APPENDIX J-13:
MCLAREN ENVIRONMENTAL ENGINEERING, "ANNUAL UPDATE REPORT ON PLANT SITE REMEDIATION," MARCH 1990

MAGUIRE THOMAS PARTNERS
PLAYA VISTA PARTNERSHIP

ANNUAL UPDATE REPORT
ON
PLANT-SITE REMEDIATION

MARCH 1990

McLaren

March 21, 1990

Mr. Hank Yacoub
Supervising Water Resources Control Engineer
Regional Water Quality Control Board
Los Angeles Region
101 Center Plaza Drive
Monterey Park, California 91754-2156

Dear Hank:

ANNUAL REPORT FOR SITE REMEDIATION AT MAGUIRE THOMAS PARTNERS/PLAYA VISTA (FORMERLY HOWARD HUGHES PROPERTIES) MDHC PLANT SITE IN CULVER CITY

Here is the annual update report for site remediation at the Maguire Thomas Partners/Playa Vista (MTP/PV) plant site. The report summarizes the remediation activities accomplished since the last update report, dated April 1989.

This report was prepared as part of the reporting requirements contained in our site remediation contract with MTP/PV. Exceptions to work proposed in the May 8 Report are noted.

Yours truly,

Larry S. Peterson

Larry S. Peterson, P.E.
Project Manager

Bl:217

Enclosure

cc: Elijah Hill, Regional Water Quality Control Board
Bob Stutsman, Maguire Thomas Partners/Playa Vista

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MAGUIRE THOMAS PARTNERS
PLAYA VISTA PARTNERSHIP

ANNUAL UPDATE REPORT
ON
PLANT-SITE REMEDIATION

MARCH 1990

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MAGUIRE THOMAS PARTNERS/ PLAYA VISTA
PARTNERSHIP PROPERTIES
ANNUAL REPORT OF ON-SITE REMEDIATION STATUS
MARCH 1990

INTRODUCTION

A site investigation of the Maguire Thomas Partners/Playa Vista (MTP/PV) plant site, formerly the Howard Hughes Properties (HHP) plant site, was conducted by McLaren from November 1985 through May 1987. The results of this investigation are contained in a report titled "Site Investigation and Evaluation of Remedial Measures Report," dated May 8, 1987 (May 8 Report). Since then, several refinements of site investigations and some site remediation has been accomplished. On July 19, 1988, McLaren entered into a comprehensive contract with HHP to carry out specific site remediation activities for source removal (soil excavation) and extraction well, pipeline, and treatment plant construction for groundwater treatment.

Two update reports, dated November 1988 and April 1989, were done to summarize the site remediation activities since the May 8 Report. This report updates the site remediation activities conducted since the annual update provided in April 1989.

REMEDIATION ACTIVITIES

The "Howard Hughes Properties Annual Update Report on Plant-Site Remediation" was submitted in November 1988 and April 1989 and contained a summary of the findings and results of site remediation activities prior to January 1989. Details of the continued site remediation activities from January 1989 to February 1990 have been recorded and submitted in letter reports. The following is a brief summary of site remediation activities which have taken place between January 1989 and February 1990.

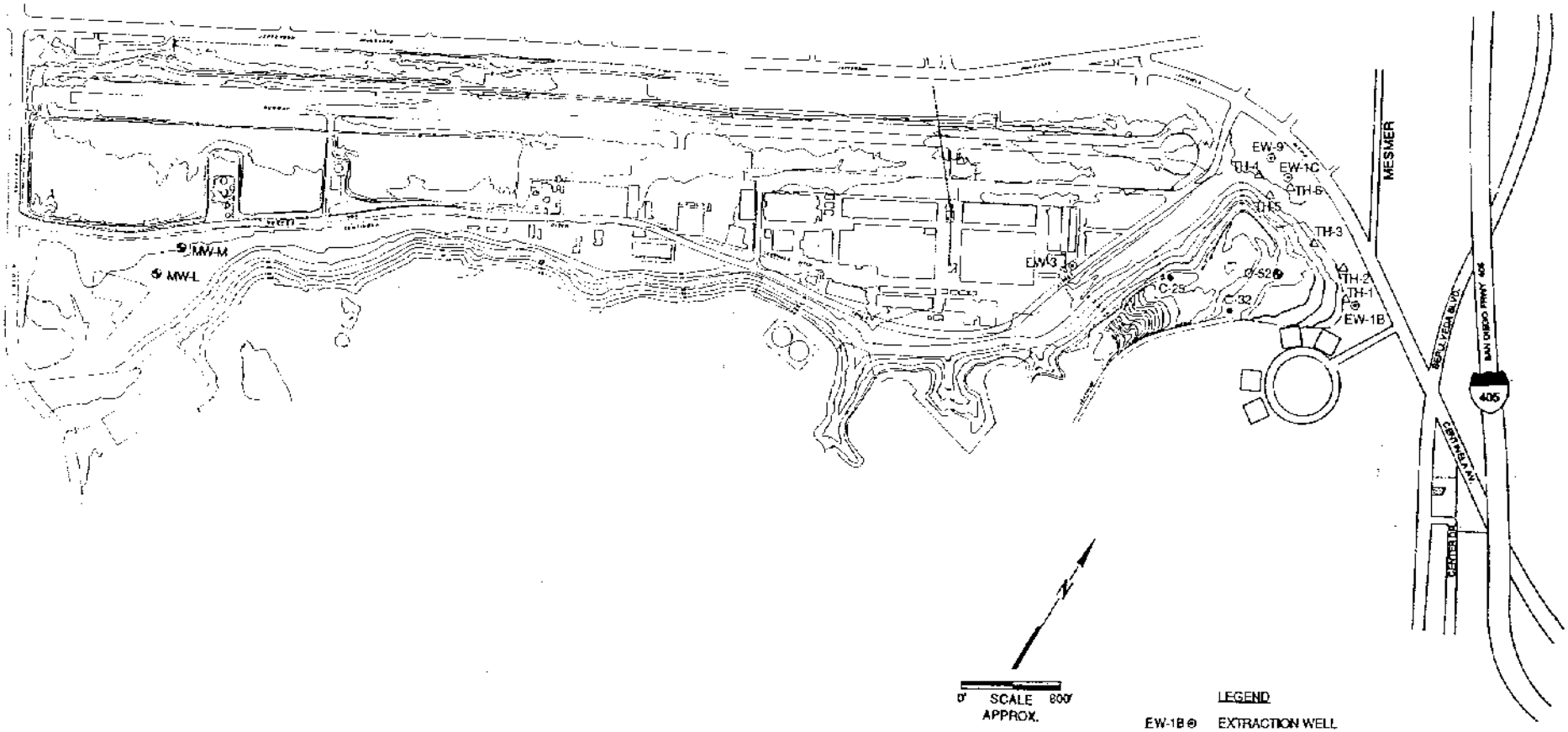
Status of Well Drilling and Abandonment, and Additional Investigations

Most of the remaining well drilling and some of the abandonment operations noted in the GMP proposal, the November 1988, and the April 1989 update reports have been completed. This consists of drilling and pumping six test hole soil borings (TH-1 through TH-6), and drilling, constructing, developing, and testing two monitoring wells (MW-M and MW-L) and three extraction wells (EW-1C, EW-3, and EW-9). Two monitor wells (C-25 and C-32), located on the eastern bluff of the property, were abandoned in this episode. Figure 1 shows the location of the newly drilled and abandoned soil borings and wells. Appendix A contains the lithologic log for the soil borings and wells along with the well design and geophysical logs for the wells.

The six test hole soil borings (TH-1 to TH-6) were proposed to find a more suitable location on the east end of the property for extraction well EW-1. Existing EW-1 (labeled EW-1B on Figure 1) did not produce enough water to create the zone of capture projected in the May 8 Report. The borings were drilled by hollow stem auger method to various depths between 61.5 to 66.5 feet below grade. A temporary 4-inch PVC well casing with a 10-foot section of 0.02-inch slotted screen at the bottom was placed in the bore hole. Short term 20-minute to 30-minute pump tests were also performed on each test hole. The hydrologic data collected from these test holes combined with the aquifer test data from monitoring wells C-14 and C-32 was used to determine the new location of extraction well (EW-1C) down-gradient of the chemical plume.

