4		0.31	2.65	114.8			3.44						

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LOG OF BORING RFB-30

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 7-31-90 FINISH DATE: 8-8-90

ELEVATION: 390.62' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 26', Air Rotary Coring 26 - 203'

LOGGED BY: EINARSON, RG #4621, 0 - 75'
PERKINS, RG #3364, 75 - 203'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
	15		0.27	2.77	126.6			578				200 191	DOLOMITIZED SHALE and DIATOMACEOUS SILTSTONE olive brown (2.5Y 4/3), strong, thinly laminated, closely fractured, fractures dip 70 degrees to core axis	

BOTTOM OF BORING RFB-30 AT 203 FEET
Borehole water sample obtained on 8/3/90.
Boring geophysically logged on 8/9/90.
Boring backfilled to surface with volclay grout.
*Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-30

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-13-90 FINISH DATE: 8-14-90

ELEVATION: 283.00' MSL

EQUIPMENT: Air Tricone 0-50', Rotary Wash Coring 50'-75'

LOGGED BY: PHILLIPS, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	PIEZOMETER
												0 283	

ASPHALT

FILL

VALMONTE DIATOMITE

SILTSTONE
brown, friable

5 278

10 273

DOLOSTONE

SILTSTONE
light gray, friable

15 268

20 263

DOLOSTONE

SILTSTONE
light gray, poorly indurated

25 258

DOLOSTONE
light gray, strong

SILTSTONE

30 253

becoming moist

no cuttings return from 31' to 40'

35 248

40 243

SILTSTONE
lost circulation from 40' to 50'

45 238

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
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Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-30A

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-13-90 FINISH DATE: 8-14-90

ELEVATION: 283.00' MSL

EQUIPMENT: Air Tricone 0-50', Rotary Wash Coring 50'-75'

LOGGED BY: PHILLIPS, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												50 233	DOLOSTONE strong	
												55 228	SILTSTONE poorly indurated	
									4.47			60 223		
													DOLOSTONE AND CHERT	
												65 218	SILTSTONE AND SILICEOUS SHALE	
									6.55			70 213		
												75 208		

BOTTOM OF BORING RFB-30A @ 75 FEET

* Logged cuttings, no samples collected.
Boring backfilled to surface with volclay grout

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.: 4-23-91
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-30A

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-23-90 FINISH DATE: 8-27-90

ELEVATION: 436.00' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 90', Air Rotary Coring 90 - 100', Air Rotary Tricone 100 - 117'

LOGGED BY: PHILLIPS, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet) Elev.		PIEZOMETER
												0 436	GRAVELLY SILT (ML) light gray, soft, dry, some cobbles (FILL)	
										6		5 431		
													grading to SILTY GRAVEL (GM) gravel clasts of siltstone, diatomite and clay, very loose fill	
	20	X								13		10 426		
82	25	X		2.47		90	28			10		15 421		
												20 416	grading to GRAVELLY SILT (ML)	
90	35	X		2.46	139.7	108	42			7				
	48	X	0.68	2.39	48.1	NP	NP	14		12		25 411		
80	70	X		2.44		101	25			9		30 406		
	49	X		2.40						10		35 401		
												40 396	FILL	
	69	X				133	30			9			COLLUVIUM SILTY GRAVEL (GM) dark brown, dense, dry	
													COLLUVIUM	
	80	X	0.67	2.43	49.5	80	31	2.0		38 /10"		45 391	becomes hard to drill	
													ALTAMIRA SHALE PHOSPHATIC FACIES DIATOMACEOUS SILTSTONE gray, friable, highly fractured, very thinly bedded	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-31

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-23-90 FINISH DATE: 8-27-90
ELEVATION: 436.00' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 90', Air Rotary Coring 90 - 100', Air Rotary Tricone 100 - 117'
LOGGED BY: PHILLIPS, RG #3718

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
34	50	X	0.49	2.61		79	16			46		50	386	
												55	381	
												60	376	
										13				
												65	371	
												70	366	
										5				
												75	361	
												80	356	
												85	351	
												90	346	
												95	341	

DIATOMACEOUS SILTSTONE to SILTY DIATOMITE
iron staining on fractures

interbedded with SANDSTONE
gray, very fine-grained, lenses are loosely consolidated, moist to wet

becoming hard at 66 feet, no recovery
DOLOSTONE
SILTSTONE
brecciated, friable, moist

no sample recovery

CHERT
brown to black, strong, highly fractured

DIATOMACEOUS MUDSTONE
light gray to brown, thickly bedded to massive, friable

DOLOSTONE
light gray, strong to very strong

Herzog Associates
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Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-31

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	START DATE: 8-23-90 FINISH DATE: 8-27-90 ELEVATION: 436.00' MSL EQUIPMENT: 8" Hollow Stem Auger 0 - 90', Air Rotary Coring 90 - 100', Air Rotary Tricone 100 - 117' LOGGED BY: PHILLIPS, RG #3718	PIEZOMETER
												100 336	DOLOSTONE AND MUDSTONE	
												105 331	MUDSTONE dark brown, friable to weak	
												110 326	grading to interbedded DOLOSTONE and DIATOMAECOUES MUDSTONE	
												115 321	groundwater encountered during drilling at 114 DOLOSTONE strong, highly fractured	

BOTTOM OF BORING RFB-31 AT 117 FEET
Water sample collected on 8/28/90.
Geophysical logging performed on 8/28/90.
Boring backfilled to surface with volclay grout.
* Converted to standard penetration blow counts.

START DATE: 10-2-90 FINISH DATE: 10-10-90

ELEVATION: 436.17' MSL

EQUIPMENT: 12" Auger 0 -52', Air Rotary Tricone 52'-133'

LOGGED BY: PERKINS, RG #3364, 0 - 64'
BROWN, RG #4557, 64 - 133'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE

Depth (feet)	Elev.
0	436
5	431
10	426
15	421
20	416
25	411
30	406
35	401
40	396
45	391

GRAVELLY SILT (ML)
pale brown (10YR 7/3), loose, slightly moist (FILL)

abundant diatomaceous shale fragments 1/2" - 2" diameter

grading to SILTY GRAVEL (GM)
pale brown (10YR 7/3), gravel clasts of dolostone, diatomaceous shale, chert, and diatomite

PIEZOMETER

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RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-31A (RENAMED M61B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 10-2-90 FINISH DATE: 10-10-90

ELEVATION: 436.17' MSL

EQUIPMENT: 12" Auger 0 -52', Air Rotary Tricone 52'-133'

LOGGED BY: PERKINS, RG #3364, 0 - 64'
BROWN, RG #4557, 64 - 133'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
												50 386	becoming clayey	
													FILL	
													ALTAMIRA SHALE PHOSPHATIC FACIES	
													DIATOMACEOUS SILTSTONE olive brown (2.5Y 4/3), very moist, abrupt change in moisture	
												55 381		
												60 376		
													DOLOSTONE, hard drilling	
												65 371	DIATOMACEOUS SILTSTONE, soft drilling	
												70 366		
													CHERT, black (7.5Y 2/0)	
												75 361	DIATOMACEOUS SILTSTONE	
												80 356		
												85 351		
													water level 10/15/90	
												90 346		
												95 341		
													hard drilling from 97 to 99 feet CHERT	
													DIATOMACEOUS SILTSTONE	

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LOG OF BORING RFB-31A (RENAMED M61B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 10-2-90 FINISH DATE: 10-10-90

ELEVATION: 436.17' MSL

EQUIPMENT: 12" Auger 0 -52', Air Rotary Tricone 52'-133'

LOGGED BY: PERKINS, RG #3364, 0 - 64'
BROWN, RG #4557, 64 - 133'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)
												100 336
												105 331
												110 326
												115 321
												120 316
												125 311
												130 306

hard drilling from 108 to 108.5 feet
DOLOSTONE
DIATOMACEOUS SILTSTONE

DOLOSTONE
DIATOMACEOUS SILTSTONE

CHERT, black (7.5YR 2/0)
DIATOMACEOUS SILTSTONE

PIEZOMETER

BOTTOM OF BORING RFB-31A AT 133 FEET
*Logged cuttings, no samples obtained.
Borehole not geophysically logged.
Piezometer RFB-31 installed in reamed boring on 10/10/90.

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RG.: EJSH
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-31A (RENAMED M61B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-8-90 FINISH DATE: 8-15-90
ELEVATION: 385.39' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353'
LOGGED BY: COFFEE, RG #4297

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth (feet) Elev.	PIEZOMETER
												0 385	
86	40	X	0.59	2.55	64.7	98	45			11			
												5 380	
12										8			
												10 375	
										16			
72	24			2.70								15 370	
										43			
54	24	X	0.42	2.73	98.5	67	43	0.02				20 365	
										44			
63	43	X	0.58	2.72	71.0	59	14	49				25 360	
										12			
29	69	X	0.65	2.63	57.9	75	36	7.76				30 355	
										21			
28	87	X	0.69	2.61	49.8	86	43	6.01				35 350	
										25			
49	52	X	0.58	2.66	69.5	85	46	2.25				40 345	
										22			
43	60	X	0.63	2.60	60.8	93	51					45 340	
										26			
36	64	X	0.66	2.66	56.9	85	43						

GRAVELLY SILT (ML)
gray yellow, soft, dry (FILL)

SILTY CLAY (CH)
olive gray (5Y 5/2), soft to medium stiff, dry

increasing gravel fragments

FILL

MALAGA MUDSTONE

SILTSTONE
light olive gray (5Y 6/2), friable to weak, highly fractured, dry

becoming moist to wet

becoming soft and wet, possible perched water zone

grading to SANDY SILTSTONE
light olive gray (5Y 6/2), highly fractured with iron oxide coating fractures

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Job No: 15384.02.00.7
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Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-8-90 FINISH DATE: 8-15-90
ELEVATION: 385.39' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353'
LOGGED BY: COFFEE, RG #4297

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												50 335	
												55 330	highly fractured at 65 degrees to core axis
												60 325	
												65 320	grading to MUDSTONE light olive gray (5Y 6/2), massive, friable, fractures at 0 - 75 degrees to core axis
												70 315	some fractures are slickensided, slight hydrocarbon odor
	55	X	0.39	2.52	96.5	100	40					75 310	becoming sandy
													CHERT black grading back to MUDSTONE microfossil analysis at 78 feet early Stichocorys peregrina assemblage, 5.5 to 6 m.y.
												80 305	
												85 300	highly fractured at 45 to 65 degrees to core axis
												90 295	minor CHERTY zones
	54	X	0.36	2.45	97.8	105	33					95 290	

PIEZOMETER

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LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-8-90 FINISH DATE: 8-15-90
ELEVATION: 385.39' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353'
LOGGED BY: COFFEE, RG #4297

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
									9.87			100 285	SANDSTONE olive yellow (5Y 6/6), coarse to fine-grained ASH layer at 102 feet, gray	
												105 280	DIATOMACEOUS SILTSTONE thinly laminated DOLOSTONE	
												110 275	DIATOMACEOUS MUDSTONE with ASH olive gray (5Y 5/2), friable, highly fractured, fractures 10 to 65 degrees to core axis	
												115 270	MUDSTONE olive gray (5Y 5/2), massive, friable MALAGA MUDSTONE	
													VALMONTE DIATOMITE	
												120 265	grading to SILTSTONE with occasional olive yellow (5Y 6/6), diatomaceous beds, thinly laminated, friable, moderately fractured with minor phosphate(?) nodules	
												125 260		
													groundwater encountered during drilling	
												130 255	becoming intensely fractured, fractures 80 to 85 degrees to core axis	
	65	X	0.60	2.29	56.9	124	55	0.21				135 250		
													DIATOMACEOUS SILTSTONE	
												140 245	ASH layer at 140 feet	
													SILTY DIATOMITE fractures 45 to 60 degrees to core axis grading to DIATOMACEOUS SILTSTONE	
												145 240	ASH layer at 146 feet, gray	

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LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-8-90 FINISH DATE: 8-15-90
ELEVATION: 385.39' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353'
LOGGED BY: COFFEE, RG #4297

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												150 235	
												155 230	
	62	X	0.61	2.35	58.0	131	46					160 225	SILTY DIATOMITE olive gray (5Y 5/2), friable to weak
													DIATOMACEOUS SILTSTONE grading to SILTY DIATOMITE thinly laminated, friable to weak
												165 220	
												170 215	DIATOMACEOUS SILTSTONE with minor interbedded ASH grading to SILTY DIATOMITE friable, thinly laminated
												175 210	microfaulted, with offsets from 1/8" to 1/2", bedding at 60 degrees to core axis
												180 205	
												185 200	becoming very thinly laminated grading to DIATOMACEOUS SILTSTONE
												190 195	
	131	X	0.73	2.03	34.6	NP	NP	3.42					grading to SILTY DIATOMITE
												195 190	becoming more indurated, weak grading to DIATOMACEOUS SILTSTONE with ASH layers

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LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-8-90 FINISH DATE: 8-15-90
ELEVATION: 385.39' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353'
LOGGED BY: COFFEE, RG #4297

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		PIEZOMETER
									0.51			200 185	DIATOMACEOUS SILTSTONE	
												205 180	SILTY DIATOMITE	
												210 175	SILTSTONE well indurated, moderately strong	
													DIATOMACEOUS SILTSTONE becoming friable to weak	
	52	X	0.55	2.37	66.8	84	18					215 170		
	102	X	0.27	2.20	100.0	146	40						SHALE dark olive gray (5Y 3/2), bituminous(?), organic-rich	
												220 165	interbedded SILTY DIATOMITE and SILTSTONE	
													DOLOSTONE	
												225 160	DIATOMACEOUS SILTSTONE with occasional beds of DIATOMITE, dark olive gray (5Y 3/2), thinly laminated to very thinly bedded, friable	
												230 155		
	64	X	0.45	2.34	80.2	111	38					235 150		
													becoming highly fractured with tar infilling 236 - 238'	
													interbedded DIATOMACEOUS SILTSTONE and SILTY DIATOMITE	
	51	X	0.50	2.45	76.7	76	26					240 145	becoming ASHY at 240 feet	
												245 140		
													BRECCIATED DOLOSTONE tary filled fractures	

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LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-8-90 FINISH DATE: 8-15-90
ELEVATION: 385.39' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353'
LOGGED BY: COFFEE, RG #4297

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		
												250	135	SILTSTONE
														BRECCIATED DIATOMACEOUS SHALE, SHALE and SILTSTONE tar-filled fractures, fractures 25 degrees to core axis
														grading between DIATOMACEOUS SILTSTONE and SILTSTONE friable to weak, laminated to thinly bedded, bedding at 55 degrees to core axis
												255	130	
	51	X	0.43	2.66	80.5	44	10	0.39				260	125	phosphate(?) nodules
	51	X	0.51	1.95	59.6	98	20							DIATOMACEOUS SHALE to PHOSPHATIC SHALE thinly laminated, tarry
												265	120	
														grading to DIATOMACEOUS SILTSTONE
												270	115	
														DOLOSTONE tar-filled fractures, fractures at 10 degrees to core axis, very thinly bedded, dips 80 degrees to core axis
												275	110	DIATOMACEOUS SHALE 274-275 feet
														DOLOSTONE 275-276 feet tar-filled fractures
														grading between DIATOMACEOUS SILTSTONE and SILTSTONE 276-290 feet
	19	X	0.30	2.40	104.8	75	24					280	105	olive (5Y 4/3), laminated, bedding at 80 to 85 degrees to core axis, friable becoming tarry 280 - 281 feet
												285	100	
												290	95	grading to DIATOMITE dark olive gray (5Y 3/2), thinly laminated
												295	90	grading to SILTSTONE bedding at 60 degrees to core axis

PIEZOMETER

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LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-8-90 FINISH DATE: 8-15-90
ELEVATION: 385.39' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353'
LOGGED BY: COFFEE, RG #4297

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		PIEZOMETER
	24	X	0.55	2.24	65.2	66	24		0.23			300 85	DOLOSTONE grading between SILTSTONE and DIATOMACEOUS SILTSTONE massive to medium bedded	
												305 80	ASH layers at 308 and 310', gray	
												310 75	DIATOMACEOUS SILTSTONE	
												315 70		
	59	X	0.65	2.41	52.5	59	14						microfossil analysis at 320 feet, Stichocorys delmontensis assemblage and Theocorys redondoensis, at 10 m.y.	
												320 65	grading to SILTSTONE with ASH, tar-filled fractures 320 - 321'	
													grading to DIATOMACEOUS SILTSTONE dark olive gray (5Y 3/2), thinly laminated	
	63	X	0.78	2.18	57.6	114	34					325 60		
													ASH layers, dips at 60 degrees to core axis	
													ASH layers	
												330 55	interbedded DIATOMACEOUS SHALE and PHOSPHATIC SHALE thinly laminated, friable, microfaulted and contorted beds	
													SILTY DIATOMITE AT 331 - 332'	
													SILTSTONE 332 - 334'	
												335 50	DIATOMACEOUS SHALE AT 334', microfaulted	
	54	X	0.58	1.96	51.8	119	20						SILTSTONE	
													becoming ASHY at 337'	
													becoming brecciated and tarry at 338'	
												340 45		
													grading back to medium bedded SILTSTONE, ASH layer	
												345 40	DOLOSTONE dips at 45 degrees to core axis	
													SILTSTONE with ASH olive gray (5Y 5/2)	
													SILTY DIATOMITE ASH layers	

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LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	START DATE: 8-8-90 FINISH DATE: 8-15-90 ELEVATION: 385.39' MSL EQUIPMENT: 8" Hollow Stem Auger 0 - 51', Air Rotary Coring 51 - 128', Rotary Wash Coring 128 - 353' LOGGED BY: COFFEE, RG #4297	PIEZOMETER
												350 35	grading to to SILTSTONE	

BOTTOM OF BORING RFB-32 AT 353 FEET
Water sample obtained on 8/13/90.
Boring geophysically logged on 8/15/90
Boring backfilled to surface with voiclay grout on 8/17/90.
* Converted to standard penetration blow counts.

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Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-32

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-14-90 FINISH DATE: 8-17-90
ELEVATION: 423.04' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 47', Air Rotary Coring 47 - 200'
LOGGED BY: BROWN, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												0 423	ASPHALT and GRAVEL BASE ROCK
													FILL
													VALMONTE DIATOMITE
													DIATOMITE light yellowish brown (2.5Y 6/4), thinly bedded, damp
85	60	X	0.62	2.52	58.7	98	21			29		5 418	
	40	X	0.44	2.35	81.6	83	29			46 /10"		10 413	CHERT dark yellowish brown (10YR 3/4), thinly bedded, strong, dry
26	37	X	0.31	2.48	107.5	65	23			49		15 408	interbedded DIATOMITE and CHERT as above
													DIATOMITE
												20 403	CHERT
													DIATOMITE, as above, moist
	50	X	0.34	2.32	95.6					60 /11"		25 398	CHERT, as above
													DIATOMITE light yellowish brown (2.5Y 6/4), as above
	16	X	0.25	2.82	132.7	NP	NP			46		30 393	DOLOSTONE gray (10YR 6/1), strong
													DIATOMITE, as above
35	77					96	30			32 /6"		35 388	CHERT gray (10YR 6/1), thinly bedded, as above
													DIATOMITE dark yellowish brown (10YR 4/4), moist to damp, as above
25	58	X	0.61	2.62	63.8	73	35	13.3		56		40 383	
													CHERT
													DIATOMITE
													CHERT
10	31			2.56						32 /6"		45 378	DIATOMITE
													DOLOSTONE
													DIATOMITE

LYSIMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L1 (RENAMED L7)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-14-90 FINISH DATE: 8-17-90
ELEVATION: 423.04' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 47', Air Rotary Coring 47 - 200'
LOGGED BY: BROWN, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet)	Elev.
												50	373
												55	368
												60	363
												65	358
												70	353
												75	348
												80	343
												85	338
												90	333
88	44											95	328
	55		0.37	2.03	80.4								

No recovery, Diatomite and Siliceous Shale in cuttings

VALMONTE DIATOMITE

ALTAMIRA SHALE
PHOSPHATIC FACIES

SILICEOUS SHALE
light yellowish brown (2.5Y 6/4), thinly bedded, bedding 20 to 25 degrees to core axis, weak to moderately strong

No recovery, siliceous shale and chert in cuttings

CHERT
light yellowish brown (2.5Y 6/4), thinly bedded, bedding 20 degrees to core axis, strong

SILTSTONE in cuttings

DOLOSTONE

SILICEOUS SHALE and CHERT
light brownish gray (10YR 6/2) and black (7.5YR 2/0), thinly bedded dipping 30 degrees to core axis, moderately fractured, fractures dip 20 degrees to core axis, iron staining common

grading to SILTSTONE and SILICEOUS SHALE
bedding 50 degrees to core axis, moderately to highly fractured, fractures 30 degrees to core axis

DOLOSTONE

SILTY SILICEOUS SHALE
well indurated, highly fractured, iron staining common

SILTY MUDSTONE
black (7.5YR 2/0), slightly phosphatic, moderately fractured, 30 degrees to core axis
intensely fractured and brecciated, tar filling fractures at 92 feet

becoming more indurated, weak to moderately strong, moderately fractured, tar filling fractures

YSIMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L1 (RENAMED L7)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-14-90 FINISH DATE: 8-17-90
ELEVATION: 423.04' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 47', Air Rotary Coring 47 - 200'
LOGGED BY: BROWN, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		LYSIMETER
												100 323	tar less common	
	26				94.8							105 318	slightly phosphatic, tar more common brecciated zone at 106 feet minor ASH at 108 feet	
												110 313		
												115 308	MUDSTONE highly to moderately fractured, fractures 20 degrees to core axis, iron staining common	
												120 303	interbedded CHERT, SILICEOUS SHALE, and SILTSTONE black (2.5Y 2/0), yellow brown (10YR 5/0) and light brown gray (2.5Y 6/2), highly to intensely fractured and brecciated, fractures 20 - 30 degrees to core axis, tar filled groundwater encountered during drilling at 119 feet	
												125 298	DOLOSTONE light brownish gray (2.5Y 6/2), fractures as above, strong	
												130 293	ASH MUDSTONE DIATOMACEOUS MUDSTONE DOLOSTONE as above, not as intensely fractured	
												135 288	SILICEOUS SHALE	
												140 283	DIATOMACEOUS MUDSTONE very dark gray (5Y 3/1), moderately fractured, tarry brecciated zone at 139 feet, quartz infilling	
												145 278		
	27		0.32	2.21	94.4								becoming more shaly PHOSPHATIC SHALE	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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LOG OF BORING RFB-L1 (RENAMED L7)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-14-90 FINISH DATE: 8-17-90
ELEVATION: 423.04' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 47', Air Rotary Coring 47 - 200'
LOGGED BY: BROWN, RG #4557

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												150 273	DOLOSTONE well bedded, strong SHALE light brownish gray (2.5Y 6/2) and black (5Y 5/1), thinly bedded, beds dip 40 degrees to core axis
												155 268	DOLOSTONE moderately brecciated, tar filled, slickensides, fractures 30 to 40 degrees to core axis SHALE very dary gray (5Y 3/1), as above, highly fractured, moderately strong
												160 263	
												165 258	contorted bedding at 164 feet
	41	X	0.42	2.38	86.4							170 253	DOLOSTONE brecciated and tar filled SHALE black (5Y 2.5/1) and light brownish gray (2.5Y 6/2), highly fractured and sheared, fractures 15 to 50 degrees to core axis, shears 1/8" to 1/4" offset
												175 248	
												180 243	brecciated and tar filled
												185 238	DOLOSTONE brecciated and tar filled, scattered phosphatic nodules, strong SHALY SILTSTONE SILTY SHALE brecciated and tar filled PHOSPHATIC SHALE laminated, friable to weak
	44		0.43	2.21	79.0							190 233	DOLOSTONE PHOSPHATIC SHALE ASH DOLOSTONE and PHOSPHATIC SHALE
												195 228	SHALE very tarry

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Date: JAN 1991

LOG OF BORING RFB-L1 (RENAMED L7)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		LYSIMETER
												200	START DATE: 8-14-90 FINISH DATE: 8-17-90 ELEVATION: 423.04' MSL EQUIPMENT: 8" Hollow Stem Auger 0 - 47', Air Rotary Coring 47 - 200' LOGGED BY: BROWN, RG #4557	
												223		

BOTTOM OF BORING RFB-L1 AT 200 FEET
Borehole water sample collected on 8/16/90.
Geophysical logging run on 8/20/90.
Voiclay grout from bottom of borehole to 48 feet.
Install Lysimeter L-1 at 45 feet on 8/22/90.
* Converted to standard penetration blow counts.