EW-1C and EW-3 were drilled and constructed by mud-rotary techniques. Field observations indicated geologic conditions similar to conditions encountered while drilling the other extraction wells. The wells were completed to depths shallower than initially proposed due to thinner occurrences of the gravel aquifer containing the chemicals. Aquifer tests and water volumes produced during sampling indicate that the transmissive properties of the aquifer are higher at EW-3 than expected.

FIGURE 1
LOCATION OF NEWLY DRILLED SOIL BORINGS
AND WELLS AT MTP/PV PLANT SITE
MAGUIRE THOMAS PARTNERS / PLAYA VISTA



However, EW-1C did not produce sufficient water to satisfy the requirement of the extraction system which was modeled. An additional extraction well, EW-9, was drilled and constructed to be manifolded to EW-1C so that the water extraction requirement of the extraction system would be met. Hydraulic tests performed on EW-9 indicated the transmissive properties of the aquifer are higher than previously estimated at this location.

At the Fire Training Burn Pit area, two Monitoring wells (MW-L and MW-M) were drilled and constructed near extraction well EW-6 to determine the depths of chemicals and the effectiveness of EW-6 to remediate chemicals. Well MW-L is 178 feet deep and has been completed in the second aquifer zone, and well MW-M is 60 feet deep and has been completed in the first aquifer zone.

Two monitoring wells (C-25 and C-32), located on the eastern bluff of the property, were abandoned by pressure grout method. Upon completion of the proposed grading of the bluff property, replacement monitoring wells (MW-H and MW-K) will be relocated, drilled, constructed, and developed. After review of the Rough Grading Plan for Tract No. 43416 dated January 15, 1990, the other two active monitor wells (C-26 and C-52) have been noted to be located in a right-of way (C-26) and next to a property line (C-52). The disposition of these wells has not been determined at this time. Recommendations for additional well abandonments proposed in the May 8 Report are subject to the Regional Water Quality Control Boards concurrence. A proposal for well abandonment with be submitted after system start-up and evaluation.

Semi-Annual Monitoring Well Sampling and Water Level Sounding Report Summer, 1989

In September 1989, the third semi-annual monitoring well sampling and monthly water level sounding program was conducted under the GMP contract. The data, which includes chemical concentrations, chemical distribution, and groundwater elevations, are collected on a continuing basis for use as a data base to evaluate treatment effectiveness in the future. According

to the sample results in the summer 1989 round, the chemical contamination plume did not alter its horizontal distribution presented from the pervious sample round (Figure 2 and Figure 3). Additional monthly groundwater levels and semi-annual water quality sampling will be performed through the start up of the groundwater treatment plant.

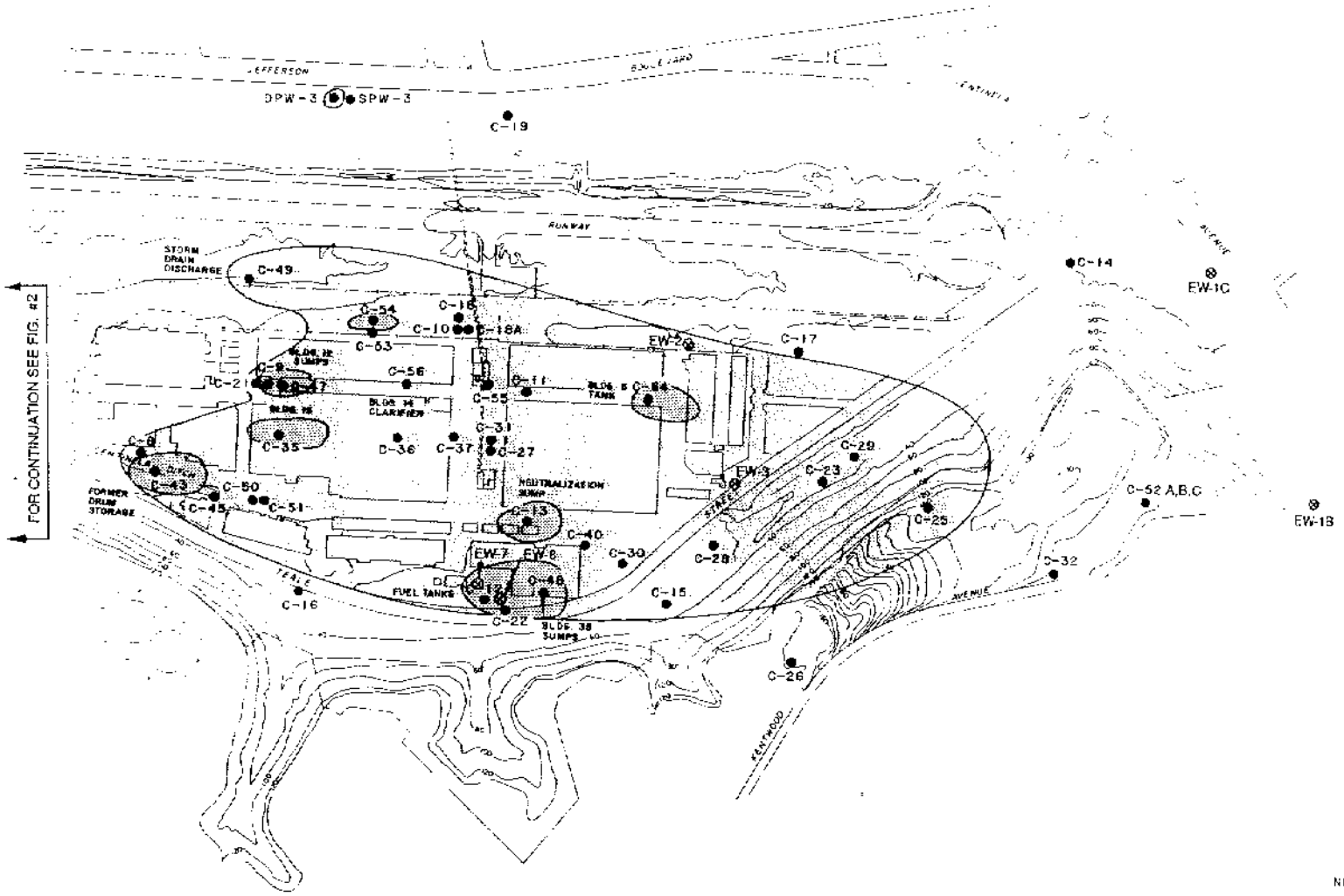
Status of Gasoline Remediation at Building 11

As stated in the "Annual Update Report on Plant-Site Remediation, April 1989," the free product recovery wells are being hand bailed monthly to recover emulsified unleaded gasoline. These recovery wells are located at the west side of Building 11, as presented in Figure 4. The floating gasoline was bailed from the recovery wells with approximately 15 to 20 gallons monthly. This free product is stored in a 55-gallon drum on-site for up to 90 days and then is transported for disposal at a licensed recycler.

SUMMARY

At the MTP/PV-HAC plant site, McLaren has accomplished the soil remediation as identified and proposed in the May 8 Report except those areas specifically excluded with the concurrence of the Regional Board. As stated in the previous update report, dated April 1989, McLaren has completed the construction of the extraction wells on the east end of the property and additional monitoring wells at the Fire Training Burn Pit. Up to date, only two monitoring wells have been abandoned at the site. As in our schedule, proposed monitoring well abandonment will continue after system evaluation. Treatment plant start-up is schedule for June 1990.