Herzog Associates
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Date: JAN 1991

LOG OF BORING RFB-L1 (RENAMED L7)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-13-90 FINISH DATE: 8-24-90

ELEVATION: 427.20' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 40', Air Coring 40 - 116', Rotary Wash Coring 116 -176'

LOGGED BY: PERKINS, RG #3364, 0 - 116'
MATTEY, RG #3832, 116 - 176'

PIEZOMETER

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												0 427	ASPHALT GRAVELLY CLAY (CL) yellow (10YR 7/6), medium stiff, dry (FILL)
													FILL
													ALTAMIRA SHALE PHOSPHATIC FACIES
	45	X	0.45	2.85	97.3					32 /3"		5 422	DOLOSTONE light gray (2.5Y 7/2), strong
		X		2.79									Interbedded CLAY (CL) and DOLOSTONE olive gray (5Y 5/2), clay is medium stiff, dolostone is strong
										22		10 417	
	66	X	0.60	2.76	59.6	100	52						
	55		0.63	2.83	66.2	42	24						
													SHALE pale brown (10YR 6/3), weak to moderately strong, highly fractured with iron staining
										40		15 412	
	58	X	0.31	2.68	115.1	95	38						DOLOSTONE gray
													grading to SHALE brownish gray (2.5Y 6/2)
	50	X	0.60	2.75	70.2	81	37			28		20 407	
	41	X	0.59	2.83	73.2	77	44			22		25 402	
	51	X	0.61	2.79	67.2	89	48						
		X		2.76		89	54			21		30 397	DOLOSTONE SILTSTONE
													DOLOSTONE pale yellow (2.5YR 7/3)
												35 392	PHOSPHATIC FACIES
		X		2.43						32 /4"			CHERTY FACIES SILTSTONE drilling easy
													CHERT gray, laminated, intensely fractured, with dark yellowish brown (10YR 3/6) clay coating fractures
	5				155.2							40 387	CHERT alternating gray (10YR 7/1) to yellowish brown (10YR 5/4), bedding dips 70 degrees to core axis
													DOLOSTONE at 41'
													SILICIFIED DIATOMITE and SILTSTONE at 41.5', moderately strong, well indurated
													SILTSTONE at 43.5'
												45 382	SILICEOUS SHALE/CHERT at 45'
													SILTSTONE with minor SILICEOUS SHALE in cuttings pinkish gray (7.5YR 6/2) to yellow brown (10YR 4/6)

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
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Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-13-90 FINISH DATE: 8-24-90

ELEVATION: 427.20' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 40', Air Coring 40 - 116', Rotary Wash Coring 116 -176'

LOGGED BY: PERKINS, RG #3364, 0 - 116'
MATTEY, RG #3832, 116 - 176'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet) Elev.		LYSIMETER
												50 377	SILICEOUS SHALE/CHERT black interbedded with SILTSTONE CHERT	
												55 372		
													grading to DIATOMACEOUS SILTSTONE brownish gray (2.5Y 6/2) to yellow brown (10YR 4/6)	
		X										60 367		
	53		0.36	2.73	109.0								becoming SILTY DIATOMITE grading back to SILTSTONE	
													DOLOSTONE	
	23		0.27	2.34	107.2							65 362	olive yellow (2.5Y 6/6), strong, laminated, bedding dips 8 degrees to core axis SILTSTONE at 65 - 66 feet DOLOSTONE, dark brown (10YR 4/3)	
		X											SHALE black, moderately strong, intensely fractured, with tar fracture filling, dips 70 degrees to core axis	
												70 357	SILTSTONE with CHERT and DOLOSTONE interbeds yellowish brown (10YR 6/4) DOLOSTONE, strong, with quartz-filled fractures SILICEOUS SHALE with SILTSTONE	
												75 352	DOLOSTONE grading back to SILICEOUS SHALE/CHERT and SILTSTONE siliceous material consists of black (10YR 2/1) to very pale brown (10YR 7/4) fragments	
												80 347	CHERTY FACIES	
	8		0.20	2.78	139.5			0.08					TUFFACEOUS FACIES DOLOSTONE gray, closely laminated, intensely fractured, with dark staining, strong	
												85 342	SILTSTONE black (10YR 2/1) to yellowish brown (10YR 5/6), intensely fractured, friable, clean fractures, locally sheared and slickensided groundwater encountered during drilling at 85.5 feet minor ASH 86 - 87'	
												90 337	DOLOSTONE very dark grayish brown (10YR 3/2) interbedded SHALE and SILTSTONE with minor gray (10YR 5/1) ASH, friable	
												95 332		
													bedding dips 10 degrees and fractures dip 60 degrees to core axis	
	46	X	0.39	2.79	105.7	90	41						SILTSTONE well indurated, weak to moderately strong, intensely	

Herzog Associates
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Date: JAN 1991

LOG OF BORING RFB-L2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-13-90 FINISH DATE: 8-24-90

ELEVATION: 427.20' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 40', Air Coring 40 - 116', Rotary Wash Coring 116 -176'

LOGGED BY: PERKINS, RG #3364, 0 - 116'
MATTEY, RG #3832, 116 - 176'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												100 327	fractured, fractures healed with light gray (10YR 7/2) infilling, grading to friable SILTSTONE
												105 322	SILICEOUS SHALE and SILTSTONE interbedded, friable to moderately strong, intensely fractured, bedding dips at 30 degrees to core axis
												110 317	
												115 312	SILTSTONE gray (10YR 5/1), weak, closely fractured, fractures healed with white calcite
	26				149.4							120 307	DOLOSTONE interbedded SHALE, SILICEOUS SHALE and SILTSTONE thinly laminated, bedding at 30 degrees to core axis
												125 302	DOLOSTONE CHERT DOLOSTONE gray (10YR 5/1) with minor interbeds of siliceous shale, bedding 20 degrees to core axis, weak to moderately strong, highly fractured
												130 297	SILICEOUS SHALE SILTSTONE very dark grayish brown (10YR 3/2) friable to weak, intensely fractured
												135 292	SILICEOUS SHALE grading back to SILTSTONE and SHALE SILICEOUS SHALE
												140 287	SILTSTONE well indurated, moderately strong becoming ASHY 140 -143
												145 282	SILICEOUS SHALE SILTSTONE SILICEOUS SHALE
	27	X	0.47	2.56	84.7	56	15						SILTSTONE DOLOSTONE, strong SILTSTONE grading to massive MUDSTONE, highly fractured, weak

YSIMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Date: JAN 1991

LOG OF BORING RFB-L2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 8-13-90 FINISH DATE: 8-24-90

ELEVATION: 427.20' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 40', Air Coring 40 - 116', Rotary Wash Coring 116 -176'

LOGGED BY: PERKINS, RG #3364, 0 - 116'
MATTEY, RG #3832, 116 - 176'

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		LYSIMETER
												150 277	SILICEOUS SHALE SILTSTONE DOLOSTONE SILTSTONE and SHALE	
												155 272	DOLOSTONE GRAY BROWN MUDSTONE	
	9		0.35	2.80	113.6								SILICEOUS SHALE	
												160 267	DOLOSTONE SILICEOUS SHALE SILTSTONE very dark grayish brown (10YR 3/2), intensely fractured, weak, thinly bedded	
												165 262	DOLOSTONE, strong, highly fractured SILTSTONE	
													SILICEOUS SHALE	
												170 257	SILTSTONE SILICEOUS SHALE and SHALE very dark grayish brown (10YR 3/2), friable, intensely fractured	
												175 252		

BOTTOM OF BORING RFB-L2 AT 176 FEET
Borehole water sample collected on 8/21/90.
Geophysical logging run on 9/4/90.
Boring backfilled to surface with volclay grout.
* Converted to standard penetration blow counts.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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Date: JAN 1991

LOG OF BORING RFB-L2

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-5-90 FINISH DATE: 9-6-90

ELEVATION: 427.19' MSL

EQUIPMENT: Air Rotary Tricone 0 - 64', Air Rotary Coring 64 - 69.5'

LOGGED BY: PERKINS, RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE

Depth (feet)	Elev.	Description
0	427	ASPHALT
		GRAVELLY CLAY (CL) yellowish brown (10YR 5/4), dry (FILL)
		SHALE, pale brown (10YR 6/3) — FILL
		ALTAMIRA SHALE PHOSPHATIC FACIES
5	422	DOLOSTONE
		SHALE
		DOLOSTONE
10	417	SHALE
15	412	DOLOSTONE
		SHALE
20	407	DOLOSTONE
		SHALE
25	402	
30	397	
		DOLOSTONE
35	392	SHALE
		DOLOSTONE
		interbedded SHALE, CHERT and DOLOSTONE
40	387	
45	382	

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L2A (RENAMED L8)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-5-90 FINISH DATE: 9-6-90

ELEVATION: 427.19' MSL

EQUIPMENT: Air Rotary Tricone 0 - 64', Air Rotary Coring 64 - 69.5'

LOGGED BY: PERKINS, RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	LYSIMETER
												50 377 55 372 60 367 65 362	

DOLOSTONE
strong

SHALE
dark gray brown (2.5Y 3/2), thinly laminated, highly fractured, fractures tar filled

BOTTOM OF BORING RFB-L2A AT 69.5 FEET
Borehole not geophysically logged.
Install lysimeter L-2 at 69.5 feet on 8/6/90.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
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LOG OF BORING RFB-L2A (RENAMED L8)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90

ELEVATION: 386.80' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'

LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth (feet) Elev.	
												0 387	SANDY CLAY (CL) dark brown (10YR 3/3), very stiff, moist
	6	X	0.21	2.72	134.1					32		5 382	
													CLAYEY SAND (SC) dark brown (10YR 3/3), very dense, moist, minor root fragments
22	8	X	0.26	2.69	124.2	19	5			54 /9"		10 377	FILL
													SAN PEDRO SAND
	8	X	0.33	2.68	112.3					40 /11"		15 372	SANDSTONE dark brown (10YR 3/3), fine to medium-grained, friable to weak
	8	X	0.22	2.68	128.2					44 /11"		20 367	
32	15	X	0.45	2.66	91.5	42	20			56		25 362	
													becoming light gray (10YR 7/2), friable, very fine-grained
10	6	X	0.38	2.72	105.4	NP	NP			36		30 357	
										44		35 352	
													becoming pale brown (10YR 6/3), medium to coarse-grained
2	2	X		2.66						38		40 347	
2	12	X	0.48	2.66	87.1	NP	NP			39		45 342	with orange brown mottling
													with coarse-grained gravels/pebbles

LYSIMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90
ELEVATION: 386.80' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		LYSIMETER
												50 337		
1	19	X	0.32	2.69	113.5	39	11			49		55 332	groundwater encountered during drilling SANDY GRAVEL gray (10YR 5/1), dense, saturated, clasts of siltstone	
													SAN PEDRO SAND	
	38	X	0.53	2.78	82.3	95	42			38		60 327	MALAGA MUDSTONE SILTY CLAY (CL) gray (10YR 5/1), wet, very stiff, vertical limonite staining,	
												65 322	grading to SILTSTONE gray (10YR 5/1)	
									0.45			70 317	grading to MUDSTONE friable, very thinly bedded, minor limonite bands, bedding at 80 degrees to core axis, fractures dip at 15 degrees to core axis	
												75 312	change to very dark gray (10YR 3/1), massive	
												80 307	losing circulation	
70	42	X	0.41	2.58	73.6	98	42	0.98				85 302		
												90 297	still losing circulation strong hydrocarbon odor from core material	
												95 292		

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90
ELEVATION: 386.80' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	
												100 287	
58	47	X	0.55	2.53	71.6	96	43	0.35	0.06			105 282	disrupted bedding, bioturbation(?), with light gray ashy material
												110 277	
													open fractures, dipping at 15 degrees to core axis
												115 272	
									0.06			120 267	becoming sandier
72	47	X	0.56	2.59	71.3	99	48	0.16					losing circulation
												125 262	
													poor recovery
												130 257	
													open fractures, dipping at 15 degrees to core axis
												135 252	
												140 247	
54	44	X	0.53	2.57	75.7	90	39					145 242	

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90
ELEVATION: 386.80' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		LYSIMETER
												150		
												237	MUDSTONE gray (10YR 5/1), massive, friable to weak	
												155		
												232	interbedded with gray ash layers, 1/8" thick, near horizontal dip	
												160		
60	52	X	0.58	2.53	68.1	106	50					227		
												165		
												222		
													no recovery	
												170		
												217		
													very friable	
												175		
												212	no recovery	
												180		
												207	intensely fractured, strong hydrocarbon odor	
31	46	X	0.47	2.53	99.5	114	50							
												185		
												202		
												190		
												197		
												195		
												192		
70	53	X	0.68	2.51	50.8	109	55							

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.: [illegible]
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90
ELEVATION: 386.80' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												200 187	massive, weak, strong hydrocarbon odor
												205 182	
												210 177	
												215 172	
34	43	X	0.53	2.55	74.5	95	45	0.48				220 167	
												225 162	DOLOSTONE MUDSTONE, as above
												230 157	
34	48		0.46	2.59	87.1	103	55					235 152	
												240 147	
												245 142	

PIEZOMETER

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LOG OF BORING RFB-L3

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90
ELEVATION: 386.80' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)		LYSIMETER
												250		
												137	no recovery	
												255		
												132		
												260		
												127	very friable	
64	54	X	0.63	2.46	57.3	109	45							
												265		
												122		
												270		
												117		
												275	DIATOMACEOUS SHALE gray (10YR 5/1), thinly to very thinly laminated, friable, bedding is microfaulted 1/8" to 1/2" Microfossil Analysis at 275 feet Lamprocyrtis heteroporos assemblage 4.2 - 5 m.y. Age Range suggests Middle to Lower Malaga	
												112		
												280	DOLOSTONE gray (10YR 5/1), strong	
												107	MUDSTONE gray (10YR 5/1), massive, friable to weak	
70	63	X	0.57	2.42	64.9	91	32							
												285		
												102		
												290		
												97		
												295		
												92	fractures filled with white mineralization, gypsum (?)	

Herzog Associates
Geoscientists

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LOG OF BORING RFB-L3

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90
ELEVATION: 386.80' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)	
												300	with faint, close laminations
56	57	X	0.61	2.47	60.3	109	48					87	
												305	
												82	
												310	
												77	
												315	
												72	
												320	
												67	
28	63	X	0.46	2.44	82.5	119	55					325	
												62	
												330	
												57	
												335	
												52	
												340	no recovery
												47	
												345	
												42	
	54	X	0.43	2.49	84.8	105	41						becoming more laminated with defined layers DIATOMACEOUS SHALE closely laminated, friable

PIEZOMETER

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 9-17-90 FINISH DATE: 9-25-90
ELEVATION: 386.80' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 61', Rotary Wash Coring 61 - 354'
LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		LYSIMETER
												350	Microfossil Analysis at 350 feet old Lamprocyrtis heteroporos assemblage or young stichocorys peregrina assemblage 5 m.y.	
46	51									37			ASHY SILTSTONE gray, thinly to medium bedded, friable	

BOTTOM OF BORING RFB-L3 AT 354 FEET
Borehole water sample collected 9/17/90.
Boring geophysically logged on 9/25/90.
Backfilled to surface with volclay grout on 9/27/90.
* Converted to standard penetration blow counts.

START DATE: 9-28-90 FINISH DATE: 9-28-90

ELEVATION: 387.42' MSL

EQUIPMENT: 8" Hollow Stem Auger

LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE

Depth (feet)	Elev.	Description	PIEZOMETER
0	387	SANDY CLAY (CL) dark brown (10YR 3/3), moist, stiff	
5	382		
		CLAYEY SAND (SC) dark brown (10YR 3/3), moist, hard	
10	377	FILL	
		SAN PEDRO SAND	
15	372	SAND dark brown (10YR 3/3), fine-medium grained, poorly sorted, low hardness, weak (SAN PEDRO SAND unit)	
20	367		
25	362		
30	357	becomes white (10YR 7/2), fine-very grained, friable	
35	352		
40	347	becomes pale brown (10YR 6/3), medium to coarse-grained	
45	342		

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RG.: [illegible]
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3A (RENAMED M62B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

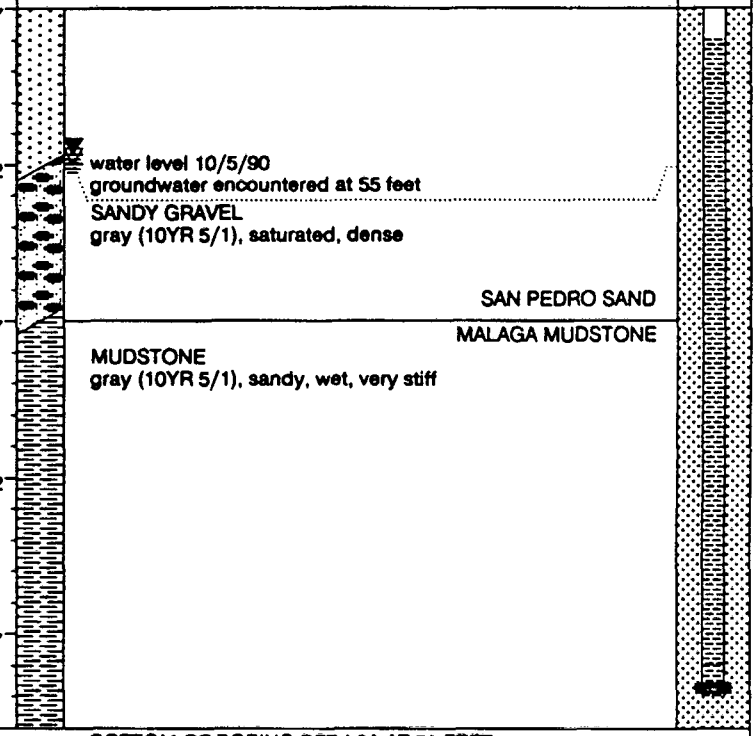
START DATE: 9-28-90 FINISH DATE: 9-28-90

ELEVATION: 387.42' MSL

EQUIPMENT: 8" Hollow Stem Auger

LOGGED BY: MATTEY, RG #3832

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-6 CM/S	FIELD PERM. 10 E-6 CM/S	BLOWS/ FOOT *	SAMPLE



PIEZOMETER

BOTTOM OF BORING RFB-L3A AT 73 FEET.
*Logged cuttings, no samples obtained.
Borehole not geophysically logged.
Piezometer RFB-L3 installed in reamed boring on 10/1/90.