FIGURE 3
MAGUIRE THOMAS PARTNERS /
PLAYA VISTA PARTNERSHIP
DISTRIBUTION OF VOCs
IN GROUNDWATER
AUGUST, 1989



LEGEND

C-32 ● MONITORING WELL

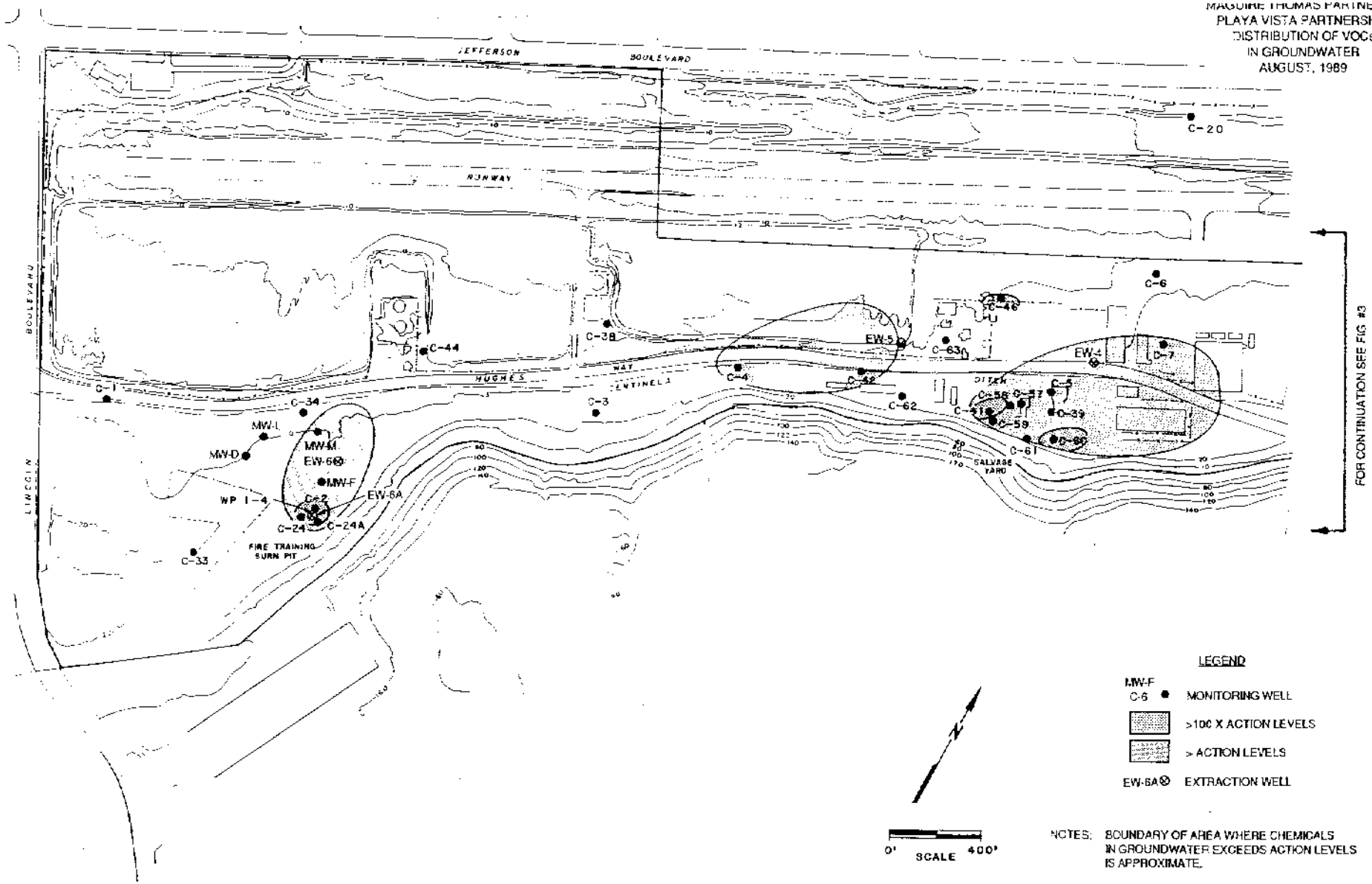
▒ > 100 X ACTION LEVELS

□ > ACTION LEVELS

EW-3 ⊗ EXTRACTION WELL

NOTES: BOUNDARY OF AREA WHERE CHEMICALS IN GROUNDWATER EXCEED ACTION LEVELS IS APPROXIMATE.

MAGUIRE THOMAS PARTNERS /
PLAYA VISTA PARTNERSHIP
DISTRIBUTION OF VOCs
IN GROUNDWATER
AUGUST, 1989



NOTES: BOUNDARY OF AREA WHERE CHEMICALS IN GROUNDWATER EXCEEDS ACTION LEVELS IS APPROXIMATE.

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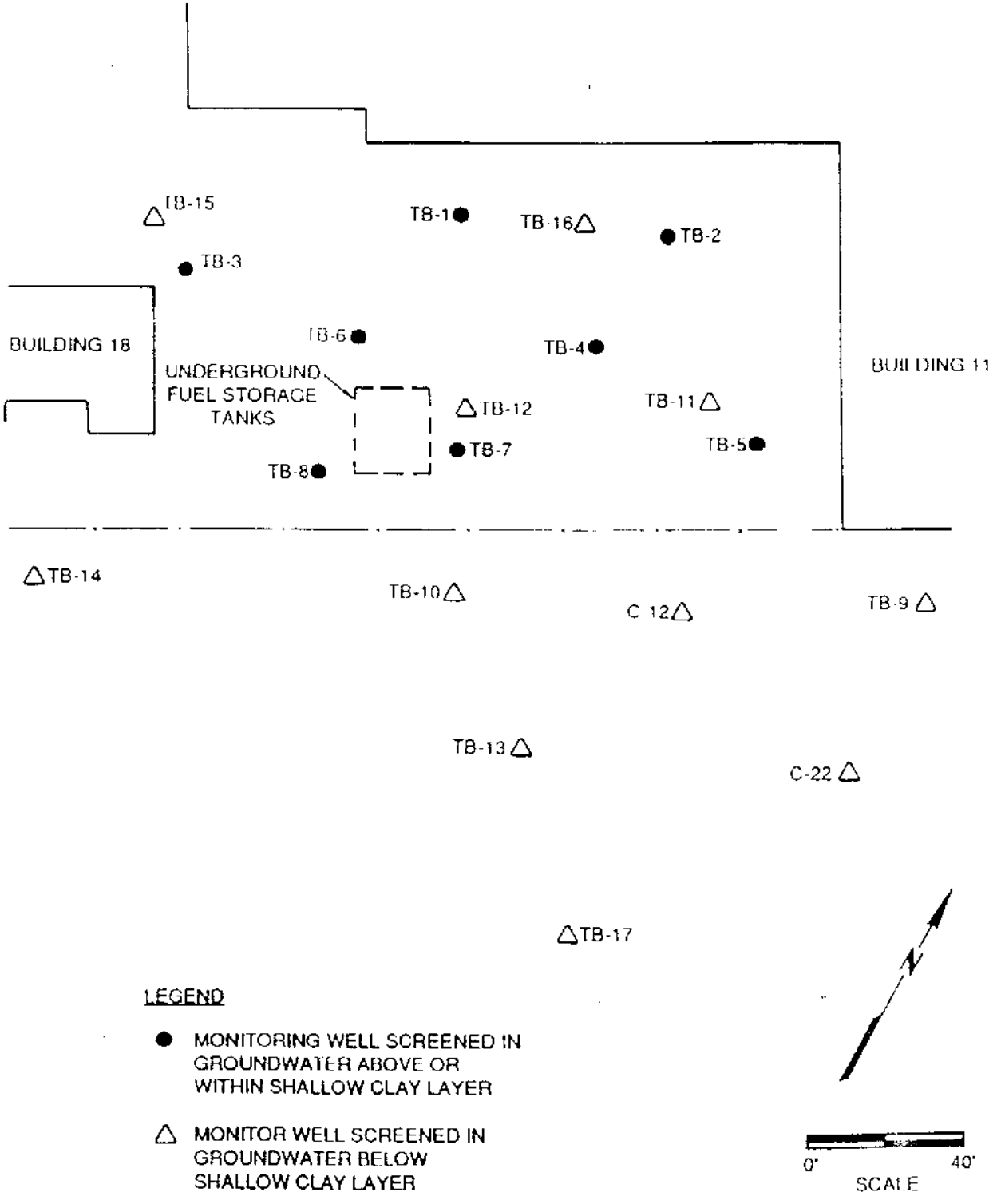
FIGURE 4
LOCATIONS OF RECOVERY WELL
NEAR BUILDING 11
MAGUIRE THOMAS PARTNERS / PV
MDHC PLANT SITE



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APPENDIX A

WELL LOGS

SB/MW#: TH-1
#D-
Page 1 of 2
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 14' N 60° W OF EW-1 B
ELEVATION MONITORING DEVICE
SAMPLING DATE(S) 1/7/89 START 9:30 AM FINISH 10:45 AM
SAMPLING METHOD GRAB SAMPLE SUBCONTRACTOR & EQUIPMENT BEYLIK/B-61
MEMO GRAB SAMPLED BOREHOLE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
0	N/A					0.0'-0.5' Asphalt.	AC			6.75" Diameter Borehole
						0.5'-1.5' Aggregate road base.	RB			Neat Cement Grout w/ 5% Bentonite
5						1.5'-13.0' Silty sand: dark brown (10YR 3/3); 5-20 % low plastic fines; fine grained, poorly sorted sand; moist. @ 7.0' color change to olive brown (2.5Y 4/4).	SM			
10										
15						13.0'-24.0' Clayey sand: light olive brown (2.5Y 5/6); 30-40% medium plastic, moderately stiff fines; fine grained, poorly sorted sand; moist. @ 16.0' color changes to olive (5Y 4/3). Sand content increasing with depth.	SC			
20										
25						24.0'- 33.0' Sand and gravelly sand: olive gray (5Y 5/2), (5Y 4/2); 10-20% medium plastic fines; medium grained, poorly sorted, subrounded sand; 20% gravel; moist.	SW			
30						(Continued on page 2)				

SB/MW#: TH-1
#D-
Page 2 of 2
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 14' N 60° W OF EW-1B
ELEVATION MONITORING DEVICE
SAMPLING DATE(S) 1/7/89 START 9:30 AM FINISH 10:45 AM
SAMPLING METHOD GRAB SAMPLE SUBCONTRACTOR & EQUIPMENT BEYLIK/B-61
MEMO GRAB SAMPLED BOREHOLE

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
35						(Continued from page 1) @ 33.0' < 10% non-plastic fines; 30-40% gravel.	SW			6.75" Diameter Borehole
40						38.0'-45.0' Grades into sandy gravel: greenish gray (5GY 5/1); < 10% non- plastic fines; 40% coarse grained, poorly sorted sand; poorly sorted, subrounded gravel; wet.	GW			Neat Cement Grout w/ 5% Bentonite
45						45.0'-55.0' Silty sand: dark greenish gray (5GY 4/1); 20% low plastic fines; fine grained, well sorted sand; wet.	SM			
50										
55						Borehole Terminated at 55.0'.				T.D. 55.0'
60										

SB/MW#: TH-2
#D- 00577-00578
Page 1 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 390' N 45° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/28/89 START 9:45 AM FINISH 12:45 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W. HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
						0.0'-0.5' Asphalt.	AC			
						0.5'-1.0' Aggregate road base.	RB			
5	5-6-9	15	5.0-6.5			1.0'-5.5' Silty sand: olive brown (2.5Y 4/4); 20-30 % low plastic fines; medium grained, poorly sorted, unconsolidated quartz and granitic sand; moist.	SM			10" Diameter Borehole
10	5-9-11	20	10.0-11.5			5.5'-10.5' Sandy clay: dark grayish brown (2.5Y 4/2); medium high plastic fines; 20% medium grained, poorly sorted sand; 5% gravel; moist.	CL/CH			Neat Cement Grout w/ 5% Bentonite
15	9-11-12	23	15.0-16.5			10.5'-17.0' Silty sand: light olive brown (2.5Y 5/4) to olive brown (2.5Y 4/4); 10-20% low plastic fines; fine grained, well sorted, granitic sand; 5% gravel; damp.	SM			
20	5-6-12	18	20.0-21.5			17.0'-24.0' Sandy silt: light olive brown (2.5Y 5/6); medium plastic fines; 30% fine grained sand; moist.	ML			
25	6-11-12	23	25.0-26.5			24.0'-28.0' Sand: light olive brown (2.5Y 4/4) to light olive yellow (2.5Y 6/6); < 10% non-plastic fines; medium grained, poorly sorted, subrounded, granitic sand; damp.	SW			
30	1-12-18	30	30.0-31.5			28.0' 31.5' Silty clay: (Continued on page 2)	CL			

SB/MW#: TH-2
#D- 00578-00579
Page 2 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 390' N 45° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/28/89 START 9:45 AM FINISH 12:45 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
						28.0'- 31.5' Silty clay: dark greenish gray (5GY 4/1); medium plastic fines; < 5% fine sand; moist. @ 31.0' 15% fine sand.	CL			
35	8-12-13	25	35.0-36.5			31.5'-42.0' Silty sand interbedded with sand and sandy silt. @31.5' Sand: greenish gray (5GY 4/1); < 10% non-plastic fines; fine grained, well sorted sand; wet. @ 35.0' Silty sand: dark greenish gray (5Y 5/1); 20-30% low plastic fines; fine grained, well sorted sand; wet. @ 35.5' Sandy silt: dark greenish gray (5GY 4/1); low plastic fines; < 10% fine sand; moist.	SM (SP) (ML)			10" Diameter Borehole
40	8-12-14	26	40.0-41.5							Neat Cement Grout w/ 5% Bentonite
45	3-8-23	31	45.0-46.5			42.0'-49.5' Sand: greenish gray (5GY 5/1); <10% non-plastic fines; fine grained, poorly sorted sand; wet. @ 46.5' Gravelly sand: dark greenish gray (5G 4/1); <10% non-plastic fines; coarse grained, poorly sorted sand; 15-20% gravel; wet.	SW			
50	8-11-14	25	50.0-51.5				GW			
55	29-33-30	63	55.0-56.5			49.0'-52.0' Grades into sandy gravel: dark greenish gray (5G 4/1); <10% non-plastic fines; 40% coarse grained, poorly sorted sand; poorly sorted, subrounded gravel; wet.	ML			
60	19-32-56	88	60.0-61.5			52.0-61.5 Sandy silt. (continued on page 3)				

SB/MW#: TH-2
#D- 00579
Page 3 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 390' N 45° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/28/89 START 9:45 AM FINISH 12:45 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	Draeger reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
65						52.0'-61.5' Sandy silt: dark greenish gray (5GY 4/1); medium plastic fines; 10-20% fine sand; damp. @ 60.0' 5% Wood chips.	ML			Neat Cement Grout w/ 5% Bentonite; TD 61.5'; 10" Diameter Borehole
70						Borehole Terminated at 61.5'.				
75										
80										
85										
90										

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SB/MW#: TH-3
#D- 00580-00581
Page 1 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 765' N 65° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/29/89 START 9:15 AM FINISH 12:45 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
						0.0'-1.5' Aggregate road base.	RB			
						1.5'-16.5' Silty clay: dark grayish brown (2.5Y 4/2); medium to high plastic, stiff fines; 10% fine grained sand; 10% organic material; moist.	CL/ CH			
5	2-4-6	10	5.0-6.5			@ 5.0' Sandy clay: dark grayish brown (2.5Y 4/2); medium to high plastic stiff fines; 20% fine grained sand; damp.				10" Diameter Borehole
10	3-6-7	13	10.0-11.5			@ 10.0' Silty clay: olive brown (2.5Y 4/4); medium to high plastic fines; 10-20% fine grained sand; moist.				Neat cement grout w/ 5% bentonite
						@ 15.0' Iron Oxide mottling noted.				
15	7-9-13	22	15.0-16.5			15.5'-16.5' Clayey silt lens; Olive gray (5Y 5/2); medium to high plastic fines; <10% fine grained sand; Iron Oxide and dark greenish gray mottling; moist.				
20	5-88	88+	20.0-21.5			16.5'-25.0' Silty sand: dark greenish gray (5GY 4/1); 30% non-plastic fines; fine grained, well sorted sand; moist.	SM			
						20.0'-20.5' Sandy silt lens; moist.				
25	13-20-25	45	25.0-26.5			25.0'-27.0' Sand: dark greenish gray (5G 4/1); <10% non-plastic fines; fine grained, moderately sorted sand; damp.	SW			
						27.0'-45.0' Silty sand.	SM (SP) (ML)			
30	7-4-11	15	30.0-31.5			(Continued on page 2)				