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RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3A (RENAMED M62B)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 10-3-90 FINISH DATE: 10-4-90

ELEVATION: 387.37' MSL

EQUIPMENT: 8" Hollow Stem Auger 0 - 72', Air Rotary Coring 72 - 84'

LOGGED BY: PERKINS, RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT *	SAMPLE	Depth Elev. (feet)		YSIMETER
												0 387	SANDY CLAY (CL) brown (7.5YR 4/4), gravel common, slightly moist	
												5 382		
												10 377	SOIL	
													SAN PEDRO SAND	
												15 372	SAND yellowish brown (10YR 5/6), fine-medium grained, poorly sorted	
												20 367		
												25 362	grades to light brownish gray (10YR 6/2), fine silty sand	
												30 357		
												35 352	grades to yellow brown (10YR 5/4), fine-medium grained, slightly moist	
												40 347		
												45 342	grades to medium-coarse grained sand, scattered gravel	

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3B (RENAMED L9)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

START DATE: 10-3-90 FINISH DATE: 10-4-90
ELEVATION: 387.37' MSL
EQUIPMENT: 8" Hollow Stem Auger 0 - 72', Air Rotary Coring 72 - 84'
LOGGED BY: PERKINS, RG #3364

MATRIC POTENTIAL	MOISTURE CONTENT %	SIEVE ANAL. SEE APNDX F	POROSITY	SPECIFIC GRAVITY	DRY DENSITY (pcf)	LIQUID LIMIT %	PLASTICITY INDEX %	LAB PERM. 10 E-8 CM/S	FIELD PERM. 10 E-8 CM/S	BLOWS/ FOOT #	SAMPLE	Depth Elev. (feet)	LYSIMETER
												50 337	
												55 332	
												60 327	
												65 322	
												70 317	
												75 312	
												80 307	

SANDY GRAVEL
olive brown (2.5YR 4/3), moist

SAN PEDRO SAND

MALAGA MUDSTONE

MUDSTONE
olive brown (2.5Y 4/3), scattered gravel, very moist-wet

grades to olive brown (2.5Y 4/4), very moist-wet

grades to olive gray (5Y 4/2)

BOTTOM OF BORING RFB-L3B AT 84 FEET
Borehole not geophysically logged.
Install Lysimeter L-3 at 81.5 feet on 10/4/90.

Herzog Associates
Geoscientists

Job No: 15384.02.00.7
RG.:
Lic No: 3488
Drwn: CLM
Date: JAN 1991

LOG OF BORING RFB-L3B (RENAMED L9)

PALOS VERDES LANDFILL RI/FS

Los Angeles County Sanitation District

UNITED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	**GRAVEL & GRAVELLY SOILS** More than 50% of coarse fraction **retained** on No. 4 sieve	**CLEAN GRAVELS** (Little or no fines)		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
				GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES (Appreciable amounts of fines)		GM	Silty gravels, gravel-sand-silt mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
	SAND & SANDY SOILS More than 50% of coarse fraction **passed** on No. 4 sieve	**CLEAN SAND** (Little or no fines)		SW	Well-graded sands, gravelly sands, little or no fines
				SP	Poorly-graded sands, gravelly sands, little or no fines
		SANDS WITH FINES (Appreciable amounts of fines)		SM	Silty sands, sand-silt mixtures
				SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS More than 50% of material is **smaller** than No. 200 sieve size	**SILTS & CLAYS** Liquid limit **less** than 50			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid limit **greater** than 50			MH	Inorganic silts, micaceous or diatomaceous fine sands or silty soils
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS				PT	Peat, humus, swamp soils with high organic contents

NOTE: Dual symbols are used to indicate borderline soil classifications

SAMPLE KEY

- No recovery
- Disturbed sample
- Undisturbed sample

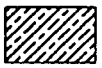
C Chemical Analyses Performed[1]
P Physical Analyses Performed[1]
M Microfossil Analyses Performed[1]

1. See Table 3 and text for details

KEY TO ROCK SYMBOLS AND LOGGING TERMS

ROCK SYMBOLS

 Dolomite

 Siltstone/Mudstone/ Claystone

GROUND WATER LEVEL SYMBOLS

 Water encountered during drilling

 Static water level in well

ROCK/SOIL COLOR DESIGNATION

10YR 7/1 Color as field checked to Munsell Soil Color Chart (1990 Edition)

FRACTURE EXPLANATION

Fracture Description	Spacing of Fractures
Intensely Fractured	< 2 inches
Highly Fractured	2 inches to 1 foot
Moderately Fractured	1 foot to 3 feet
Slightly Fractured	3 feet to 10 feet
Massive	>10 feet

Fracture Description	Separation (mm)
Closed	0
Very Narrow	0.0-0.1
Narrow	0.1-1.0
Wide	1.0-5.0
Very Wide	5.0-15.0+

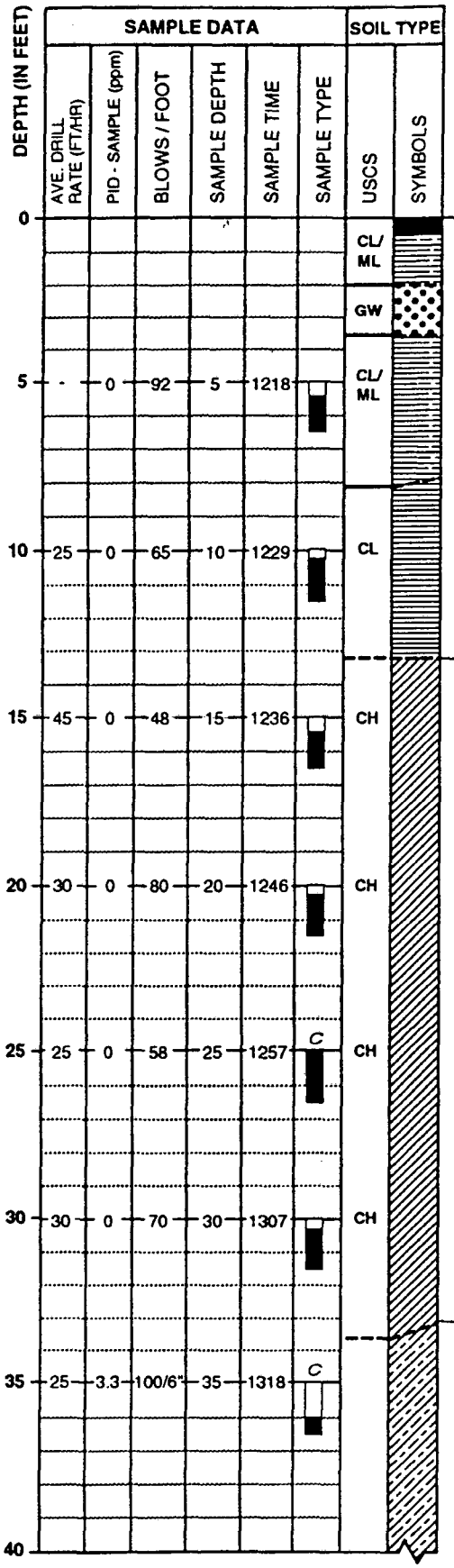
Fracture Description	Definition
Clean	No fracture filling
Stained	Discoloration of fracture
Filled	Fracture filled with recognizable material

WEATHERING EXPLANATION

Grade	Diagnostic Features
Fresh	No sign of decomposition or discoloration
Slightly weathered	Slight discoloration inwards from open fractures
Moderately weathered	Discoloration throughout; strength somewhat less than fresh rock
Highly weathered	Corestones present in more weathered matrix; individual minerals decomposed
Completely weathered	Decomposed to soil but structure preserved; easily crumbled or penetrated

BORING AB-1

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
SURFACE ELEVATION: 318.30' MSL



DESCRIPTION

5" Asphalt

Olive gray (5Y 5/2) silty CLAY to clayey SILT with little fine to coarse sand, moist, dense, no odor. [Fill]
Gray (5Y 6/1) GRAVEL, moist, loose, no odor. [Fill around pipe]

Pale yellow (5Y 5/2) clayey SILT to olive gray (5Y 5/2) silty CLAY, moist, dense, no odor; trace dark brown (10YR 5/4) staining.

Olive gray (5Y 5/2) silty CLAY with trace coarse sand, moist, dense, no odor. [Fill]

1/2' thick gravelly zone at 13' bgs. [Base of Fill?]

COLLUVIUM:

Olive gray (5Y 5/2) CLAY with trace to little silt and trace sand, moist, stiff, no odor.
1" thick pale yellow (5Y 8/2) diatomite with trace dark yellowish brown (10YR 5/4) to dark gray (5Y 5/2) organic fragments at 16'.

Olive gray (5Y 5/2) CLAY with trace silt, moist, stiff, no odor, plastic.

Olive gray (5Y 5/2) silty CLAY, moist, stiff, no odor.

Olive (5Y 5/3) CLAY with trace silt, moist, stiff, no odor, plastic.

MALAGA MUDSTONE MEMBER, MONTEREY FM:

Very dark gray (5Y 3/1) MUDSTONE with trace light gray laminations, bedding dips 60°, slightly moist, very dense, no odor, diatomaceous (?), massive (no fractures observed).

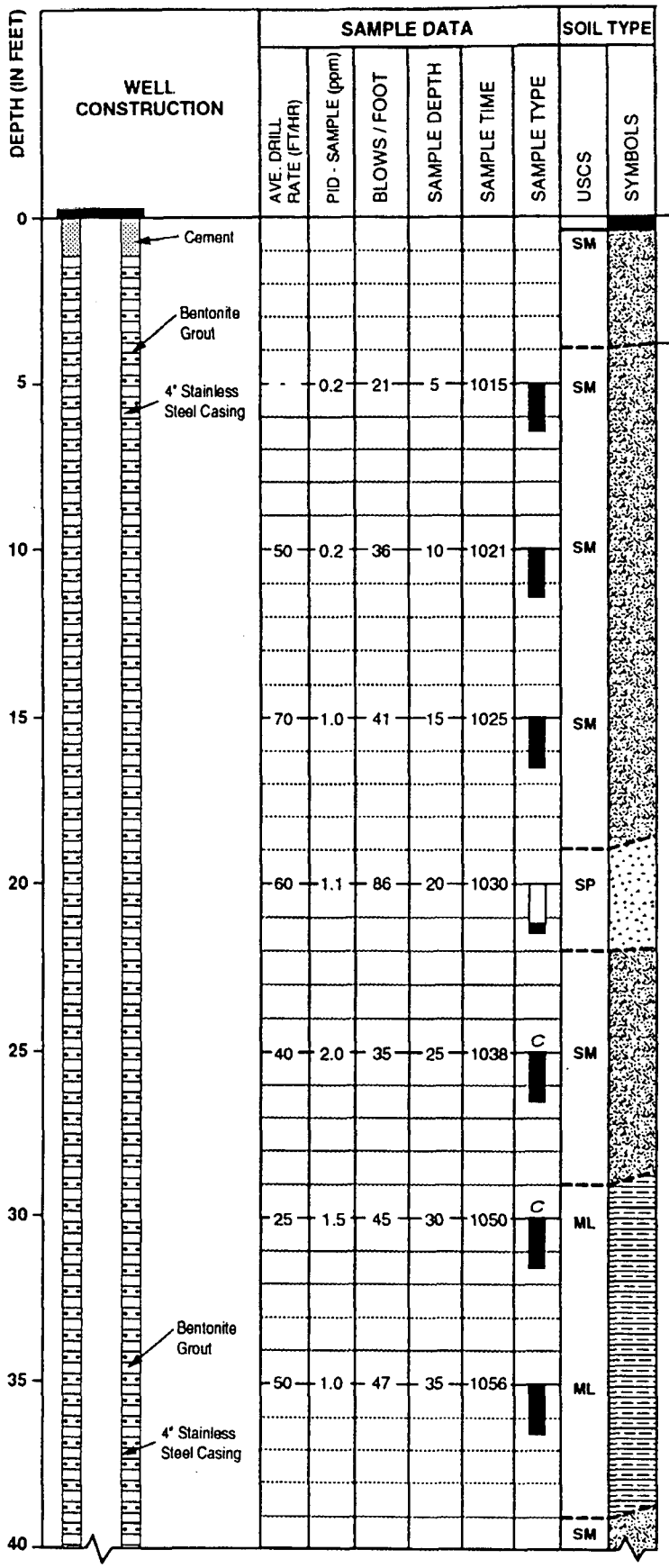
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M64B (Formerly Boring AB-1A)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 244.81' MSL



DESCRIPTION

4" Asphalt
Olive brown (2.5Y 4/3) silty fine SAND with trace gravel, coarse sand, and cobbles; damp, loose, no odor. [Fill]

LOMITA MARL MEMBER, SAN PEDRO FM:
Light olive brown (2.5Y 5/4) silty fine SAND with trace coarse sand, shell fragments (turitella), and roots; damp, loose, no odor.

Light yellowish brown (2.5Y 6/4) silty fine SAND with approximately 20% fine sand- to gravel-sized shell fragments, damp, dense, no odor.

Light yellowish brown (2.5Y 6/4) silty fine SAND with fine to coarse sand-sized shells and shell fragments, trace medium sand-sized heavy minerals (hornblende), damp, dense, no odor.

Pale yellow (2.5Y 7/3) medium SAND with 30% coarse sand-sized shell fragments, trace medium sand-sized heavy minerals (hornblende), damp, very dense, calcite cemented, no odor.

Yellowish brown (10YR 5/6) silty fine SAND with little clay and fine to coarse sand-sized shell fragments, damp, dense, no odor.

Pale olive (5Y 6/3) SILT with little fine sand and trace clay, trace coarse sand-sized shell fragments, damp, dense, no odor.

Pale olive (5Y 6/3) SILT with trace clay and little fine sand, trace shell fragments, damp, dense, no odor.

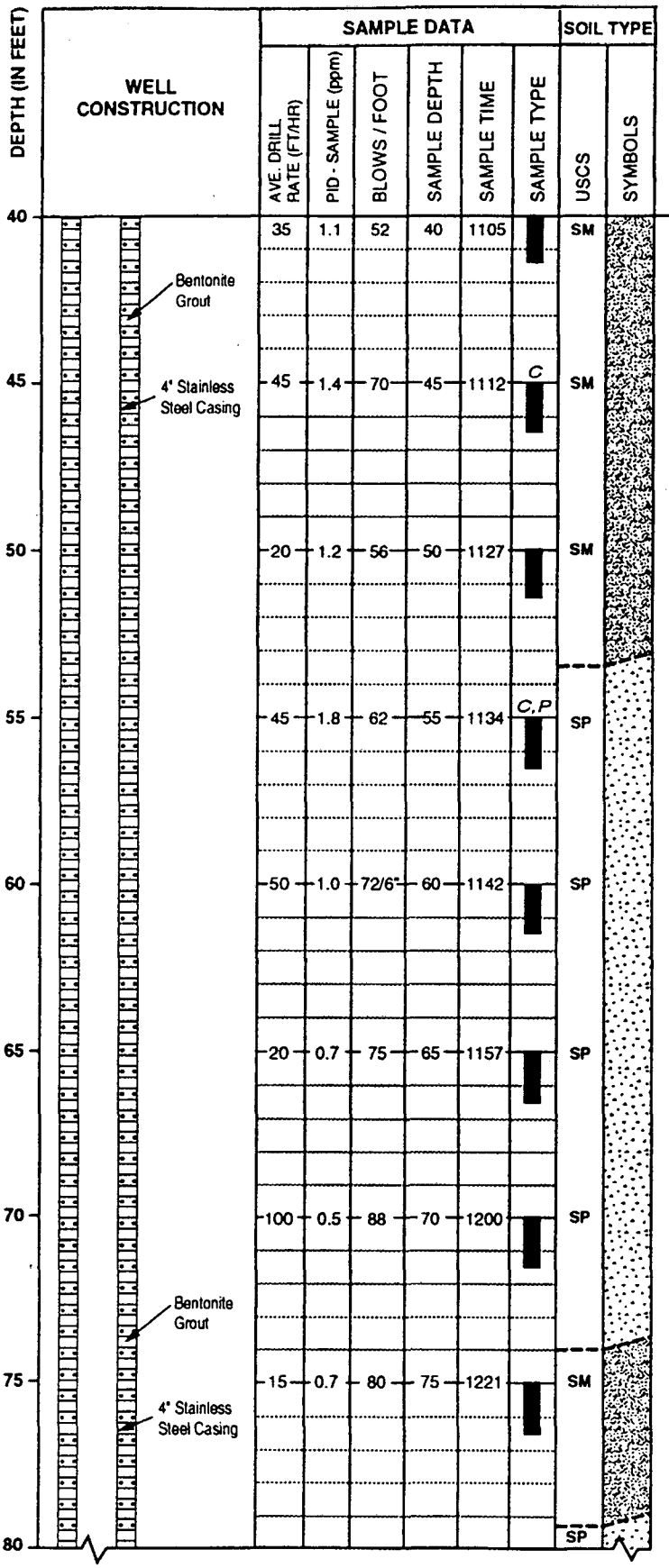
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M64B (Formerly Boring AB-1A) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 244.81' MSL



DESCRIPTION

Pale olive (5Y 6/3) silty fine SAND with trace shell fragments, moist, dense, no odor.

Pale olive (5Y 6/3) silty fine SAND with trace shell fragments, damp, dense, no odor.

Olive (5Y 5/3) silty fine to medium SAND with trace shell fragments, damp, dense, no odor.

Pale yellow (2.5Y 7/4) medium SAND with 40% medium sand-sized shell fragments and trace rock fragments, damp, dense, no odor.

Pale yellow (2.5Y 7/4) medium SAND and 60% fine sand-sized SHELL FRAGMENTS with some olive gray (5Y 5/2) very hard siltstone fragments, damp, dense, no odor, partially cemented.

Pale yellow (5Y 6/4) coarse to medium SAND and SHELL FRAGMENTS (60-70%), trace coarse sand-sized heavy minerals (hornblende), damp, very dense, locally well cemented, no odor.

Pale yellow (5Y 6/4) medium to coarse SAND and SHELL FRAGMENTS, trace angular dark rock fragments, damp, very dense, locally cemented, no odor.

Pale Yellow (5Y 7/3) silty fine to medium SAND with little shell fragments, trace chert pebbles, damp, dense, no odor.

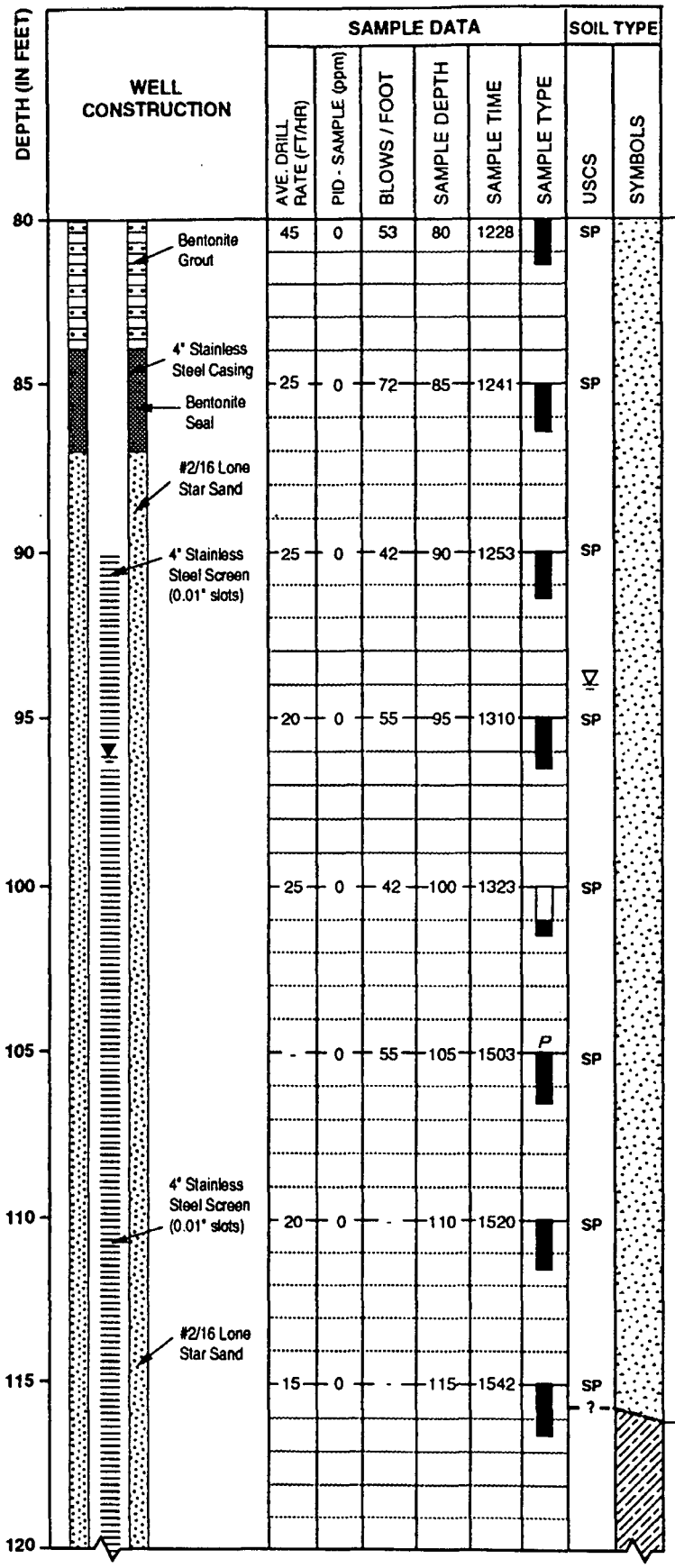
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M64B (Formerly Boring AB-1A) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 244.81' MSL



DESCRIPTION

Pale yellow (5Y 7/4) medium SAND and SHELL FRAGMENTS, damp, dense, no odor.