SB/MW#: TH-3
#D- 00581-00582
Page 2 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 765' N 65° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/29/89 START 9:15 AM FINISH 12:30 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
35	7-8-10	18	35.0-36.5			27.0'-45.0' Silty sand interbedded with sand and sandy silt. Silty sand: dark greenish gray (5Y 4/1); 20-30% low plastic fines; fine grained, well sorted sand; wet. @31.5' Sand lens: greenish gray (5GY 4/1); <10% non-plastic fines; fine grained, well sorted sand; wet. @35.0' Sandy silt: dark greenish gray (5GY 4/1); low plastic fines; 10-20% fine grained sand; moist. @41.0' Silty sand: wet.	SM (SP) (ML)			10" Diameter Borehole
40	10-13-16	29	40.0-41.5							Neat Cement Grout w/ 5% Bentonite
45	34-55+	55+	45.0-46.5			45.0'-56.0' Sand: dark greenish gray (5GY 4/1); <10% non-plastic fines; medium grained, well sorted sand; wet. @46.0' Gravelly sand lens. 50.0'-56.0' Gravelly sand: dark greenish gray (5G 4/1); <10% non-plastic fines; medium grained, poorly sorted sand; 20-30% gravel; wet.	SW			
50	13-18-19	37	50.0-51.5							
55	Not Sampled					56.0'-58.0' Grades into sandy gravel: dark greenish gray (5G 4/1); <10% non-plastic fines; 40% coarse grained, poorly sorted sand; poorly sorted, sub-rounded gravel; wet.	GW			
60	50-24-38	62	60.0-61.5			58.0'-61.0' Silty sand. (Continued on page 3)	SM			

SB/MW#: TH-3
#D- 00582
Page 3 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 765° N 65° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/29/89 START 9:15 AM FINISH 12:45 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
65	74-30-39	69	61.5-63.0			58.0'-61.0' Silty sand: dark greenish gray (5Y 4/1); 10-20% low plastic fines; fine grained, well sorted sand; wet. @60.5' Gravelly sand lens: Dark greenish gray (5G 4/1); <10% non-plastic fines; coarse grained, poorly sorted sand; 30-40% gravel; wet.	SM			Neat Cement Grout w/ 5% Bentonite; 10" Diameter Borehole
70						61.0'-63.0' Sandy silt: dark greenish gray (5GY 4/1); medium plastic fines; 10-20% fine grained sand; damp. Noted black laminations. @62.0' Silty sand lens.	ML			
70						Borehole Terminated at 63.0'.				T.D. 63.0'

McLaren Environmental Engineering

SB/MW#: TH-4
#D- 00583-00584
Page 1 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 1100' N 70° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/30/89-3/31/89 START 9:15 AM/8:45 AM FINISH 4:30 PM/10:45 AM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW THE GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	Draeger reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
						0.0'-0.5' Asphalt.	AC			
						0.5'-1.5' Aggregate Road base.	RB			
5	Grab Sample					1.5'-15.0' Sandy clay: very dark grayish brown (2.5Y 3/2); medium to high plastic fines; 20% fine grained, moderately sorted sand; moist.	CL/ CH			10" Diameter Borehole; Neat Cement Grout w/ 5% Bentonite
10	6-11-14	25	10.0-11.5			@ 10.0' Color changes to dark grayish brown (2.5Y 4/2); 20-30% fine sand.				
15	6-11-13	24	15.0-16.5							
20	11-13-14	27	20.0-21.5			16.0'-30.0' Silty sand: light olive brown (2.5Y 5/4); 20-30% low plastic fines; fine grained, poorly sorted sand; damp. @ 20.0' color changes to dark greenish gray (5G 4/1).	SM			
25	4-8-15	23	25.0-26.5			@ 25.0' color changes to dark greenish gray (5GY 4/1).				
30	11-14-15	29	30.0-31.5			(Continued on page 2)				

SB/MW#: TH-4
#D- 00584-00585
Page 2 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 1100' N 70° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/30/89-3/31/89 START 9:15 AM/8:45 AM FINISH 4:30 PM/10:45 AM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W. HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW THE GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classificatio	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
35	27-44-50	94	35.0-36.5			30.0' -33.0' Sand with interbeds of silty sand: Sand: dark greenish gray (5GY 4/1); <10% non-plastic fines; fine grained, moderately sorted sand; damp. @ 31' moist.	SP (SM)			10" Diameter Borehole
40	24-32-40	72	40.0-41.5			33.0'-47.0' Gravelly sand and sand: dark greenish gray (5G 4/1); <10% non-plastic fines; medium grained, poorly sorted sand; 0-20% gravel; wet. @36' Color change to greenish gray (5G 5/1). @40' Color change to dark greenish gray (5G 4/1). @40.5' Noted a 2" sand layer olive (5Y 4/3).	SW			Neat Cement Grout w/ 5% Bentonite
45	Not Sampled									
50	Not Sampled					47.0'-50.0' Graded into sandy gravel: dark greenish gray (5GY 4/1); <10% non-plastic fines; 40% coarse grained, poorly sorted sand; poorly sorted, subrounded gravel; wet.	GW			
55	Not Sampled					50.0'-58.0' Grades into gravelly sand and sand: Dark greenish gray (5G 4/1); <10% non-plastic fines; medium grained, poorly sorted sand; 0-20% gravel; wet.	SW			
60	14-26-52	78	60.0-61.5			58.0'-65.0' Silty sand. (Continued on page 3)	SM			

SB/MW#: TH-4
#D- 00583
Page 3 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 1100' N 70° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/30/89-3/31/89 START 9:15 AM/8:45 AM FINISH 4:30 PM/10:45 AM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W. HAZMAT CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW THE GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	Draeger reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
65	19-40-50	90	65.0-66.5			58.0'-65.0' Silty sand: dark greenish gray (5GY 4/1); 20% low plastic fines; fine grained, well sorted sand; wet. @ 60' 20% Shells; 5% wood chips; wet. Shells and wood chips decrease with depth. @60.5' Moist.	SM			10" Diameter Borehole; Neat Cement Grout w/ 5% Bentonite
						65.0'-66.5' Sandy silt: dark greenish gray (5GY 4/1); low plastic fines; 30% fine grained, well sorted sand; 5% wood chips; slightly moist.	ML			
70						Borehole terminated at 66.5'				T.D. 66.5'

McLaren Environmental Engineering

SB/MW#: TH-5
#D- 00586-00587
Page 1 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 920' N 75° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 4/11/89 START 10:00 AM FINISH 12:30 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
						0.0-0.2' Asphalt.	AC			
5	Grab Sample					0.2'-25.5' Silty sand: dark brown (10YR 3/3); 5-20% non-plastic fines; fine grained, well sorted, quartz rich sand; damp. @ 3.0' Color change to olive brown (2.5Y 4/4). @ 10.0' Color change to light olive brown (2.5Y 5/4). Intermittent 1" thick interbeds of sand; light olive brown (2.5Y 5/4); < 10% non-plastic fines; fine grained, poorly sorted sand; dry. @ 15' noted 2-5% gravel and Iron Oxide mottling.	SM (SW)			10" Diameter Borehole; Neat Cement Grout w/ 5% Bentonite
10	8-11-15	26	10.0-11.5							
15	11-20-28	48	15.0-16.5							
20	14-32-35	67	20.0-21.5							
25	20-25-30	55	25.0-26.5			25.5'-30.0' Sand: olive (5Y 5/4); < 10% non-plastic fines; medium grained, poorly sorted sand; damp. @ 29.0' 2-5% Gravel.	SW			
30	8-11-13	24	30.0-31.5			30.0'-38.0' Silty sand. (Continued on page 2)	SM			