Yellow (2.5Y 7/6) medium sand-sized SHELL FRAGMENTS (90%) with trace sand, damp, dense, no odor

Pale yellow (2.5Y 7/3) medium SAND with some medium sand-sized shell fragments, moist, dense, no odor.

Wet at 94 feet.

White (2.5Y 8/1) medium SAND with little medium sand-sized shell fragments, wet, dense, no odor.

Pale olive (5Y 6/4) fine to medium SAND with little medium to coarse sand-sized shell fragments, wet, dense, no odor.

Pale yellow (2.5Y 7/9) medium SAND and sand- and gravel-sized SHELL FRAGMENTS with little silt and trace clay, partially cemented, dense, wet with occassional damp spots, no odor.

Pale yellow (2.5Y 8/2) medium to coarse SAND and SHELL FRAGMENTS, trace black rock fragments (iron oxide?) and siltstone fragments, wet with occassional damp spots, dense, no odor.

White (2.5Y 8/2) medium to coarse SAND and SHELL FRAGMENTS, wet, dense to hard, partially cemented, no odor.

MALAGA MUDSTONE MEMBER, MONTEREY FM (?):
Dark gray mudstone fragment in tip of sampler at 116 feet.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M64B (Formerly Boring AB-1A) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 244.81' MSL

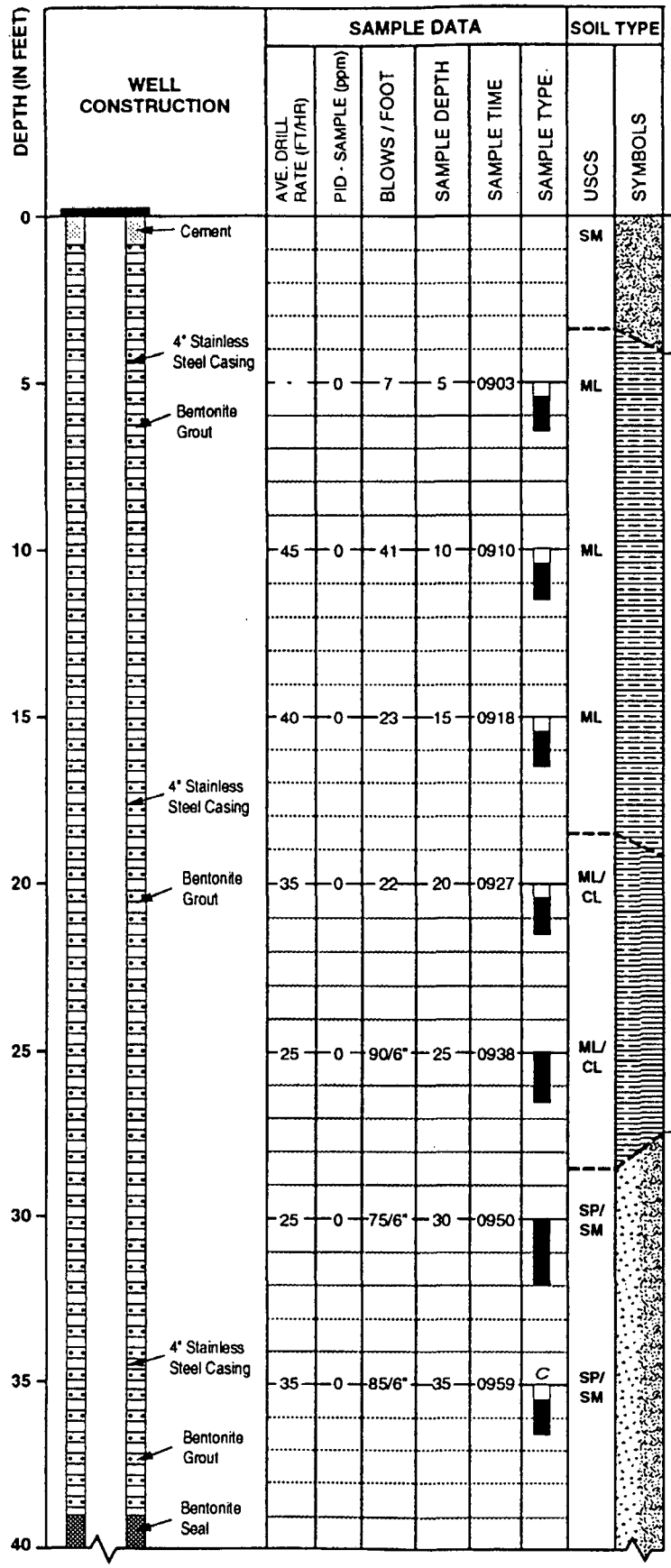
DEPTH (IN FEET)	WELL CONSTRUCTION	SAMPLE DATA: AVE. DRILL RATE (FT/HR)	PID - SAMPLE (ppm)	BLOWS / FOOT	SAMPLE DEPTH	SAMPLE TIME	SAMPLE TYPE	SOIL TYPE: USCS	SOIL TYPE: SYMBOLS	DESCRIPTION
120	4" Stainless Steel Casing (Sediment Sump)	10	-	-	120	1550				No recovery, very hard drilling.
	#2/16 Lone Star Sand									
125										

Boring completed to a depth of 123 feet bgs on 12/27/93.
Ground water encountered at 94 feet bgs during drilling.
Well installed on 12/28/93.
Ground water measured at 96.35 feet bgs in well on 1/6/94.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M63B (Formerly Boring AB-2)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: T.A. Johnson & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 204.06' MSL

DESCRIPTION

Very dark gray (10YR 3/1) silty gravelly fine SAND (well sorted) with some silt and subangular to rounded gravel (to 2" diameter), moist, loose. [Fill]

More clay and less gravel at 3 feet.

[Base of Fill]

Very dark gray (10YR 3/1) sandy clayey SILT with some gravel and fine to medium sand, (gravel is angular to well rounded, to 1.5" diameter) moist, soft, no odor.

Very dark gray (10YR 3/1) to gray (10YR 5/1) clayey SILT with some fine to medium sand and gravel (to 3" diameter, angular to rounded, composed of siltstone and fine sandstone), moist, medium stiff, no odor.

Very dark gray (10YR 3/1) to gray (10YR 5/1) clayey SILT with fine to coarse sand and gravel (to 1" diameter, angular to subrounded, composed of granitic rock), damp to moist, medium stiff, no odor.

Very dark gray (10YR 3/1) to very dark grayish brown (10YR 3/2) silty clay to clayey SILT with some fine to coarse sand and gravel (to 1" diameter composed of siltstone), damp to moist, medium stiff, no odor.

Brown (10YR 4/3), gravelly sandy clayey SILT (sand is poorly sorted, fine to coarse; gravel to 2" diameter, angular to sub rounded, composed of predominantly flat siltstone and trace gypsum), damp to moist, no odor.

LOMITA MARL MEMBER, SAN PEDRO FM:

Light yellowish brown (2.5YR 6/4) silty fine SAND (well sorted) with 5% coarse sand-sized shell fragments and one 1/2" chert nodule, strong hydrocarbon reaction, moist, dense, some reddish brown iron oxide staining.

Yellowish brown (10YR 5/6) silty fine to coarse SAND with some rock fragments (subangular to sub rounded, to 1-1/2" diameter), moist, dense, heavy iron oxide staining (reddish brown) in matrix and on rock fragments, weak HCl reaction.

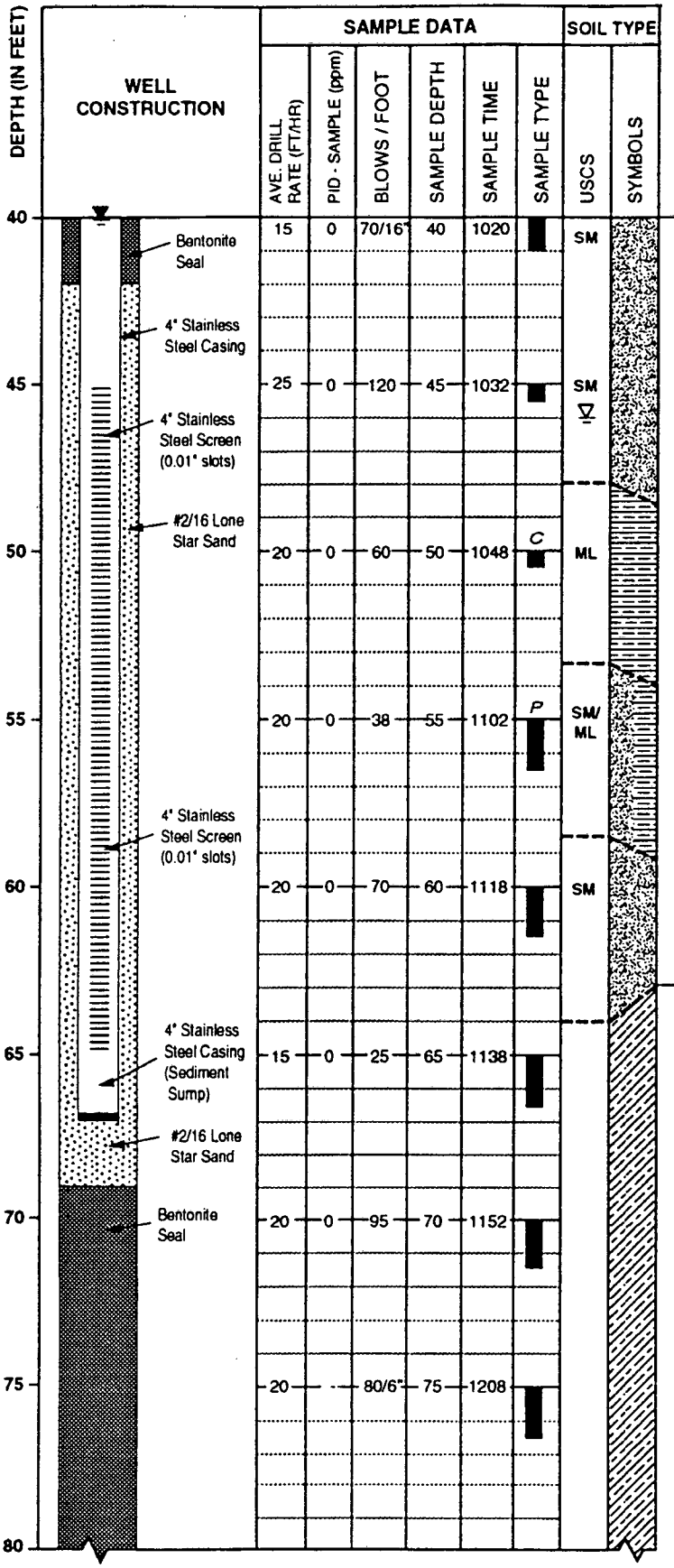
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M63B (Formerly Boring AB-2) (continued)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: T.A. Johnson & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 204.06' MSL



DESCRIPTION

Light yellowish brown (2.5Y 6/4) silty fine SAND with some rock fragments (to 3" diameter, composed of gray dolomite), weak HCl reaction.

Light yellowish brown (10YR 6/4) silty fine to medium SAND with some silt and coarse sand, trace gravel (to 1" diameter, angular to sub rounded), moist to wet, very dense, strong HCl reaction.

Wet at 46 feet.

Light olive brown (2.5Y 5/4) to light yellowish brown (2.5Y 6/4) gravelly clayey SILT with trace fine to coarse sand, saturated, stiff. Percent gravel: sand: silt: clay=15:5:60:20. Gravel composed of gray dolomite to 3," very hard, weak HCl reaction.

Dark yellowish brown (10YR 4/4) silty fine to medium SAND and sandy SILT with trace clay, abundant shell fragments, some whole bivalve shells, moist to wet, medium dense, strong HCl reaction.

Pale olive (5Y 6/3) silty fine to medium SAND, with trace coarse sand, silt, and medium sand-sized shell fragments; wet to saturated, medium dense, strong HCl reaction.

MALAGA MUDSTONE MEMBER, MONTEREY FM:

Olive brown (2.5Y 4/3) fine sandy SILT with some clay and trace medium to coarse sand, trace shell fragments, trace diatoms/radiolaria, moist to wet, medium stiff to soft, strong HCl reaction (dissipates quickly), no HCl reaction to diatoms (silica), highly weathered, massive (no fractures observed).

Light olive brown (2.5Y 5/4) to gray (2.5Y 6/1) clayey SILT with trace fine sand, moist, stiff, highly weathered, trace diatoms, very thinly bedded to laminated, moderately fractured; fractures are very narrow to wide, filled with silty clay, and stained reddish brown and black with iron oxide.

Black (10YR 2/1) silty MUDSTONE with trace diatoms and trace fine sand, micaceous, damp, very stiff, no odor, fresh (unweathered), massive (no fractures observed), occassional thin (1/16") interbeds of gray (2.5Y 6/1) silt, no HCl reaction, no odor.

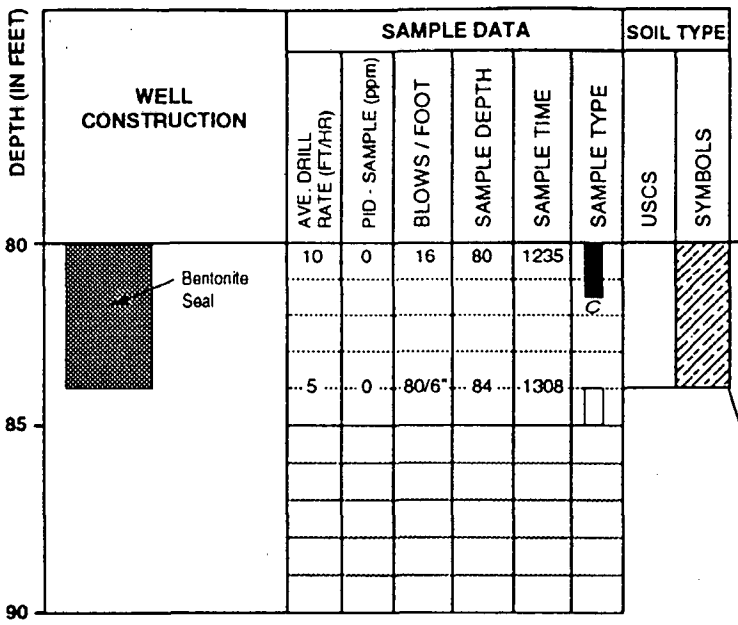
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M63B (Formerly Boring AB-2) (continued)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: T.A. Johnson & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 204.06' MSL



DESCRIPTION

Black (10YR 2/1) MUDSTONE with trace fine to medium sand and 1/8" gray silt laminae, damp to moist, stiff, petroliferous odor, moderately fractured; fractures are closed to wide, filled with trace gypsum; fresh (unweathered).

Black (10YR 2/1) MUDSTONE with trace fine sand, interlayered with 1/16" to 1/8" gray sandy SILT beds, bedding dips nearly vertical, damp to moist, petroliferous odor, medium stiff, massive (no fractures observed), fresh (unweathered), moderately indurated to semi-consolidated.

Boring completed to a depth of 84 feet bgs on 1/3/94.
Ground water encountered between 46 and 68 feet bgs during drilling.
Well installed on 1/3/94.
Ground water measured at 40.05 feet bgs in well on 1/12/94.

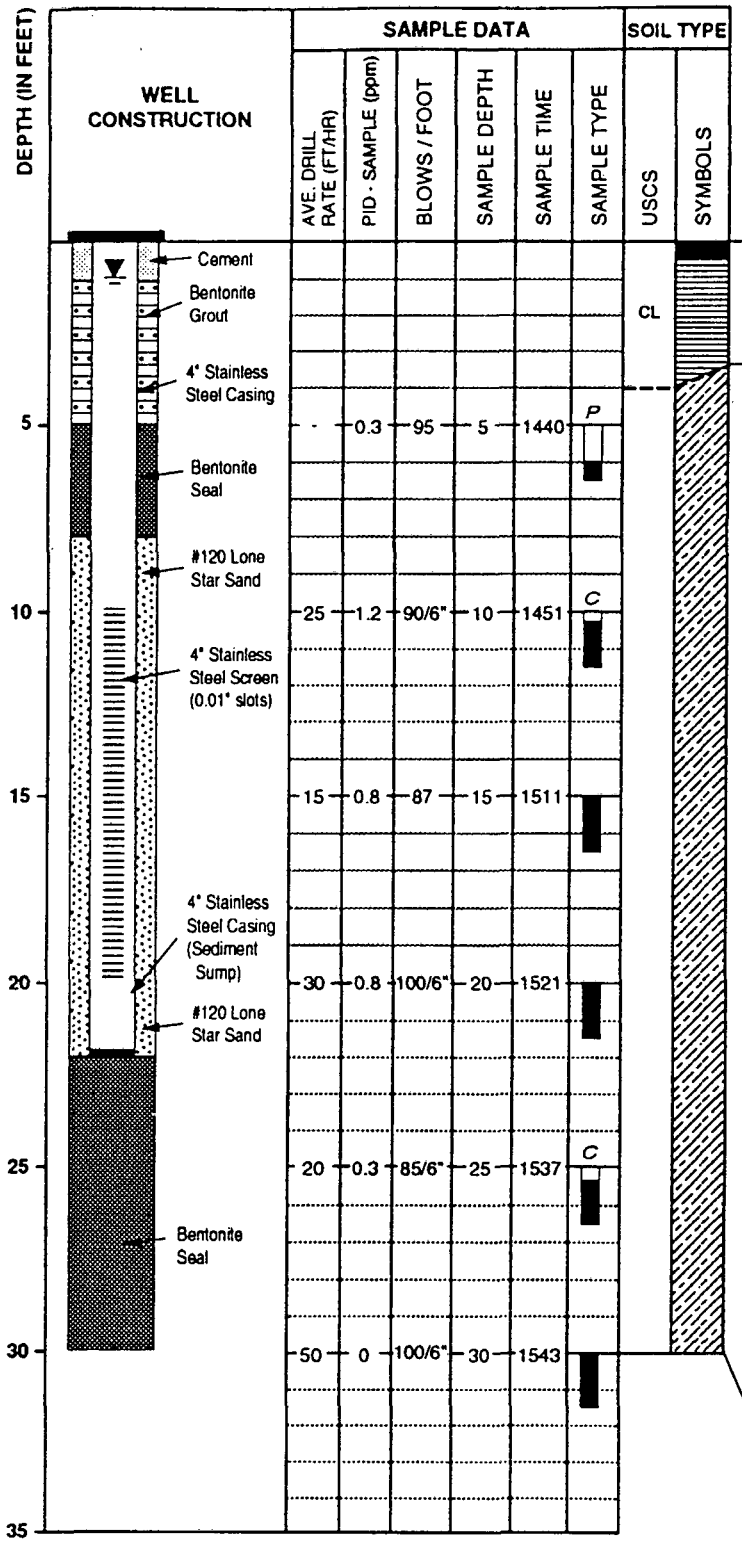
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M65B (Formerly Boring AB-3)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 8" Hollow Stem Auger, Failing F-10 Rig, Reamed with 10" Hollow Stem Auger
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 282.93' MSL



DESCRIPTION

4" Asphalt.
Black (5Y 2.5/1) to olive brown (2.5Y 4/3) CLAY with some silt, trace medium to coarse sand, damp, dense, no odor. [Fill]

MALAGA MUDSTONE MEMBER, MONTEREY FM:

Black (5Y 2.5/2) MUDSTONE, damp, dense hydrocarbon odor, massive (no bedding or fractures observed), trace microfossils, fresh (unweathered).

Dark olive gray (5Y 3/2) MUDSTONE with trace angular dolomite rock fragments, damp, dense, hydrocarbon odor, massive, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, damp, very dense, slight hydrocarbon odor, trace microfossils, highly to intensely fractured, fractures closed, fracture surfaces rough with possible slickensides, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, damp, very dense, trace hydrocarbon odor, highly and intensely fractured, fractures closed and at various angles, trace microfossils, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE with trace fine to medium sand and 1/8" thick medium sand lense, damp, very dense, highly fractured (blocky), low plasticity, bedding dips 25°, fresh (unweathered).