SOIL DRILLING LOG

SB/MW#: TH-5
#D- 00587-00588
Page 2 of 3
Sampler: L. KROL

PROJECT HHP GMP 3.4 LOCATION 920' N 75° 'W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 4/11/89 START 10:00 AM FINISH 12:30 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W. HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
35	8-14-15	29	35.0-36.5			30.0'-38.0' Silty sand interbedded with sand and sandy silt. Silty sand: dark greenish gray (5G 4/1); 20-30% low plastic fines; fine grained, well sorted sand;damp. Sand: greenish gray (5GY 4/1); <10% non-plastic fines; fine grained, well sorted sand; wet. Sandy silt: dark greenish gray (5GY 4/1); low plastic fines; 10-20% fine grained sand; wet.	SM (SP) ML)			10" Diameter Borehole
40	15-19-31	50	40.0-41.5			38.0'-46.0' Sand and gravelly sand. 38.0-41.0' Sand: dark greenish gray(5G 4/1); <10% non-plastic fines; medium grained, poorly sorted, subrounded sand; 5-10% gravel; wet.	SW			Neat Cement Grout w/ 5% Bentonite
45	Not Sampled					@41.0'-46.0' Gravelly sand: 30% gravel.	GW			
50	not sampled					46.0'-50.0' Grades into sandy gravel: dark greenish gray(5GY 4/1); 20% low plastic fines; fine grained ,well sorted sand; wet.				
55	not sampled					50.0'-58.0' Grades into gravelly sand and sand: dark greenish gray (5G 4/1); <10% non-plastic fines; medium grained, poorly sorted sand; 0-20% gravel; wet.	SW			
60	not sampled					58.0'-62.0' Silty sand: dark greenish gray (5GY 4/1); 20% low plastic fines; fine grained, well sorted sand; 10-15% shells; 5% woodchips; wet. Minor interbeds of sand.	SM			

(Continued on page 3)

SOIL DRILLING LOG

SB/MW#: TH-5
#D- 00588
Page 3 of 3
Sampler: L. KROL

PROJECT HHP GMP 3.4 LOCATION 920' N 65° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 4/11/89 START 10:00 AM FINISH 12:30 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
						58.0'-62.0' Silty sand. (Continued from page 2).	SM			Neat Cement Grout w/ 5% Bentonite; 10" Diameter Borehole
65	13-26-39	65	65.0-66.5			62.0'-66.5' Sandy silt: dark greenish gray (5GY 4/1); low plastic fines; 10-20% fine grained, well sorted sand; damp.	ML			
						Borehole terminated at 66.5'.				T.D. 66.5'
70										
70										
75										
80										
85										

McLaren Environmental Engineering

SB/MW#: TH-6
#D- 00589-00590
Page 1 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 1060' N 60° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 4/3/89 START 10:30 AM FINISH 1:30 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW THE GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
0						0.0'-1.5' Silty sand: dark brown (10YR 3/3); 20-30% low plastic fines; fine grained, poorly sorted sand; damp.	SM			
5	Grab Sample					1.5'-15.0' Sandy clay: dark gray (5Y 4/1); medium and high plastic fines; 10% fine grained sand; moist. @10.0' Color change to olive (5Y 5/3); 10-20% fine grained sand; Iron Oxide mottling.	CL/ CH			10" Diameter Borehole; Neat Cement Grout w/ 5% Bentonite
10	4-6-8	14	10.0-11.5			15.0'-25.0' Silty sand: olive (5Y 5/3); 20-30% low plastic fines; fine grained, well sorted sand; damp. Intermittent interbeds of sand: light olive brown (2.5Y 5/4); <10% non-plastic fines; fine grained, poorly sorted sand; damp. Sandy silt: olive brown (2.5Y 4/4); low plastic fines; 10% fine grained sand; damp. @20' clay lens.	SM (SW) (ML)			
15	6-8-8	16	15.0-16.5							
20	5-9-10	19	20.0-21.5							
25	14-26-29	55	25.0-26.5			25.0'-28.0' Sand: dark greenish gray (5G 4/1); <10% non-plastic fines; fine grained, moderately sorted sand, damp. Noted silty sand laminations.	SW			
30	10-12-20	32	30.0-31.5			28.0'-40.0' Silty sand.	SM (SP) (ML)			

(Continued on page 2)

SB/MW#: TH-6
#D- 00589-00590
Page 2 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 1060' N 60° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 4/3/89 START 10:30 AM FINISH 1:30 PM
SAMPLING METHOD DRIVE SAMPLE SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW THE GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
35	Not Sampled					28.0'-40.0' Silty sand interbedded with sand and sandy silt. Silty sand: dark greenish gray (5Y 4/1); 20-30% low plastic fines; fine grained, well sorted sand; damp. @ 30.0' Wet. Sand: greenish gray (5GY 4/1); <10% non-plastic fines; fine grained, well sorted sand; damp. Sandy silt: dark greenish gray (5GY 4/1) low plastic fines, 10-20% fine grained sand; moist.	SM (SP) (ML)			10" Diameter Borehole; Neat Cement Grout w/ 5% Bentonite
40	Not Sampled					40.0'-45.0' Sand: dark greenish gray (5GY 4/1); <10% non-plastic fines; medium to coarse grained, poorly sorted sand; wet. 42.0'-45.0' Gravelly sand: 30-40% gravel; wet.	SW			
45	Not Sampled					45.0'-52.0' Grades into sandy gravel: dark greenish gray (5G 4/1); <10% non-plastic fines; 40% coarse grained, poorly sorted, subrounded sand; poorly sorted, subrounded gravel; wet.	GW			
50	Not Sampled									
55	Not Sampled					52.0'-60.0' Grades into gravelly sand and sand: dark greenish gray (5G 4/1); <10% non-plastic fines; medium grained, poorly sorted sand; 0-20% gravel; wet.	SW			
60	11-20-34	54	60.0-61.5			60.0'-62.0' Silty sand. (Continued on page 3)	SM			

SOIL DRILLING LOG

SB/MW#: TH-6
#D- 00590-00591
Page 3 of 3
Sampler: L. KROL

PROJECT HHP GMP 3.4 LOCATION 1060' N 60° W OF EW-1B
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 4/3/89 START 10:30 AM FINISH 1:30 PM
SAMPLING METHOD DRIVE SAMPLER SUBCONTRACTOR & EQUIPMENT W.HAZMAT/CME-75
MEMO 18" STANDARD PENITROMETER USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 7 FEET BELOW THE GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	TIP reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
65	19-32-35	67	65.0' 66.5'			62.0'-66.5' Sandy silt: dark greenish gray (5GY 4/1); low plastic fines; 10-20% fine grained, well sorted sand; very moist. .@ 66' moist.	ML			10" Diameter Borehole; Neat Cement Grout w/ 5% Bentonite
						Borehole terminated at 66.5'				T.D. 66.5'
70										

McLaren Environmental Engineering

SB/MW#: TH-3
#D- 00580-00581
Page 1 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 765'N 65'W (DEGREES) OF EW-1
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/29/89 START 9:15 AM FINISH 12:45 PM
SAMPLING METHOD DRIVE SAMPLES SUBCONTRACTOR & EQUIPMENT WEST HAZMAT
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	Hnu reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
						0.0'-1.5' Road base.	RB			10" Diameter Borehole
5	2-4-6	10	5.0-6.5			1.5'-16.5' Silty clay: dark grayish brown (2.5Y 4/2); medium to high plastic stiff fines;10% finegrained sand; 10% organic material;moist. @ 5.0' Sandy clay: dark grayish brown (2.5Y 4/2);medium to high plastic, stiff fines;20% fine grained sand;damp. @ 10.0' Silty clay: olive brown (2.5Y 4/4);medium to high plastic fines;10-20% finegrained sand;moist. @ 15.0' Iron oxide mottling noted. @ 15.5'-16.5' Clayey silt lens; olive gray (5Y 5/2);medium to high plastic fines;<10% fine grained sand;iron oxide and dark greenish gray mottling; moist.	CL/ CH			Neat Cement Grout w/ 5% Bentonite
10	3-6-7	13	10.0-11.5							
15	7-9-13	22	15.0-16.5							
20	5-88	88	20.0-21.5			16.5'-25.0' Silty sand: dark greenish gray (5GY 4/1);30% non-plastic fines;fine grained, well sorted sand;moist. @ 20.0'-20.5' Sandy Silt lens; moist.	SM			
25	13-20-25	45	25.0-26.5			25.0'-27.0' Sand: dark greenish gray (5G 4/1);40% non-plastic fines;fine grained, moderately sorted sand;damp.	SW/ SP			
30	7-4-11	15	30.0-31.5			(Continued on page 2)				

SB/MW#: TH-3
#D- 00581-00582
Page 2 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 765'N 65'W (DEGREES) OF EW-1
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/29/89 START 9:15 am FINISH 12:30 pm
SAMPLING METHOD DRIVE SAMPLES SUBCONTRACTOR & EQUIPMENT BEYLIK
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	Draeger reading (ppm)	Soil Description Color, Texture, Moisture,Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
35	7-8-10	18	35.0-36.5			27.0'-45.0' Silty sand interbedded sand and sandy silt; silty sand: dark greenish gray(5y 4/1);20-30% low plastic fines;fine grained well sorted sand;wet. @ 31.5' sand lens:greenish gray(5gy4/1); <10% non-plastic fines; fine grained, well sorted sand; wet.	SM (sp) (ml)			10" Diameter Borehole; Neat Cement Grout w/ 5% Bentonite
40	10-13-16	29	40.0-41.5			@35' sandy silt: dark greenish gray (5gy 4/1); low plastic fines; 10-20% fine grained sand; moist. @41' silty sand: wet.				
45	34-55	55	45.0-46.5			45-56' sand; dark greenish gray (5GY 4/1); <10% non-plastic fines; medium grained,poorly sorted sand;wet. @46' gravelly sand lens.	SW			
50	13-18-19	37	50.0-51.5			@50-56' Gravelly sand: dark greenish gray(5G 4/1); <10% non-plastic fines; medium grained, poorly sorted sand; 20-30% gravel; wet.				
55	no sample					56-58' grades into sandy gravel; dark greenish gray (5G 4/1); 10% non-plastic fines; 40% coarsegrained,poorly sorted sand';poorly sorted, subrounded gravel; wet.	GW			
60	50-24-38	88	60.0-61.5			(Continued on page 3)	SM			

SB/MW#: TH-3
#D- 00582
Page 3 of 3
Sampler: L. KROL

SOIL DRILLING LOG

PROJECT HHP GMP 3.4 LOCATION 765'N 65'W (DEGREES) OF EW-1
ELEVATION _____ MONITORING DEVICE _____
SAMPLING DATE(S) 3/29/89 START 9:15 am FINISH 12:30 PM
SAMPLING METHOD DRIVE SAMPLES SUBCONTRACTOR & EQUIPMENT WEST HAZMAT
MEMO 18" STANDARD PENITROMETER; USING 140 LB. HAMMER WITH 30" DROP.
HAND AUGERED TO 5 FEET BELOW GROUND SURFACE.

Depth Below Surface(ft.)	Penetration Results: Blows 6"-6"-6"	Penetration Results: BPF	Sampler Depth Interval (ft.)	Sample ID #	Hnu reading (ppm)	Soil Description Color, Texture, Moisture, Etc.	Unified Classification	Graphic Log	Sampled Depth	Borehole Abandonment/ Well Construction Details
65	74-30-39	69	61.5-63.0			58.0'-61.0' Silty sand: dark greenish gray (5Y4/1);10-20% low plastic fines;finegrained, well sorted sand;wet. @ 60.5' Gravelly sand lens: dark greenish gray (5G 4/1); <10%non-plastic fines;coarse grained,poorly sorted sand; 30-40% gravel;wet. Some interbeds of silty sand.	SM			Neat Cement Grout w/ 5% Bentonite; 10" Diameter Borehole
70						61.0'-63.0' Sandy silt: dark greenish gray (5GY 4/1); medium plastic fines;10-20% finegrained sand;damp. Black laminations noted. @62.0' Silty sand lens.	ML			
75						Boring terminated at 63.0'				TD 63.0'
80										
85										
90										

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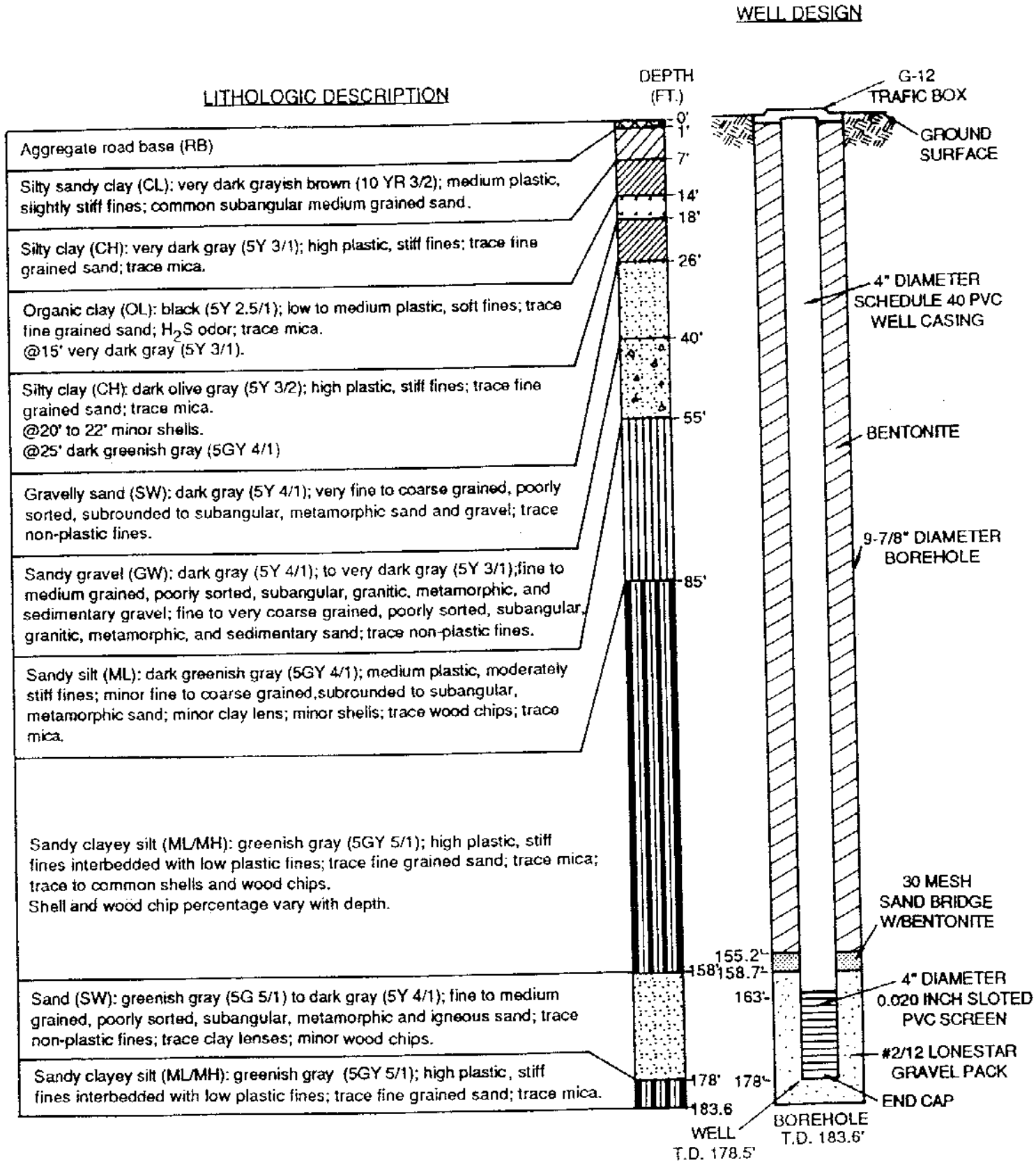
MW-L MONITORING WELL DESIGN/
LITHOLOGIC LOG



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MW-M MONITORING WELL DESIGN/
LITHOLOGIC LOG

LITHOLOGIC DESCRIPTION

Gravelly sand (SW): light olive brown (2.5Y 5/4); fine to coarse grained, poorly sorted, subangular to subrounded, unconsolidated, granitic sand; common gravel; minor medium plastic fines.

Silty clay (CH): very dark gray (5Y 3/1); high plastic, stiff fines; trace fine grained sand; trace mica.

Organic clay (OL): black (5Y 2.5/1); low to medium plastic, soft fines; trace fine grained sand; H_2S odor; trace mica.
@15.0' Trace shells.