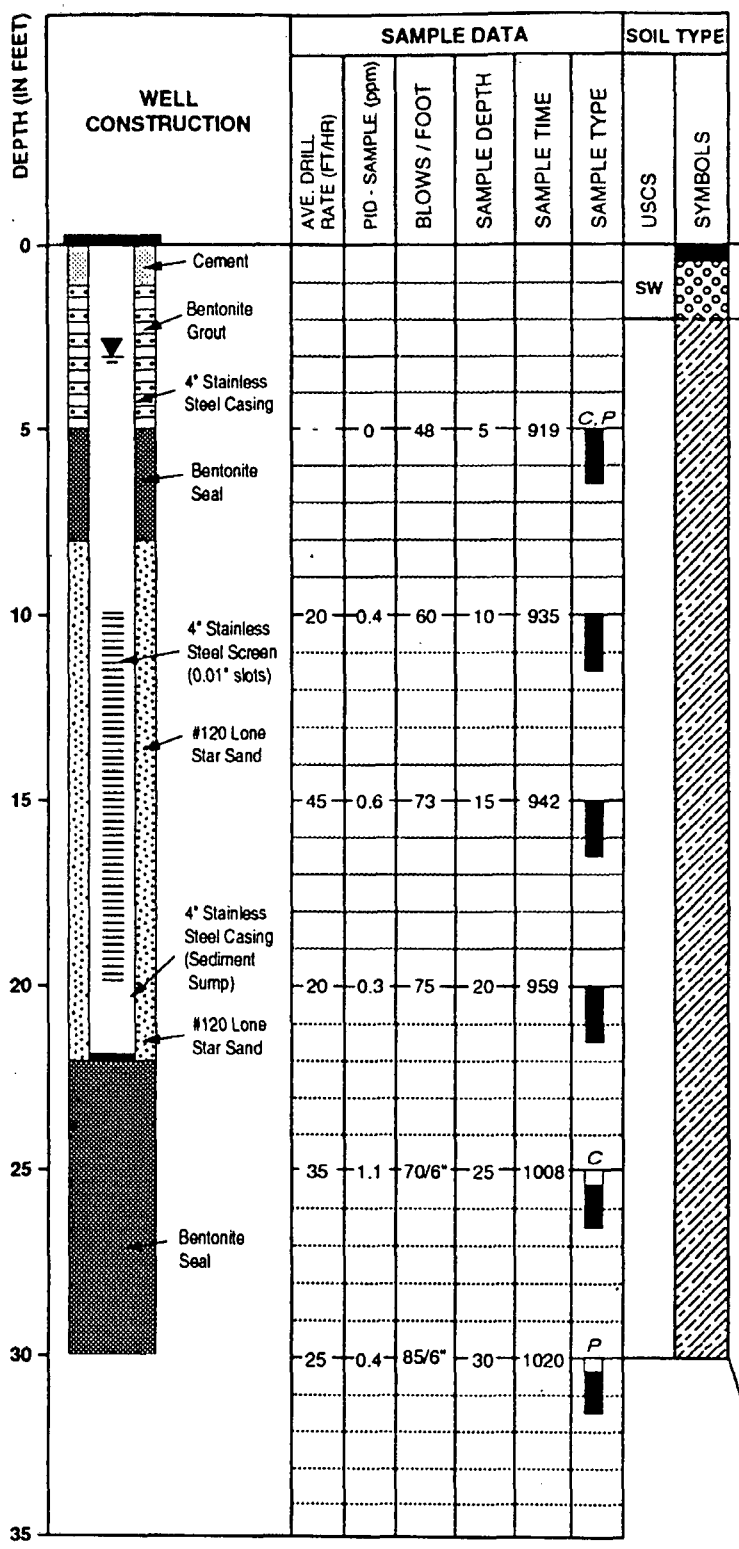
Black (5Y 2.5/2) MUDSTONE, highly to intensely fractured, fractures dip ~10°, damp, very dense, strong hydrocarbon odor, fracture surfaces rough with possible slickenslides, fresh (unweathered).

Boring completed to a depth of 30 feet bgs on 12/9/93.
No ground water encountered during drilling.
Ground water measured in open hole at 1.5 feet bgs on 12/13/93.
Well installed on 12/15/93.
Ground water measured in well at 0.97 feet bgs on 1/6/94.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M66B (Formerly Boring AB-4)

SAMPLING METHOD: California Modified Split Spoon

DRILLING METHOD: 8" Hollow Stem Auger, Failing F-10 Rig, Reamed with 10" Hollow Stem Auger

LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402

TOP CASING ELEVATION: 264.76' MSL

DESCRIPTION

4" Asphalt.
Olive gray (5Y 4/2) fine to coarse SAND with little gravel and pebbles, damp, loose, no odor. [Fill]

MALAGA MUDSTONE MEMBER, MONTEREY FM:

Very dark gray (5Y 3/1) clayey SILTSTONE, trace microfossils and mica, damp, dense, slight hydrocarbon odor, massive (no fractures observed), fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, dense, damp, highly fractured, fractures closed (blocky), strong hydrocarbon odor, trace microfossils, fresh (unweathered).

Black (5Y 2.5/2) MUDSTONE with thin layers of diatomite, micaceous, weak bedding dipping 40°, damp, dense, intensely fractured (blocky), fracture surfaces rough, fractures closed, strong hydrocarbon odor, fresh (unweathered).

Black (5Y 2.5/2) MUDSTONE, trace microfossils, bedding dips ~30°, highly fractured (blocky), fractures closed, fracture surfaces rough, damp, dense, strong hydrocarbon odor, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, intensely fractured (blocky), fractures closed, fracture surfaces rough, weak bedding dips 30°, damp, dense, strong hydrocarbon odor, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, highly fractured (blocky), fractures closed, fracture surfaces smooth to rough, damp, very dense, strong hydrocarbon odor, fresh (unweathered).

Black (5Y 2.5/2) MUDSTONE with trace mica and hard gray diatomaceous shale; damp, very dense, hydrocarbon odor, fresh (unweathered), slightly fractured, fractures closed, fracture surfaces smooth.

Boring completed to a depth of 30 feet bgs on 12/13/93.
No ground water encountered during drilling.
Ground water measured in open hole at 4.7 feet bgs on 12/14/93.
Well installed on 12/15/93.
Ground water measured in well at 2.93 feet bgs on 1/7/94.

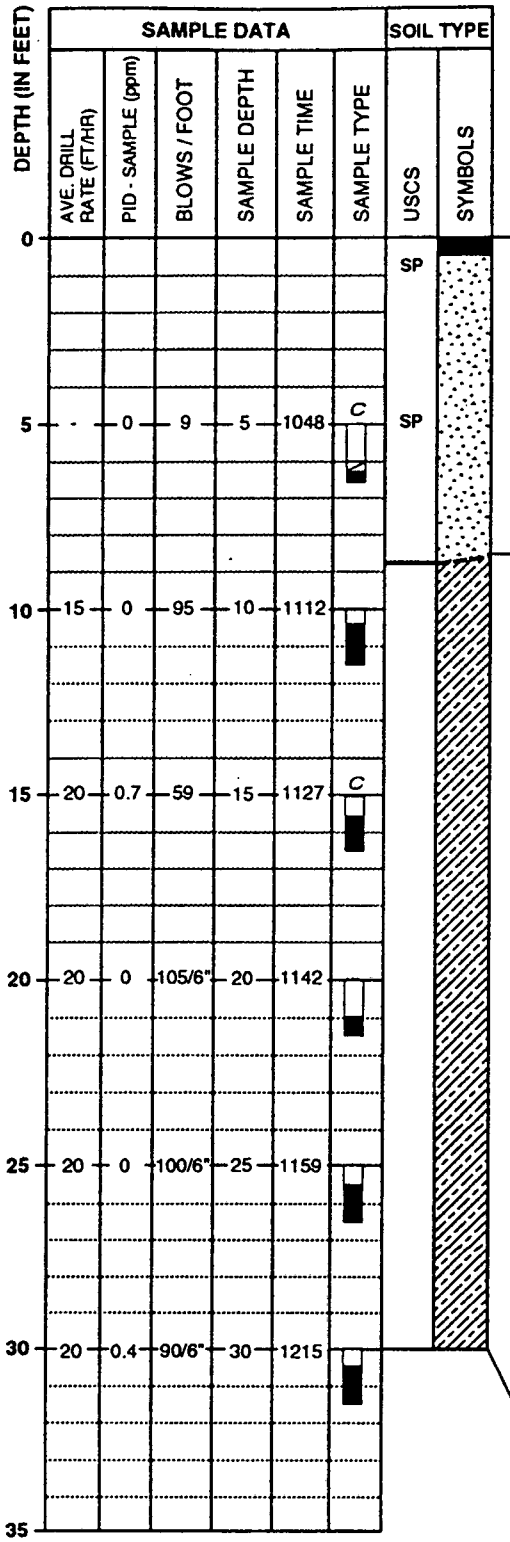
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

BORING AB-5

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 8" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
SURFACE ELEVATION: 298.23' MSL

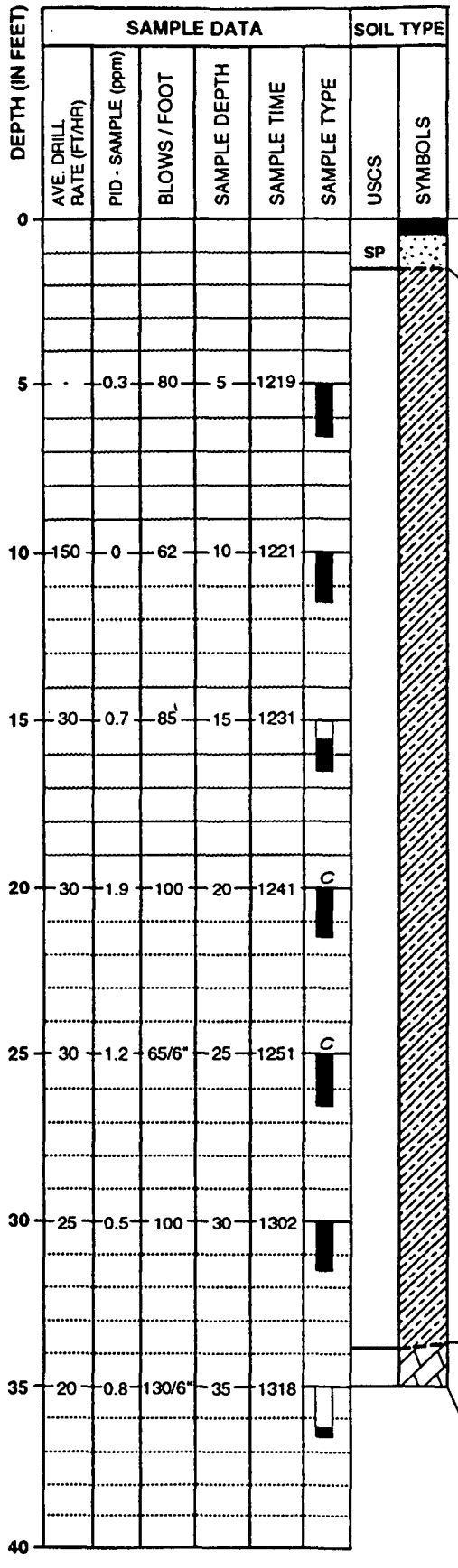


DESCRIPTION
4" Asphalt. Light olive brown (2.5Y 5/4) fine to medium SAND, trace silt, moist, loose, no odor, trace shell fragments and mica. [Fill]
Moist to slightly wet at 3 1/2". Moist at 4".
MALAGA MUDSTONE MEMBER, MONTEREY FM: Black (5Y 2.5/2) MUDSTONE, trace microfossils, trace mica, massive (no fractures observed), damp, very dense, slight hydrocarbon odor, fresh (unweathered).
Black (5Y 2.5/2) clayey SILTSTONE, trace microfossils, massive, damp, very dense, slight hydrocarbon odor, fresh (unweathered).
Olive gray (5Y 5/2) MUDSTONE, damp, very dense, slight hydrocarbon odor, massive, fresh (unweathered).
Black (5Y 2.5/2) CLAYSTONE, moist, very dense, slight oily odor, massive, trace small shells, fresh (unweathered).
Black (5Y 2.5/2) CLAYSTONE with trace diatomite, bedding dips ~20°, moist, massive, fresh (unweathered).
Boring completed to a depth of 30 feet bgs on 12/9/93. No ground water encountered during drilling or in open borehole after several hours. Boring backfilled with bentonite grout.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



BORING AB-5A

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 8" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
SURFACE ELEVATION: 295.45' MSL

DESCRIPTION

4" Asphalt
Light yellowish brown (2.5Y 6/4) fine to medium SAND with trace coarse sand, damp, loose, no odor [Fill].

MALAGA MUDSTONE MEMBER, MONTEREY FM:

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, trace microfossils, massive, damp, dense, slight hydrocarbon odor, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, trace microfossils, massive, damp, dense, slight hydrocarbon odor, highly fractured (blocky), fractures closed, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, highly fractured (blocky), fractures dip 20°, strong hydrocarbon odor, trace microfossils, damp, dense, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, highly fractured, fractures narrow and dip 20-50°, little microfossils, damp, dense, strong hydrocarbon odor, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, highly fractured, fractures at random orientation and closed, fresh (unweathered).

Black (5Y 2.5/2) clayey SILTSTONE, micaceous, trace microfossils, highly fractured, smooth fracture surfaces, fractures closed and dip horizontal, damp , dense, trace microfossils, strong hydrocarbon odor, trace bedding dips 60°, fresh (unweathered).

VALMONTE DIATOMITE MEMBER, MONTEREY FM:

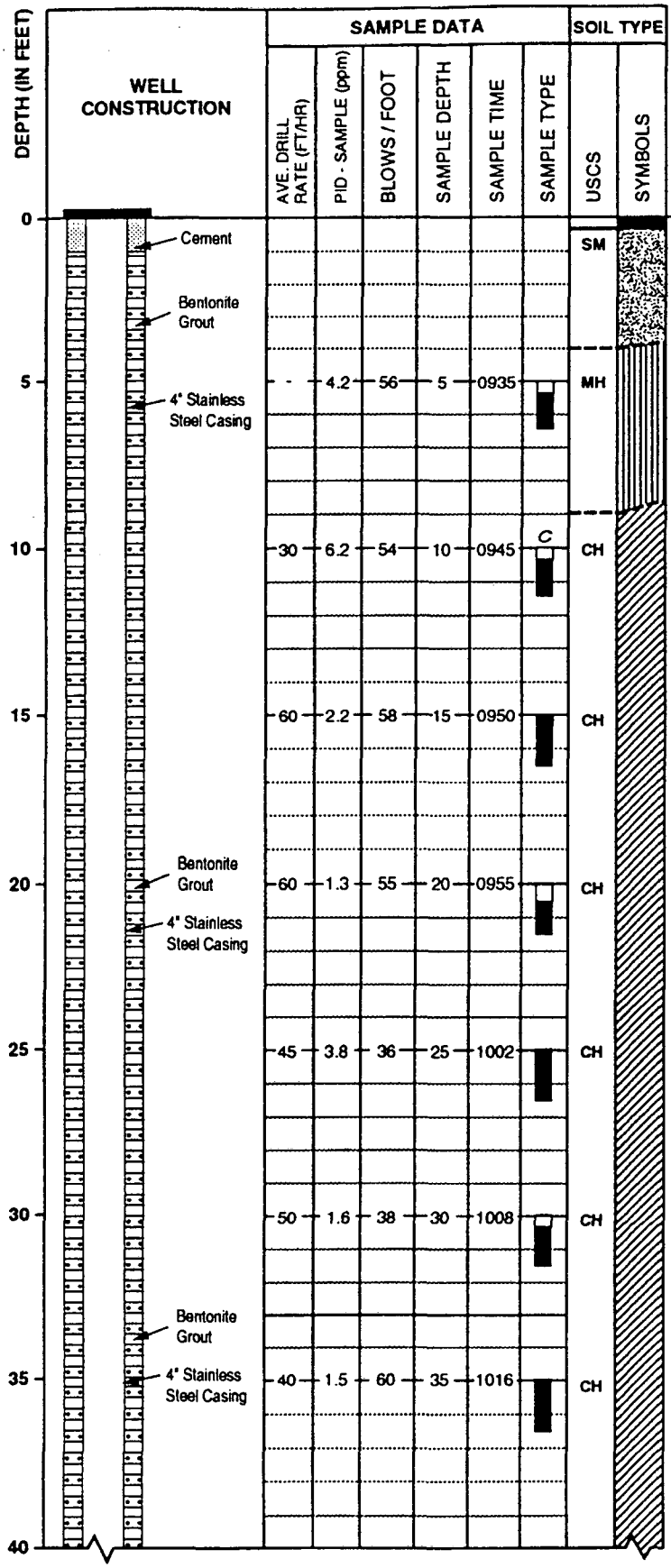
Gray (5Y 6/1) DOLOMITE with large pebble inclusions, damp, dense, slight hydrocarbon odor, fresh (unweathered).

Boring completed to a depth of 35 feet bgs on 12/13/93.
No ground water encountered.
Boring backfilled with bentonite grout.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M69B (Formerly Boring AB-6)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: T.A. Johnson & N.J. Dargo, R.G.#4402
TOP CASING ELEVATION: 329.66' MSL

DESCRIPTION

2" Asphalt
Light olive brown (2.5Y 5/3) silty fine to medium SAND, trace diatoms, damp, loose, no odor. [Fill]

Olive brown (2.5Y 4/4) clayey SILT with trace fine sand, abundant diatoms and rootlets, damp, stiff, no odor. [Fill]

Olive Brown (2.5Y 4/3) silty CLAY with abundant diatoms, moist, very stiff. [Fill]

Olive brown (2.5Y 4/3) diatomaceous silty CLAY with trace coarse sand, diatoms are slightly weathered, moist, stiff, no odor [Fill].

Grayish brown (2.5Y 5/2) diatomaceous silty CLAY with trace siltstone fragments and coarse sand, moist, medium stiff, no odor. [Fill]

Light brownish gray (2.5Y 6/2) silty CLAY with trace coarse sand, abundant diatoms, trace diatomaceous siltstone and slightly weathered feldspar fragments, moist, stiff, no odor. [Fill]

Light olive brown (2.5Y 5/4) silty CLAY with trace fine to coarse sand (sand is slightly weathered, subrounded to subangular), trace gravel-sized diatomite concretions and asphalt fragments (to 3/8"), moist, medium stiff. [Fill]

Light olive brown (2.5Y 5/4) silty CLAY with some fine to medium sand and diatomite, trace siltstone fragments, one 2-1/2" diameter siltstone pebble, trace asphalt fragments, moist, medium stiff. [Fill]

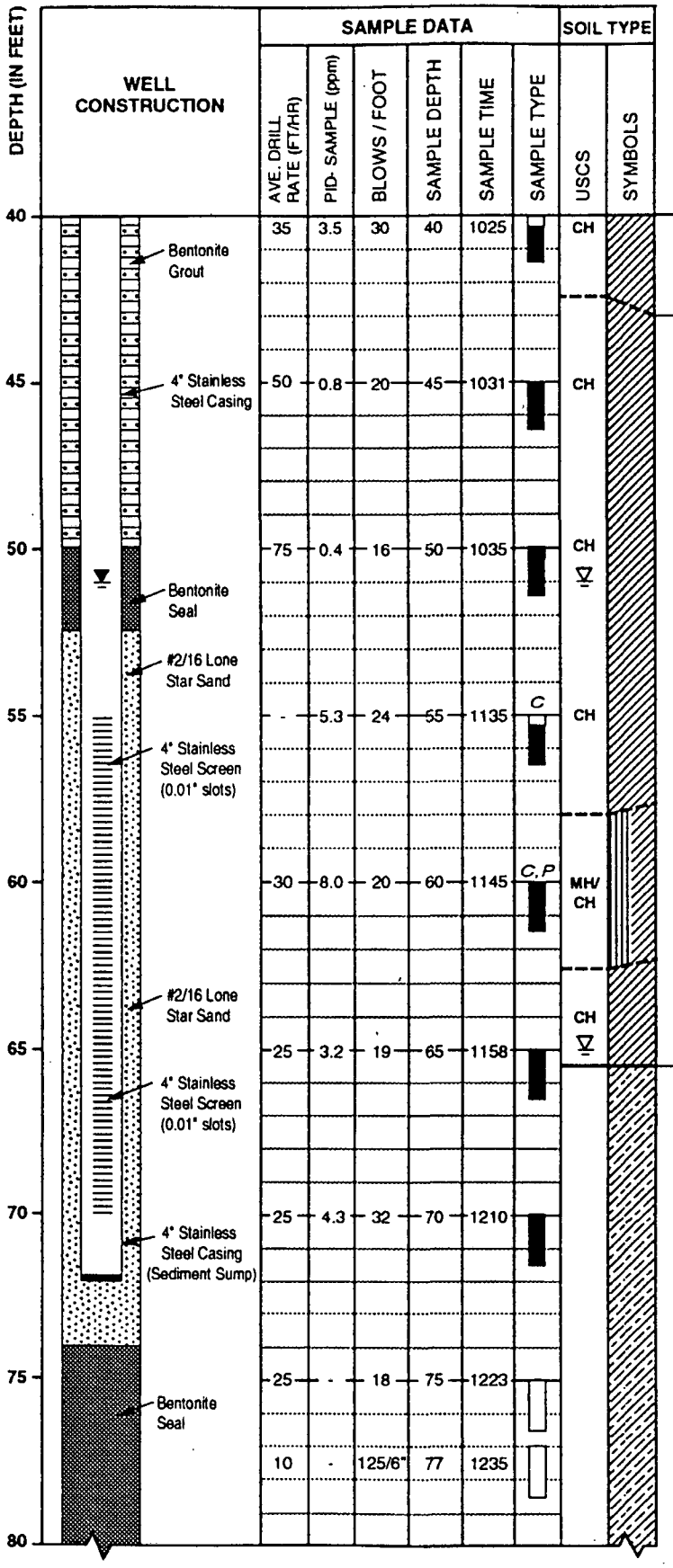
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M69B (Formerly Boring AB-6) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: T.A. Johnson & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 329.66' MSL



DESCRIPTION

Grayish brown (2.5Y 5/3) silty CLAY with trace sand, trace siltstone and rounded chert fragments, trace diatoms, moist, medium stiff. [Fill]

[Base of Fill?]

COLLUVIUM (?):

Dark grayish brown (2.5Y 4/2) silty CLAY with trace fine sand, abundant diatoms, moist, soft to medium stiff.

Gray (5Y 6/1) and grayish brown (2.5Y 5/2) silty CLAY, very thinly bedded to laminated, moist, medium stiff, no odor, slightly fractured; fracture narrow, filled, and iron oxide-stained.
Wet at 51 feet.

Dark gray (5Y 4/1) CLAY with some silt and trace sand, wet to saturated, trace siltstone fragments (subrounded, 1/4" diameter), very soft.
Sandier and saturated at 56 feet.

Yellowish brown (10YR 5/4) clayey SILT, massive, moist, medium sti
Grades to silty CLAY with alternating 1/4" bands of greenish gra (5G 6/1) and yellowish brown (10YR 5/8) silty clay at 61'.

Light olive brown (2.5Y 5/4) silty CLAY, saturated at 65 feet.

MALAGA MUDSTONE MEMBER, MONTEREY FM(?):
Light olive brown (2.5Y 5/4) silty CLAY, and SILTSTONE and very dark gray (2.5Y 3/1) MUDSTONE rock fragments (2-3" diameter), moist to wet, stiff, highly fractured, fractures are narrow and have iron oxide stained clay filler; siltstone is very thinly bedded, no odor, stiff, highly weathered.

Light olive brown (2.5Y 5/6) silty CLAY and CLAYSTONE, massive (no fractures observed), occasional 1/8"-wide laminae, moist, stiff, no odors, some iron oxide staining, highly to moderately weathered.

No recovery - saturated (?)

No recovery - 2-1/2" diameter rock stuck in sampler shoe: very thinly bedded SILTSTONE, completely lithified, extremely hard, fresh to slightly weathered, some $CaCO_3$ cementation, weak HCl reaction.
Out of rock zone at approximately 79 feet.

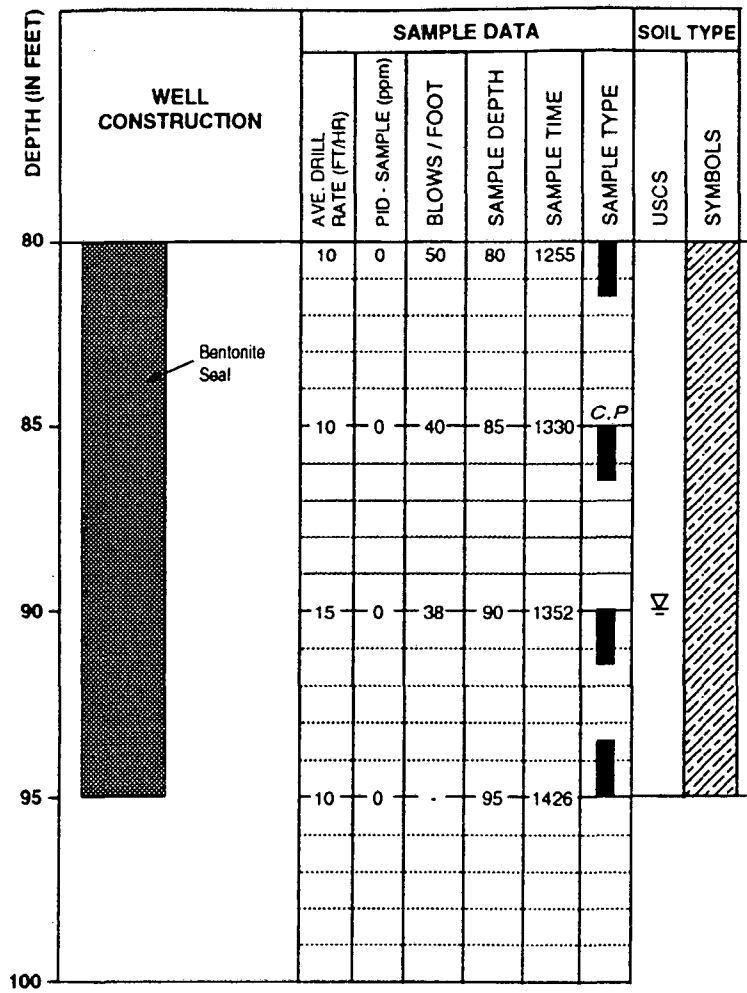
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M69B (Formerly Boring AB-6) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: T.A. Johnson & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 329.66' MSL



DESCRIPTION

Dark grayish brown (10YR 4/2) silty CLAY with trace dark gray mudstone rock fragments and microfossils, moist, medium stiff, slightly to moderately weathered, highly to intensely fractured; narrow to wide, clay-filled fractures, iron oxide-stained, fractures near vertical, fractures do not appear wet.

Dark grayish brown (10YR 4/2) silty CLAYSTONE, moist, medium stiff, slightly to moderately weathered, intensely fractured; fractures narrow to wide, clay-filled and iron oxide-stained, fracture surfaces appear slickensided.

Dark grayish brown (10YR 4/2) silty CLAYSTONE, moist to wet, medium stiff highly fractured, fractures narrow, filled, iron oxide-stained, no odor, highly weathered.

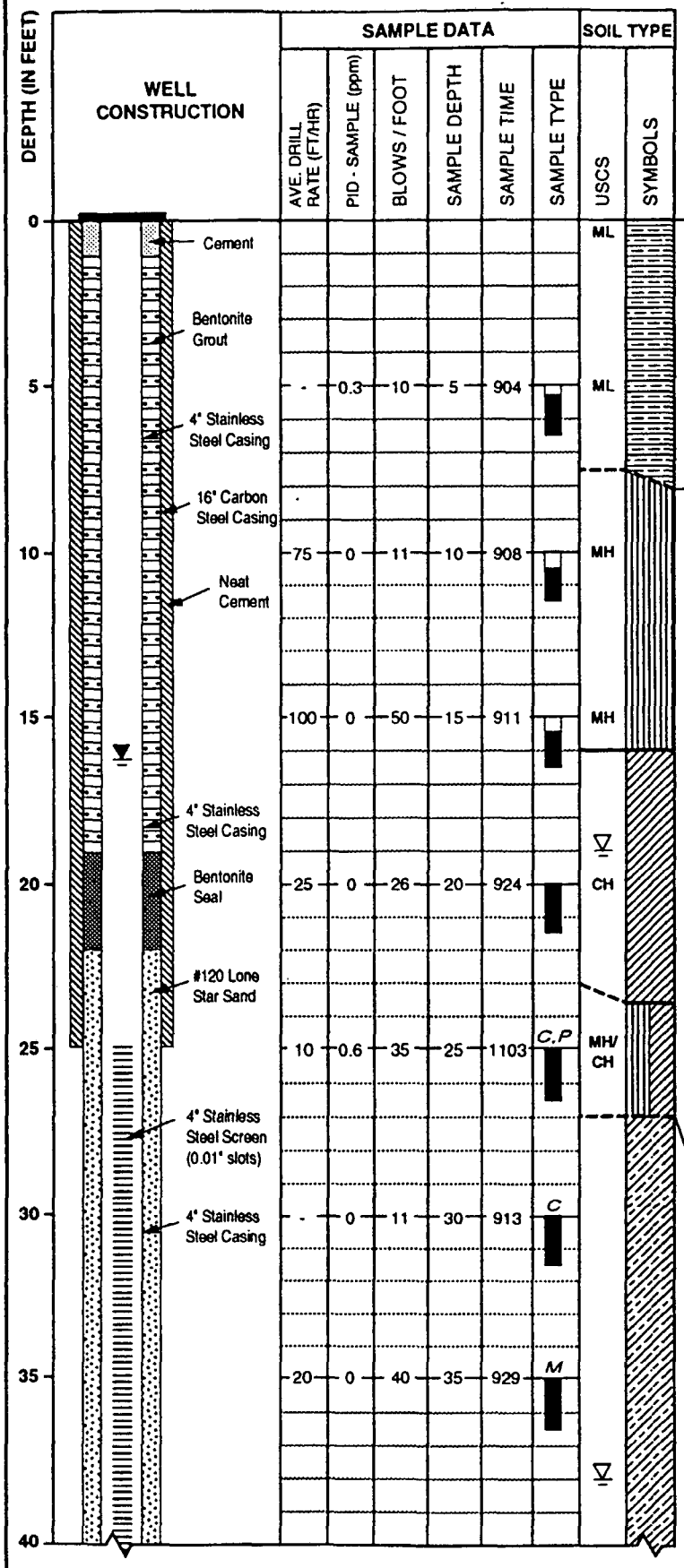
Dark grayish brown (10YR 4/2) silty CLAYSTONE, moist to wet, medium stiff, highly fractured; fractures narrow, clay-filled, iron oxide-stained, no odor, highly weathered.

Boring completed to a depth of 95 feet bgs on 12/30/93.
Ground water encountered in approximately the following intervals during drilling: 51-58 feet, 65-69 feet and 90-95 feet bgs.
Well installed on 12/30/93.
Ground water measured at 50.95 feet bgs on 1/12/94.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M70B (Formerly Boring AB-7)

SAMPLING METHOD: California Modified Split Spoon

DRILLING METHOD: 8" Hollow Stem Auger, (Failing F-10 Rig), to 25' bgs; Bucket Auger Rig 0'-25' to set conductor casing; 10" Hollow Stem Auger 25' - TD

LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402

TOP CASING ELEVATION: 302.03' MSL

DESCRIPTION

Pale brown (10YR 6/3) SILT with some fine sand, trace calcareous blebs and siltstone rock fragments, damp, soft, no odor. [Fill]

Light yellowish brown (10YR 6/4) SILT with trace fine sand, little angular siltstone rock fragments, damp, soft, no odor. [Fill]

[Base of Fill?]

COLLUVIUM / LANDSLIDE MATERIAL:

Yellowish brown (10YR 5/4) SILT with some angular siltstone rock fragments, damp, soft.

Sharp contact at 16'

Very dark gray (5Y 3/1) CLAY with trace silt, damp, dense, trace hydrocarbon odor.

Olive gray (5Y 5/2) CLAY with trace silt, trace organic matter; mixed with olive (5Y 5/4) silty CLAYSTONE, moist to wet, soft, medium plasticity, no odor.

Light olive brown (2.5Y 5/4) silty CLAY to clayey SILT with little sand, trace reddish brown (5YR 4/4) iron staining, moderately to highly weathered, moist, soft, medium plasticity, no odor, massive.

[Boring AB07 stopped at a depth of 25' bgs on 12/14/93. Groundwater encountered between approximately 19' and 21' bgs on 12/14/93. Conductor casing set to 25' bgs on 12/17/93. Boring restarted on 12/29/93 with 10" hollow stem augers.]

MALAGA MUDSTONE MEMBER, MONTEREY FM:
Dark olive brown (2.5Y 2/5) CLAYSTONE, moist, soft, medium plasticity, no odor, massive, moderately to highly weathered.

Dark olive brown (2.5Y 2/3) silty CLAYSTONE, moist, stiff, medium plasticity, highly fractured, fractures narrow and stained yellowish and reddish brown trace gypsum deposits on fractured surfaces, slightly to moderately weathered, no odor.

Wet at 38' bgs.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California

For County Sanitation Districts of Los Angeles County

DAMES & MOORE

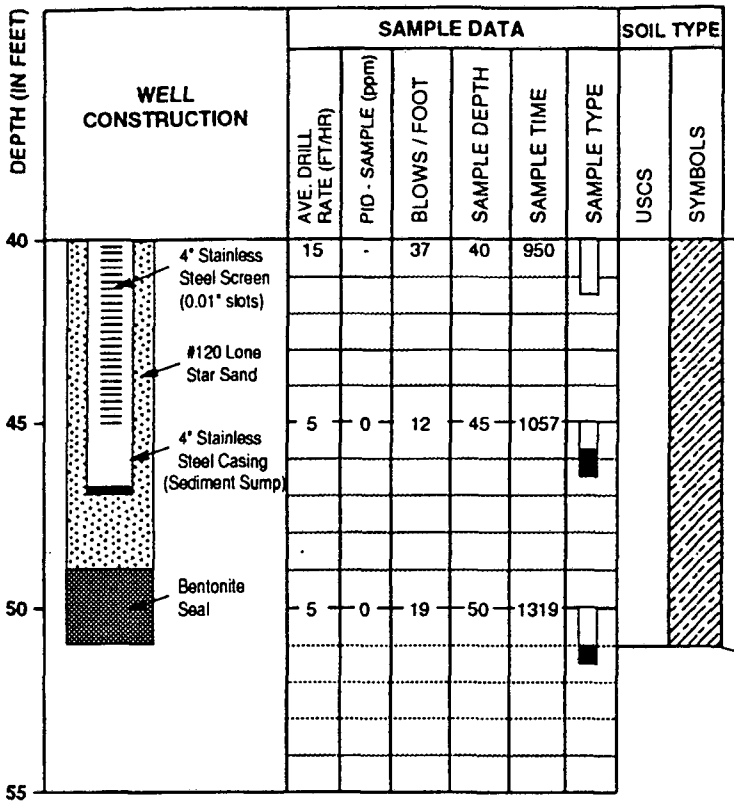
M70B (Formerly Boring AB-7) (continued)

SAMPLING METHOD: California Modified Split Spoon

DRILLING METHOD: 8" Hollow Stem Auger, (Failing F-10 Rig), to 25' bgs; Bucket Auger Rig 0'-25' to set conductor casing; 10" Hollow Stem Auger 25' - TD

LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402

TOP CASING ELEVATION: 302.03' MSL



DESCRIPTION

No recovery.

Olive brown (2.5Y 4/3) CLAYSTONE, trace silt, highly fractured, fractures narrow to closed, stained to filled with gypsum or hematite (?), staining along fractures is yellowish, fractures are near vertical, moderately weathered, moist, stiff, no odor.

Very dark gray (5Y 3/1) CLAYSTONE, trace silt, massive, damp, very stiff, slight hydrocarbon odor, fresh (unweathered).

Boring completed to a depth of 51 feet bgs on 12/29/93.
Ground water encountered in approximately the following intervals during drilling: 19-21' and 38-42' (?) bgs.
Well installed on 12/29/93.
Ground water measured at 16.26 feet bgs in well on 1/7/94.

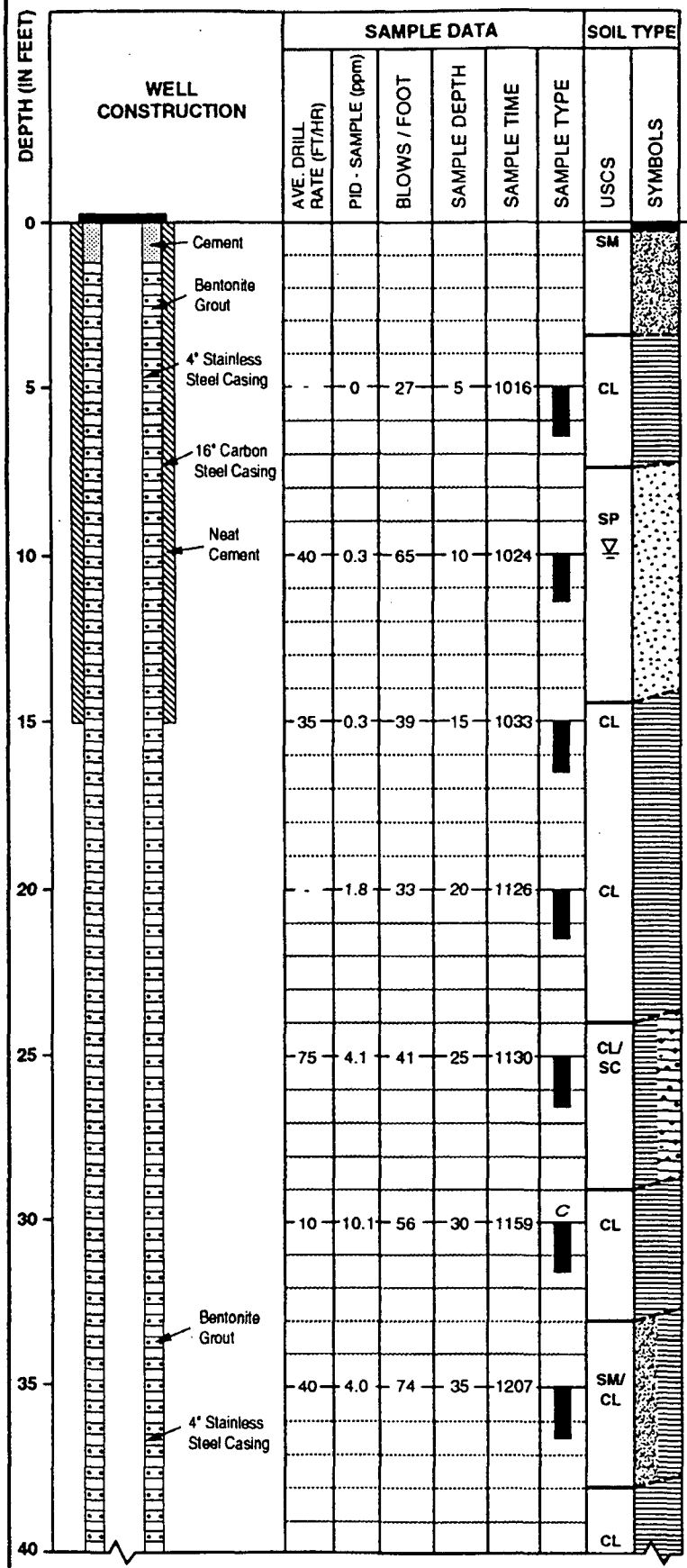
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M67B (formerly AB-8)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 8" Hollow Stem Auger (Failing F-10 Rig) to 15' bgs; Bucket Auger Rig 0-15' to set conductor casing; 10" Hollow Stem Auger 15'-TD
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 203.45' MSL



DESCRIPTION

4" Asphalt and 2" gravel road base.
Olive brown (2.5Y 5/4) silty fine to medium SAND with trace coarse sand, gravel, and clay; trace chert pebbles, damp, loose, no odor. [Fill]

More clay and less gravel at 3'.

Olive (5Y 5/3) sandy CLAY, trace chert fragments, damp to moist, soft. [Fill]

Olive gray (5Y 4/2) fine to medium SAND with little silt and trace coarse sand, gravel, and clay; moist to wet, dense, no odor. [Fill]

Gravelly layer encountered at 14 feet.

Black (5Y 2.5/2) silty CLAY with little medium to fine sand and trace gravel, damp, dense, slight hydrocarbon odor. [Fill].

[Boring stopped at 15 feet on 12/16/93. Groundwater encountered between approximately 10 and 14 feet during drilling on 12/16/93. Conductor casing set to 15 feet bgs on 12/17/93. Boring restarted on 12/20/93 with 10" hollow stem augers.]

Olive gray (5Y 5/2) CLAY with trace silt, trace medium sand (in 1" thick lenses), moist, stiff, plastic, no odor. [Fill]

Black (5Y 2.5/1) silty clayey SAND with trace gravel and medium sand, damp, dense, strong hydrocarbon odor; mixed with olive gray (5 Y 5/2) sandy CLAY with trace silt, damp, plastic, stiff, no odor. [Fill with Malaga Mudstone fragments]

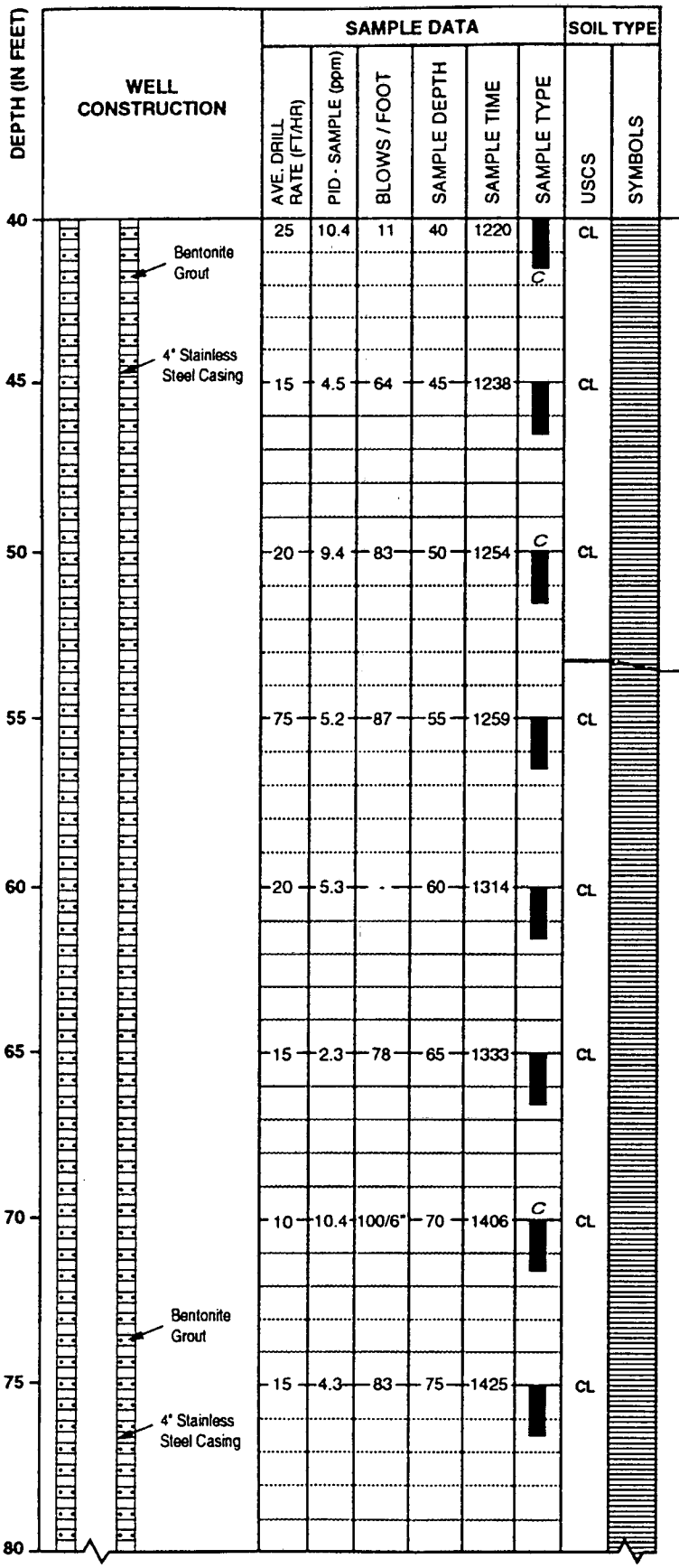
Dark gray (5Y 5/4) silty sandy CLAY with trace gravel, damp, stiff, solvent-like(?) odor, micaceous. [Fill]

Olive (5Y 5/4) silty fine to coarse SAND mixed with olive gray sandy clay, trace rock fragments, damp, dense, no odor. [Fill]

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M67B (formerly AB-8) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler

DRILLING METHOD: 8" Hollow Stem Auger (Failing F-10 Rig) to 15' bgs; Bucket Auger Rig 0-15' to set conductor casing; 10" Hollow Stem Auger 15'-TD

LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402

TOP CASING ELEVATION: 203.45' MSL

DESCRIPTION

Black (5Y 2.5/1) silty CLAY with trace medium sand, damp, stiff, strong oily odor. [Fill]

Black (5Y 2.5/2) CLAY with some silt and medium sand, little white (5 Y 8/1) rock fragments, damp, very stiff, slight hydrocarbon odor. [Fill]

Very dark gray (5Y 3/1) CLAY with trace medium sand and silt, damp, stiff, slight hydrocarbon odor. [Fill?]

[Base of Fill?]

COLLUVIUM (?):

Black (5Y 2.5/2) sandy CLAY (sand is medium to coarse) mixed with greenish gray (56 Y 6/1) medium SAND, damp, stiff, dense, no odor.

Black (5Y 2.5/2) silty CLAY with trace greenish gray medium sandy clay layers, horizontal bedding, trace rock fragments, damp, stiff, no odor.

Olive (5Y 5/4) to black (5Y 2.5/2) silty CLAY with trace medium sand and gravel and thin (<1") lenses of greenish gray coarse sand, horizontal bedding, damp, stiff, no odor, trace rock fragments.

Black (5Y 2.5/2) silty, sandy CLAY (sand is medium to coarse-grained), trace gravel, damp, very stiff, hydrocarbon odor, horizontal bedding.

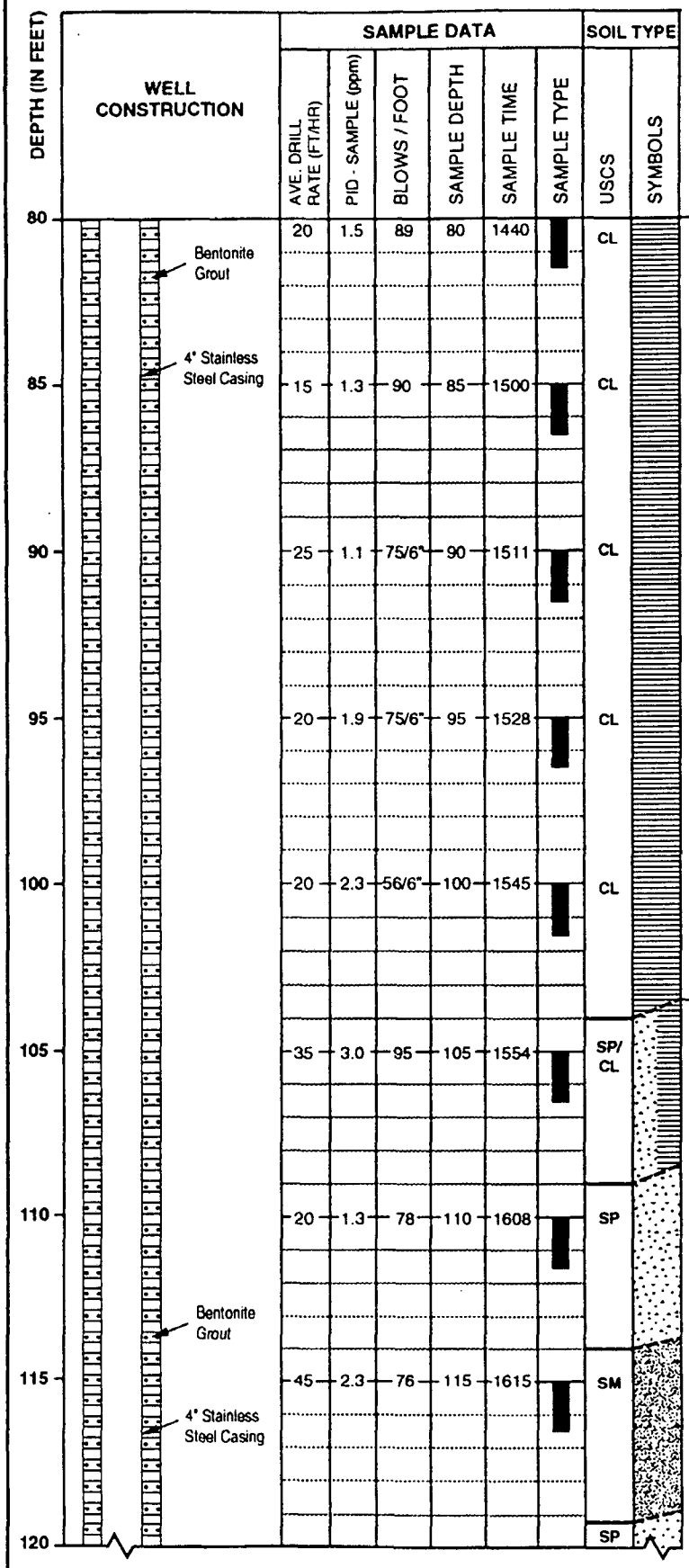
Black (5Y 2.5/1) silty CLAY with trace medium sand and rock fragments, damp, stiff, horizontal bedding, hydrocarbon odor, gray siltstone fragments incorporated into and flattened along bedding planes.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California

For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M67B (formerly AB-8) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler

DRILLING METHOD: 8" Hollow Stem Auger (Failing F-10 Rig) to 15' bgs; Bucket Auger Rig 0-15' to set conductor casing; 10" Hollow Stem Auger 15'-TD

LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402

TOP CASING ELEVATION: 203.45' MSL

DESCRIPTION

Black (5Y 2.5/1) silty CLAY with trace gray siltstone fragments and medium sand, damp, stiff, slightly fractured; fracture closed, dipping 20°, and smooth.

Black (5Y 2.5/1) silty CLAY with trace medium to coarse sand, trace microfossils; with greenish gray (5GY 5/1) layer composed of siltstone fragments with trace well preserved root fragments (grass?), damp, stiff, no odor.

Black (5Y 2.5/1) silty CLAY mixed with greenish gray (5GY 5/1) SILTSTONE fragments, angular, damp, stiff, no odor.

Black (5Y 2.5/1) silty CLAY, damp, slight hydrocarbon odor, stiff; mixed with lenses of light olive gray (5Y 6/2) medium SAND with trace coarse sand, sub-angular grains, quartz-rich; damp, stiff, dense, no odor.

Black (5Y 2.5/2) silty sandy CLAY with some coarse sand and rock fragments and thin lenses of greenish grey medium sand, sand is quartz and sub-rounded to rounded, damp, stiff, slight hydrocarbon odor, dense.

SAN PEDRO SAND MEMBER, SAN PEDRO FM:

Light gray (5Y 7/2) medium quartz SAND mixed with olive (5Y 4/4) silty CLAY, trace wood fragments and red staining from wood, damp, dense, no odor.

Olive (5Y 5/4) to light gray (5Y 7/2) medium SAND, damp, dense, no odor.

Pale yellow (2.5Y 7/4) silty fine SAND, trace sand- to gravel-sized shell fragments, trace coarse sand, moist, dense, no odor.

LOG OF BORING

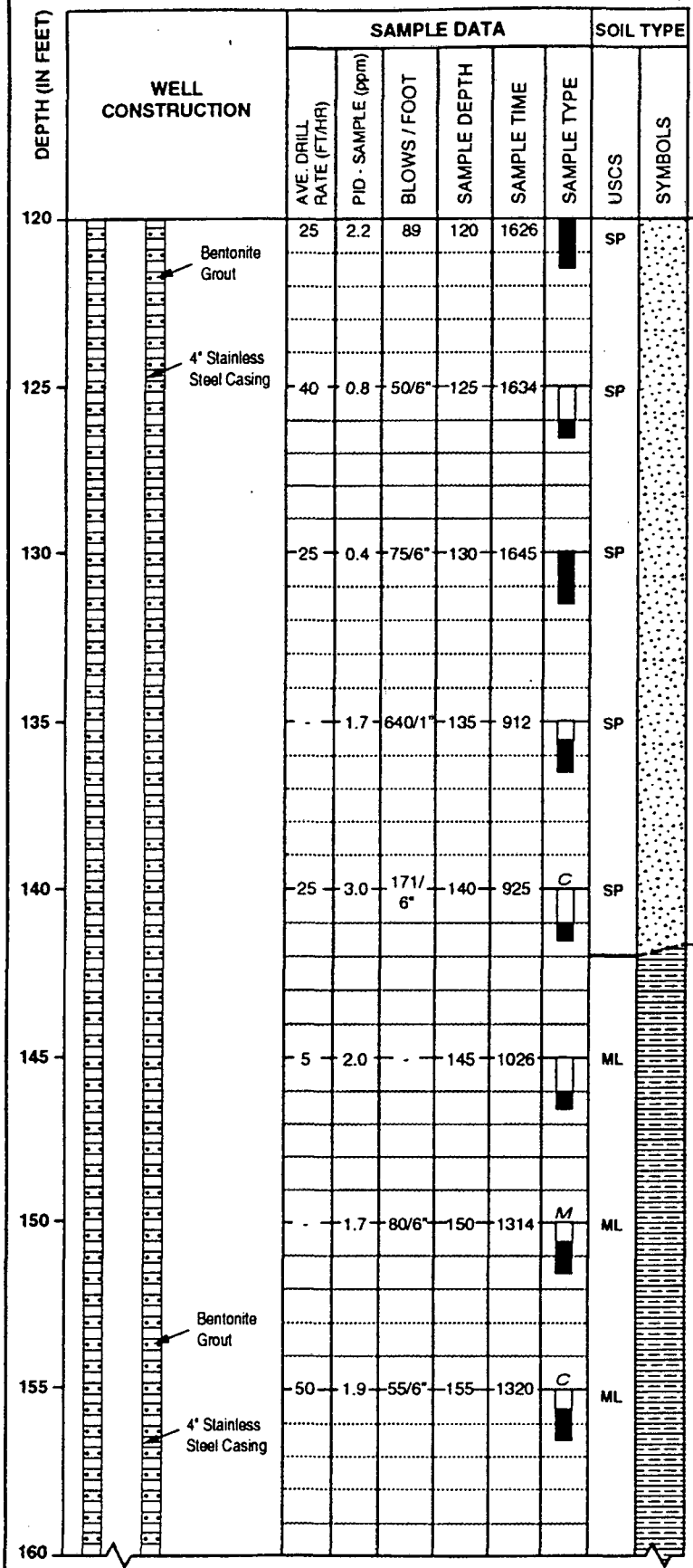
Palos Verdes Landfill — Rolling Hills Estates, California

For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M67B (formerly AB-8) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 8" Hollow Stem Auger (Failing F-10 Rig) to 15' bgs; Bucket Auger Rig 0-15' to set conductor casing; 10" Hollow Stem Auger 15'-TD
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
SURFACE ELEVATION: 203.45' MSL



DESCRIPTION

Olive yellow (2.5Y 6/6) fine to medium SAND, damp, dense, no odor.

Pale olive (5Y 6/4) medium SAND with trace silt, damp, very dense, no odor.

Light yellowish brown (2.5Y 6/4) medium SAND with trace coarse sand, damp, very dense, no odor.

[Drilling stopped 12/20/93 at 130 feet bgs. Drilling restarted 12/21/93.]

Pale yellow (5Y 7/4) medium SAND, mostly quartz (90%), damp, very dense, no odor.

Olive (5Y 5/6) medium to coarse SAND, 90% quartz, damp, very dense, no odor.

PICO FM./UPPER MEMBER FERNANDO FM:

Dark greenish gray (5GY 4/1) SILT, dry to damp, very dense, no odor, micaceous.
[Hammer broke]

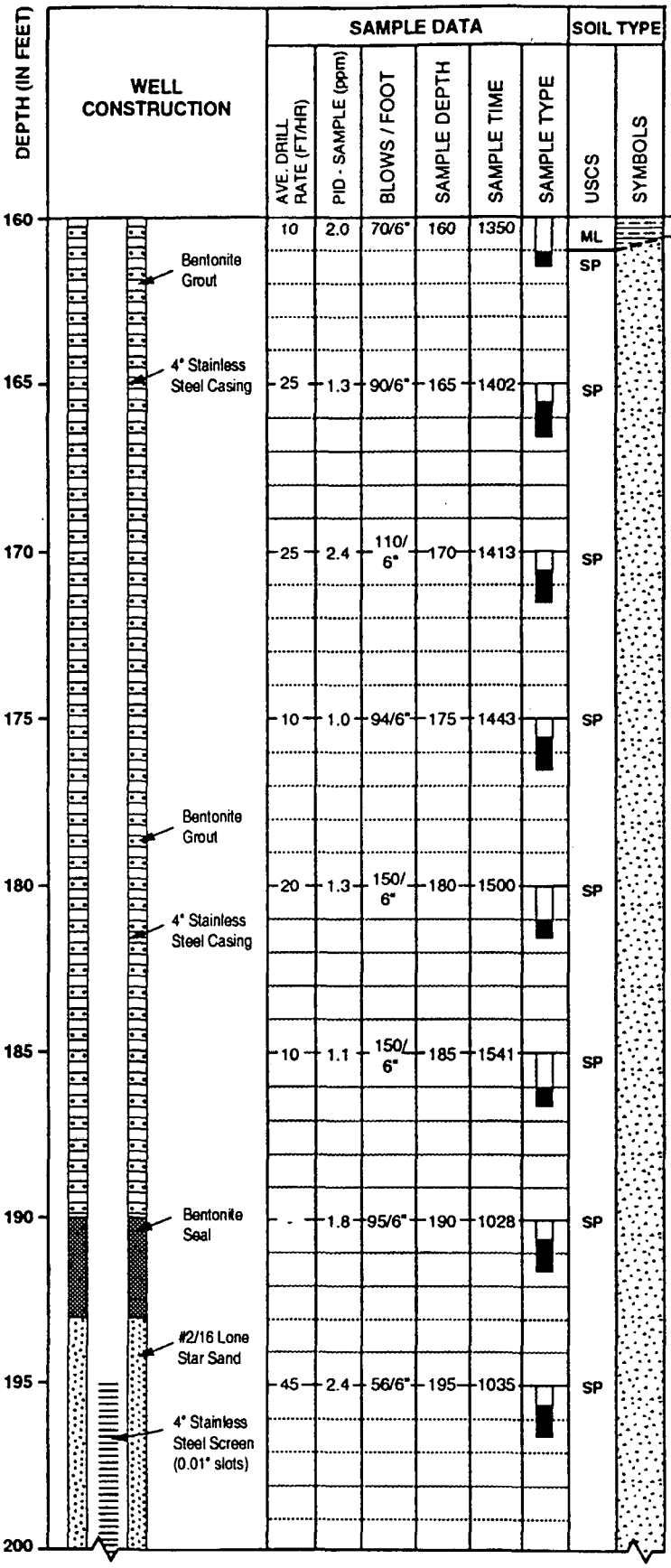
Dark greenish gray (5GY 4/1) SILT, with trace clay and pebbles, damp, very dense, no odor, micaceous.

Dark greenish gray (5GY 4/1) SILT damp, very dense, no odor.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M67B (formerly AB-8) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 8" Hollow Stem Auger (Failing F-10 Rig) to 15' bgs; Bucket Auger Rig 0-15' to set conductor casing; 10" Hollow Stem Auger 15'-TD
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
SURFACE ELEVATION: 203.45' MSL

DESCRIPTION

Dark greenish gray (5GY 4/1) SILT, damp, very dense, no odor.

SAN PEDRO SAND MEMBER, SAN PEDRO FM:
Pale olive (5Y 6/4) medium SAND, damp, very dense, no odor.

Light yellowish brown (2.5Y 6/4) medium SAND with trace coarse sand and mica, damp, very dense, no odor.

Pale olive (5Y 6/4) medium to coarse SAND with trace fine sand, damp, very dense, no odor.

Pale olive (5Y 6/4) medium to coarse SAND, damp, very dense, no odor.

Pale olive (5Y 6/4) medium SAND with little coarse sand, damp, very dense, no odor.

Pale olive (5Y 6/4) fine to coarse SAND, trace rock fragments (siltstone), damp, very dense, no odor.
[Drilling stopped 12/21/93 at 185 feet. Drilling restarted on 12/22/93].

Pale olive (5Y 6/4) fine to medium SAND, damp, very dense, no odor.

Pale olive (5Y 6/4) medium SAND, sub-rounded, 90% quartz, damp, dense, no odor.

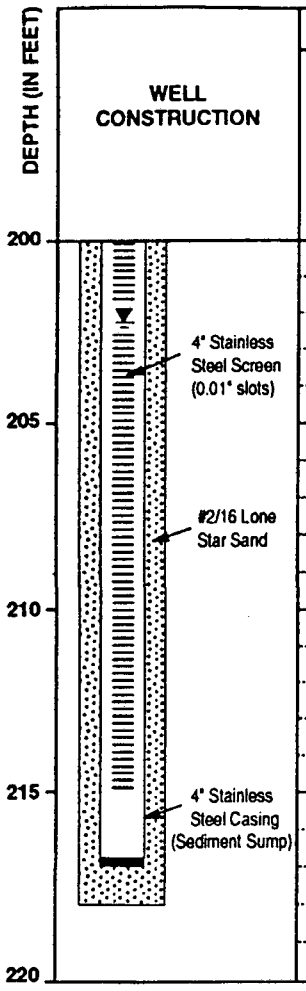
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M67B (formerly AB-8) (continued)

SAMPLING METHOD: California Modified Split Spoon Sampler
DRILLING METHOD: 8" Hollow Stem Auger (Failing F-10 Rig) to 15' bgs; Bucket Auger Rig 0-15' to set conductor casing; 10" Hollow Stem Auger 15'-TD
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
SURFACE ELEVATION: 203.45' MSL



SAMPLE DATA						SOIL TYPE		DESCRIPTION
AVE. DRILL RATE (FT/HR)	PID - SAMPLE (ppm)	BLOWS / FOOT	SAMPLE DEPTH	SAMPLE TIME	SAMPLE TYPE	USCS	SYMBOLS	
45	3.3	106/6"	200	1042		SP		Pale olive (5Y 6/4) medium SAND, moist, very dense, no odor. Wet at 201 feet.
20	3.3	66/6"	205	1158	P	SP		Olive (5Y 4/3) medium SAND with trace coarse sand and silt, wet, dense, no odor.
						SP		Olive (5Y 4/3) medium SAND, wet, dense, no odor.

Boring completed to a depth of 218 feet bgs on 12/22/93.
Ground water encountered in approximately the following intervals during drilling: 10-14 feet and 201-218 feet bgs.
Well installed on 12/22/93.
Ground water measured at 202.36 feet bgs in well on 1/13/94.

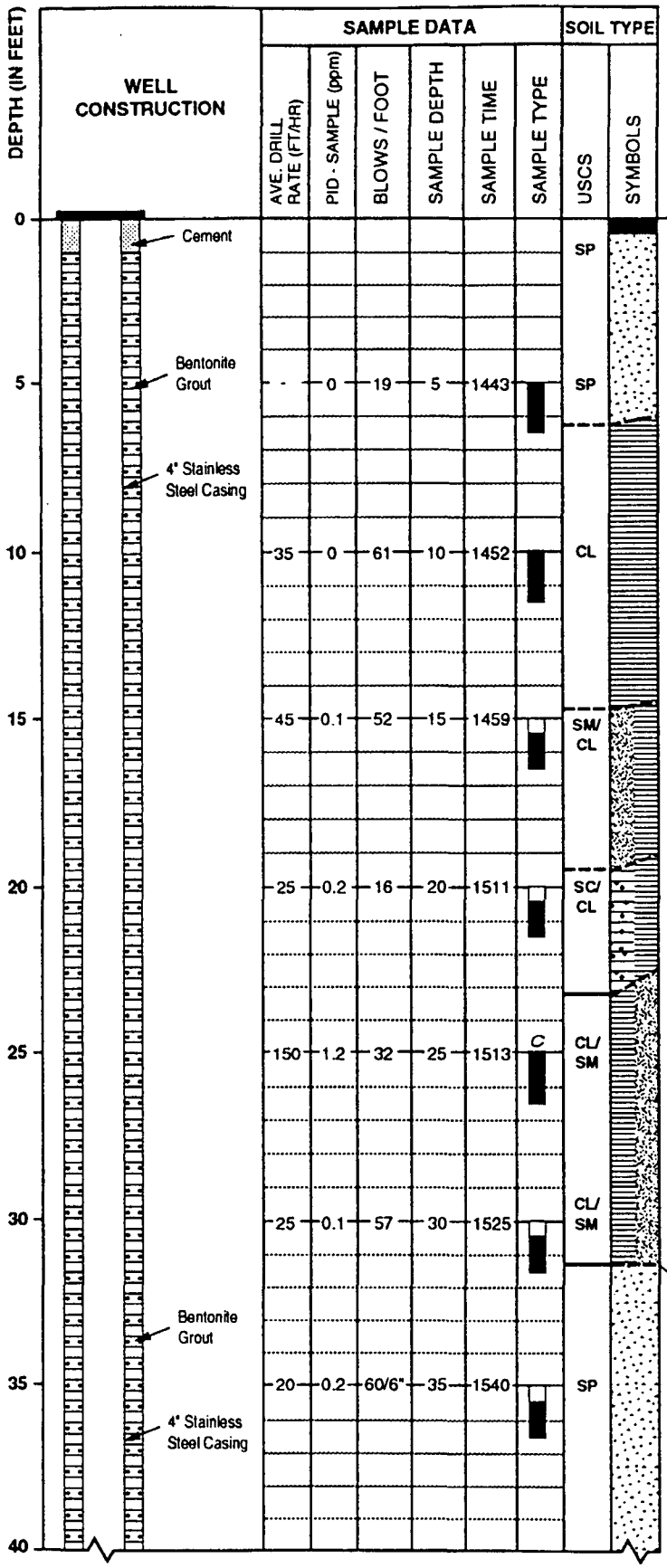
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M68B (formerly AB-9)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 179.70' MSL



DESCRIPTION

4" Asphalt
Light yellowish brown (10YR 6/4) medium SAND with trace fine to coarse sand, little rounded chert pebbles and angular rock fragments, trace brick fragments (?), damp, dense, no odor. [Fill]

Olive brown (2.5Y 4/3) fine SAND with trace mica, silt, and medium to coarse sand; mixed with black (5Y 2.5/2) micaceous silty CLAY (Malaga Mudstone fragments), moist, stiff, slight hydrocarbon odor. [Fill]

Black (5Y 2.5/1) silty CLAY (mudstone fragments) with trace mica, moist, stiff, slight hydrocarbon odor. [Fill]

Gravelly lense at 13' bgs.

Gravelly lense at 14' bgs.

Olive brown (2.5Y 4/4) silty fine SAND; mixed with silty CLAY with trace fine to medium sand; moist, stiff, dense, no odor, medium plasticity [Fill].

Bluish gray (5B 5/1) clayey coarse SAND, to olive brown (2.5Y 4/4) silty CLAY moist, loose/soft, no odor. [Fill]

Olive gray (5Y 4/2) CLAY with some silt and medium sand, plastic, moist, very stiff, slight hydrocarbon odor; interbedded with dark gray silty medium SAND with trace clay, moist, no odor. [Fill?]

MIXED olive (5Y 4/3) and black (5Y 2.5/1) silty medium SAND and silty CLAY, trace wood fragments, trace gravel, moist, dense/stiff, no odor. [Fill]

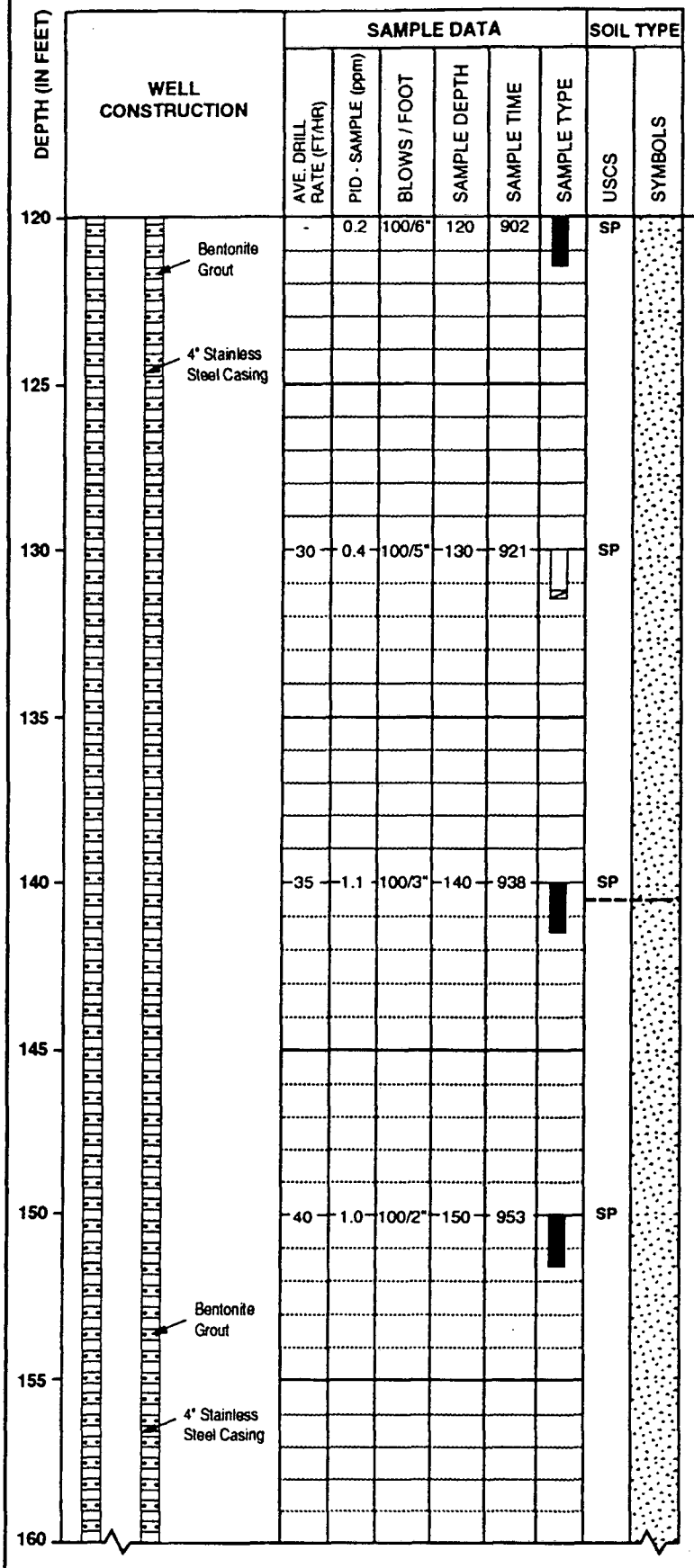
SAN PEDRO SAND MEMBER, SAN PEDRO FM:
Light yellowish brown medium SAND with trace fine sand, moist, stiff, no odor.

Pale yellow (2.5 Y 7/3) micaceous medium SAND, moist, dense, no odor, no bedding.
[Boring stopped on 12/14/93. Restarted on 12/16/93. No water accumulated in boring between 12/14/93 and 12/16/93.]

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M68B (formerly AB-9) (continued)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 179.70' MSL

DESCRIPTION

Pale olive (5Y 6/4) coarse SAND with trace medium sand, very dense, damp, no odor.

Pale olive (5Y 6/4) medium to coarse SAND (rounded quartz grains), damp, very dense, no odor.

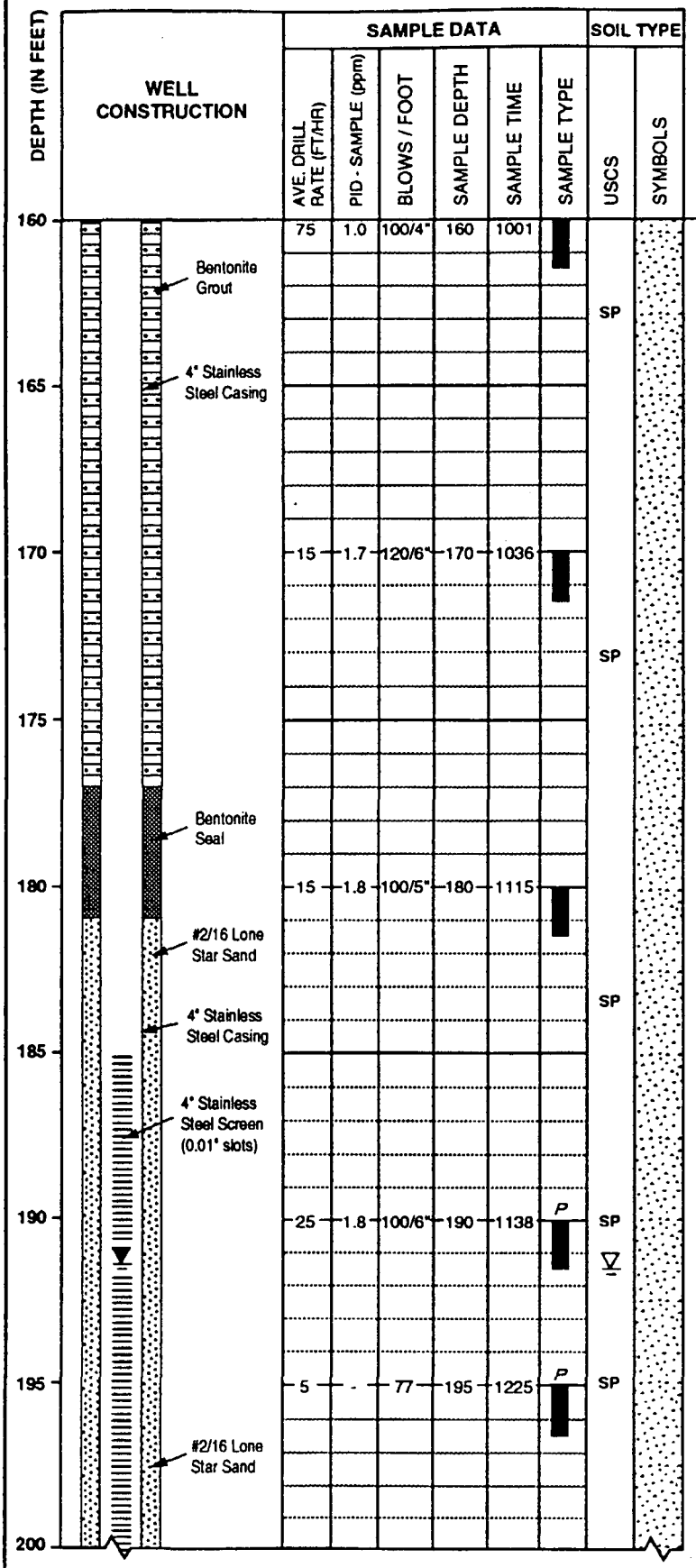
Pale olive (5Y 6/3) medium SAND, damp, dense, no odor.
Olive (5Y 5/3) medium to coarse SAND with trace gravel, damp to moist, very dense, no odor.

Light gray (5Y 7/2) to olive (5Y 5/3) medium to coarse SAND with little pebbles, moist, very dense, no odor.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE



M68B (formerly AB-9) (continued)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 179.70' MSL

DESCRIPTION

Light gray (5Y 7/2) medium SAND, moist, very dense, no odor.

Light yellowish brown (2.5Y 6/4) medium SAND with trace coarse sand, mica, damp, very dense, no odor.

Pale yellow (2.5Y 7/4) medium SAND (quartz), damp, very dense, no odor.

Pale olive (5Y 6/3) fine to medium SAND with trace silt, moist to wet, loose, no odor.
Wet at 191'.

Pale olive (5Y 6/3) fine to medium SAND, wet, loose, no odor.

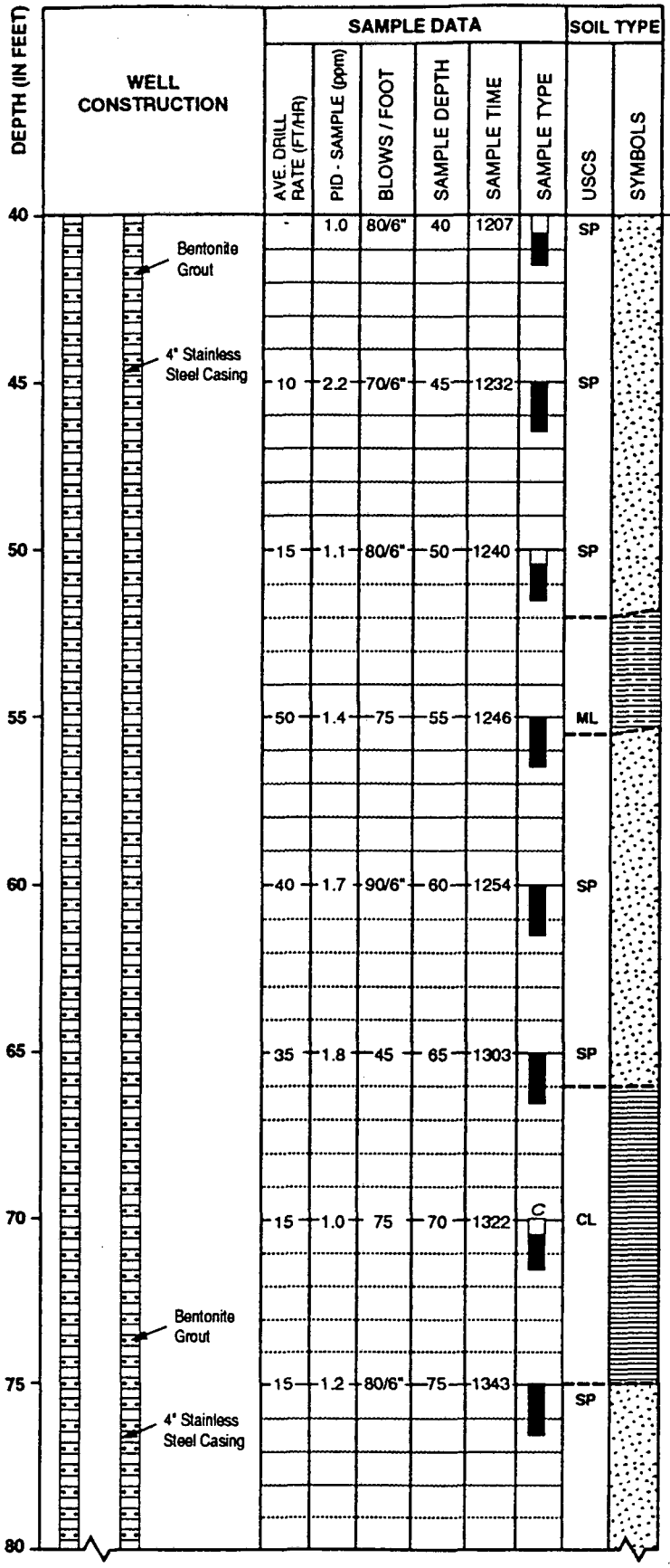
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M68B (formerly AB-9) (continued)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 179.70' MSL



DESCRIPTION

Pale yellow (2.5Y 7/3) micaceous medium SAND, with trace clay blebs, no bedding observed, damp, dense, no odor.

Pale yellow (2.5Y 7/3) micaceous medium SAND, damp, dense, no odor.

Pale yellow with some reddish yellow (5YR 6/8) staining, micaceous medium SAND, moist dense, no odor.

Olive gray (5Y 4/2) SILT with trace fine to medium SAND, trace mica, moist, dense, no odor.

Light olive brown (2.5Y 5/6) medium sand, micaceous, damp, dense, no odor.

Olive yellow (5Y 6/6) coarse SAND (rounded quartz grains), trace angular chert fragments, damp, very dense, no odor.

Olive yellow (5Y 6/6) coarse SAND (rounded quartz grains) with trace gravel, damp, dense, no odor.
Olive gray (5Y 4/2) sandy CLAY, damp, very stiff, no odor.

Olive gray (5Y 4/2) sandy CLAY with little coarse sand; trace silt, rock fragments, and shell fragments; damp, very stiff, no odor.

Pale olive (5Y 6/4) medium to coarse SAND (rounded quartz grains) with trace quartz gravel and pebbles, damp, very dense, no odor.

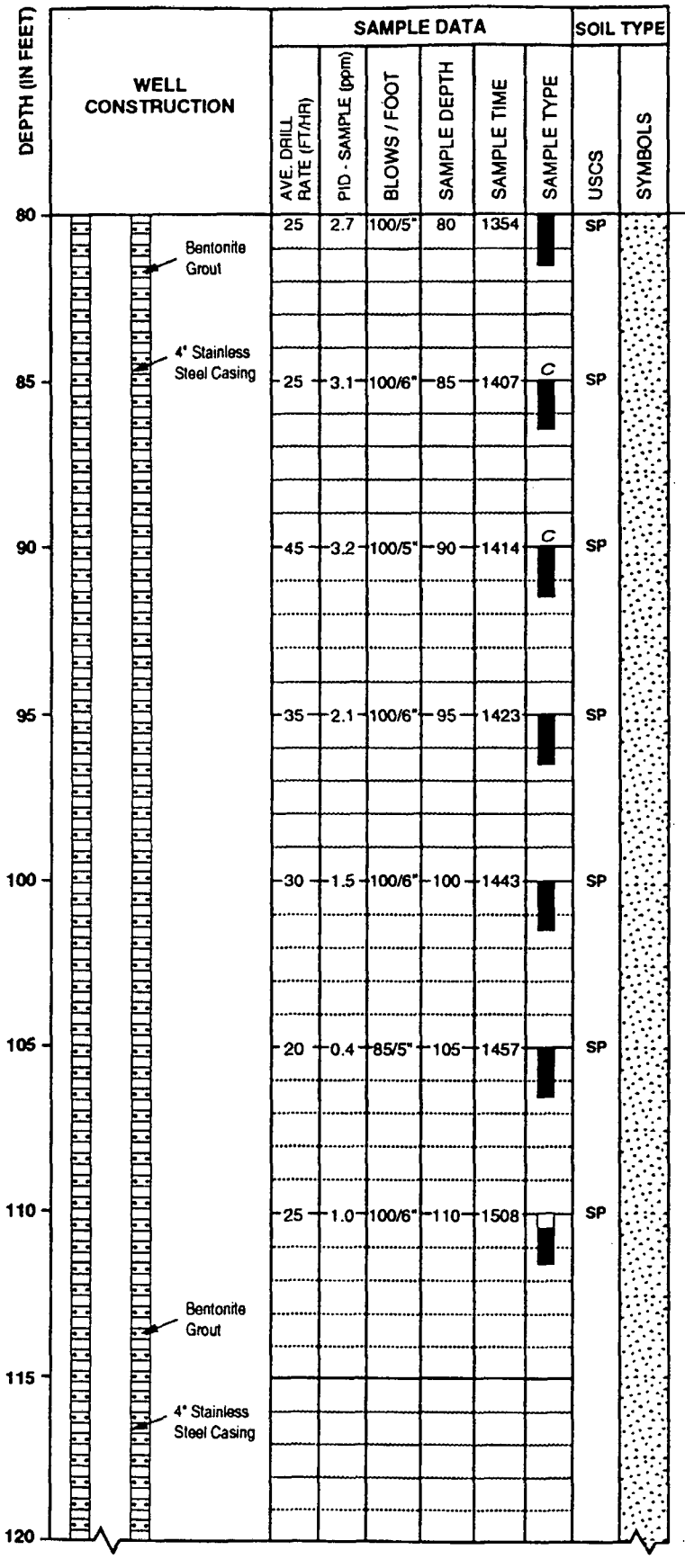
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M68B (formerly AB-9) (continued)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 179.70' MSL



DESCRIPTION

Light olive brown (2.5Y 5/6) medium to coarse sand with little gravel, red oxidation staining, damp, very dense, no odor.

Light olive brown (2.5Y 5/6) coarse SAND with little medium sand (rounded quartz grains) damp, dense, no odor.

Light olive brown (2.5Y 5/6) coarse to medium SAND (well rounded quartz grains), damp, dense, no odor.

Light olive brown (2.5Y 5/6) coarse SAND with little medium sand, damp, very dense, no odor.

Pale olive (5Y 6/4) coarse SAND with some medium sand, damp, very dense, no odor.

Pale olive (5Y 6/4) coarse SAND (rounded quatrz grains), little medium sand, trace gravel, damp, very dense, no odor.

Pale olive (5Y 6/4) coarse SAND with little medium sand and trace gravel, damp, very dense , no odor.

[Boring stopped on 12/16/93. Restarted drilling 12/17/93 with 10-foot sampling intervals.]

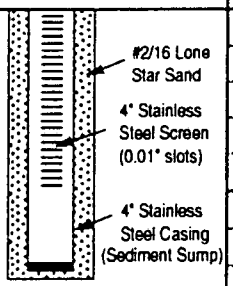
LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE

M68B (formerly AB-9) (continued)

SAMPLING METHOD: California Modified Split Spoon
DRILLING METHOD: 10" Hollow Stem Auger, Failing F-10 Rig
LOGGED BY: P.R. Dworian & N.J. Darigo, R.G.#4402
TOP CASING ELEVATION: 179.70' MSL

DEPTH (IN FEET)	WELL CONSTRUCTION	SAMPLE DATA: AVE. DRILL RATE (FT/HR)	PID - SAMPLE (ppm)	BLOWS / FOOT	SAMPLE DEPTH	SAMPLE TIME	SAMPLE TYPE	SOIL TYPE: USCS	SYMBOLS	DESCRIPTION
200								SP		Pale olive (5Y 6/3) fine to medium SAND, wet, no odor.
205										Pale olive (5Y 6/3) fine to medium SAND, wet, no odor.
210										

Boring completed to depth of 207 feet bgs on 12/17/93.
Ground water encountered during drilling at approximately 191 feet bgs.
Ground water measured in open hole at 192.7 feet bgs on 12/17/93.
Well installed on 12/17/93.
Ground water measured in well at 190.99 feet bgs on 1/12/94.

LOG OF BORING

Palos Verdes Landfill — Rolling Hills Estates, California
For County Sanitation Districts of Los Angeles County

DAMES & MOORE