Silty clay (CH): dark greenish gray (5GY 4/1); high plastic, stiff fines; trace fine grained sand; trace shells; trace wood chips.
@17.0' H_2S odor.

Sand (SW): dark gray (5Y 4/1); coarse grained, poorly sorted, subrounded, unconsolidated, metamorphic sand; trace non-plastic fines.

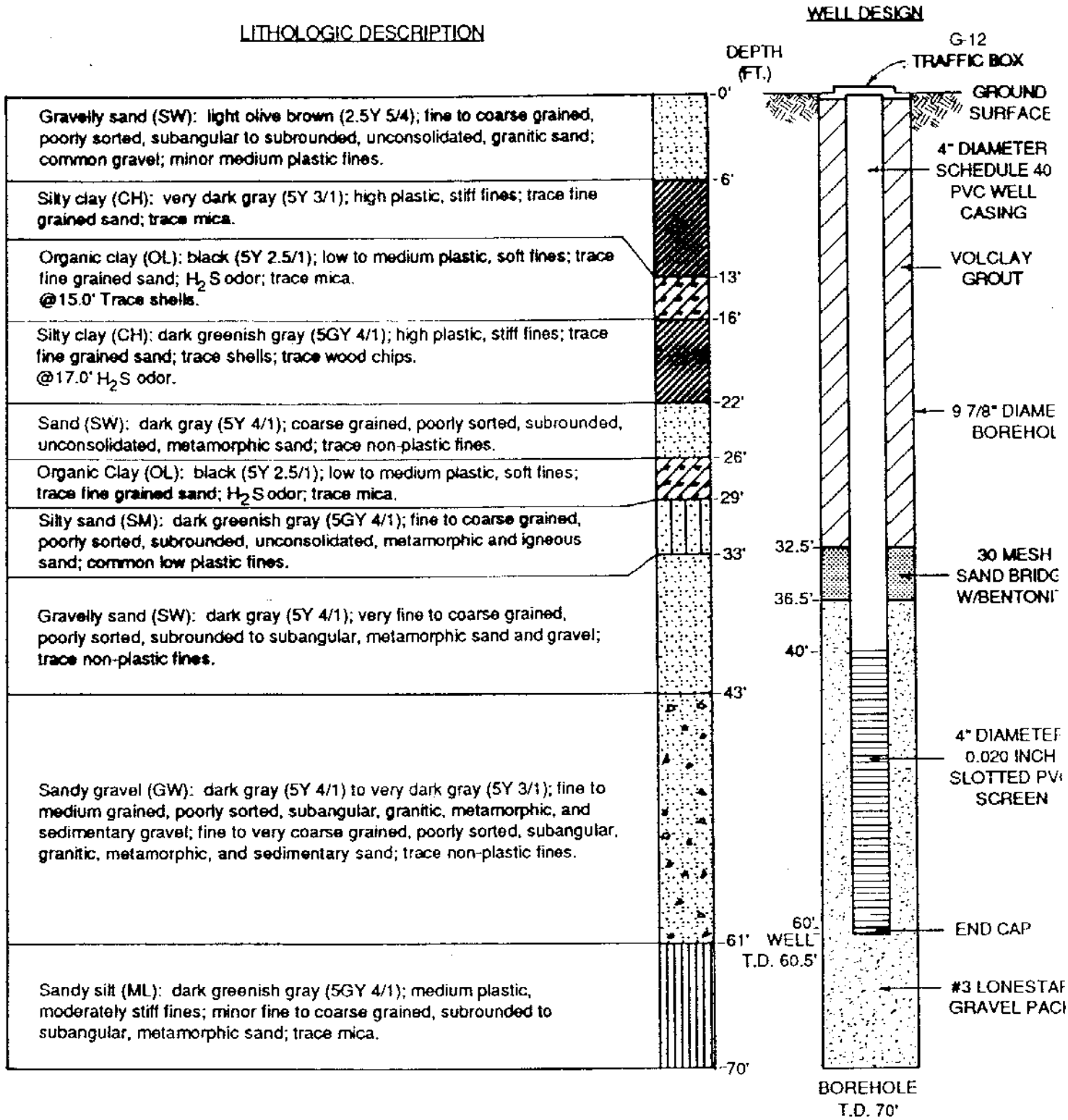
Organic Clay (OL): black (5Y 2.5/1); low to medium plastic, soft fines; trace fine grained sand; H_2S odor; trace mica.

Silty sand (SM): dark greenish gray (5GY 4/1); fine to coarse grained, poorly sorted, subrounded, unconsolidated, metamorphic and igneous sand; common low plastic fines.

Gravelly sand (SW): dark gray (5Y 4/1); very fine to coarse grained, poorly sorted, subrounded to subangular, metamorphic sand and gravel; trace non-plastic fines.

Sandy gravel (GW): dark gray (5Y 4/1) to very dark gray (5Y 3/1); fine to medium grained, poorly sorted, subangular, granitic, metamorphic, and sedimentary gravel; fine to very coarse grained, poorly sorted, subangular, granitic, metamorphic, and sedimentary sand; trace non-plastic fines.

Sandy silt (ML): dark greenish gray (5GY 4/1); medium plastic, moderately stiff fines; minor fine to coarse grained, subrounded to subangular, metamorphic sand; trace mica.



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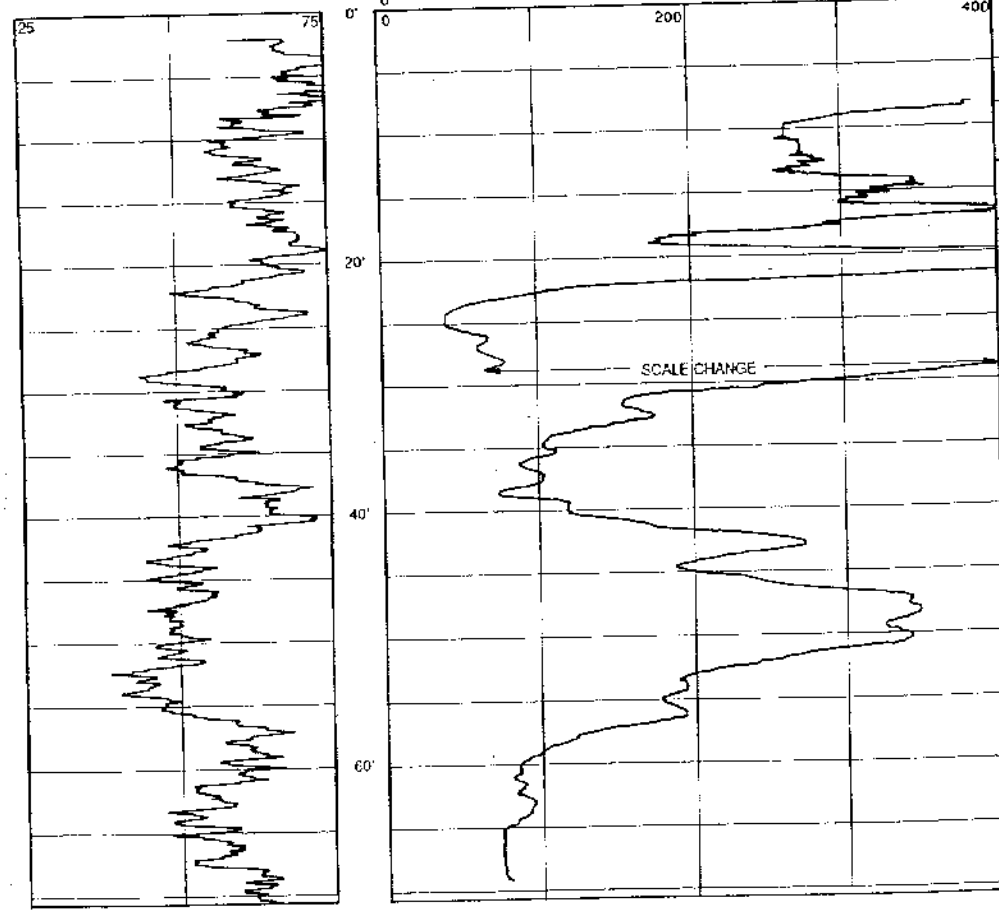
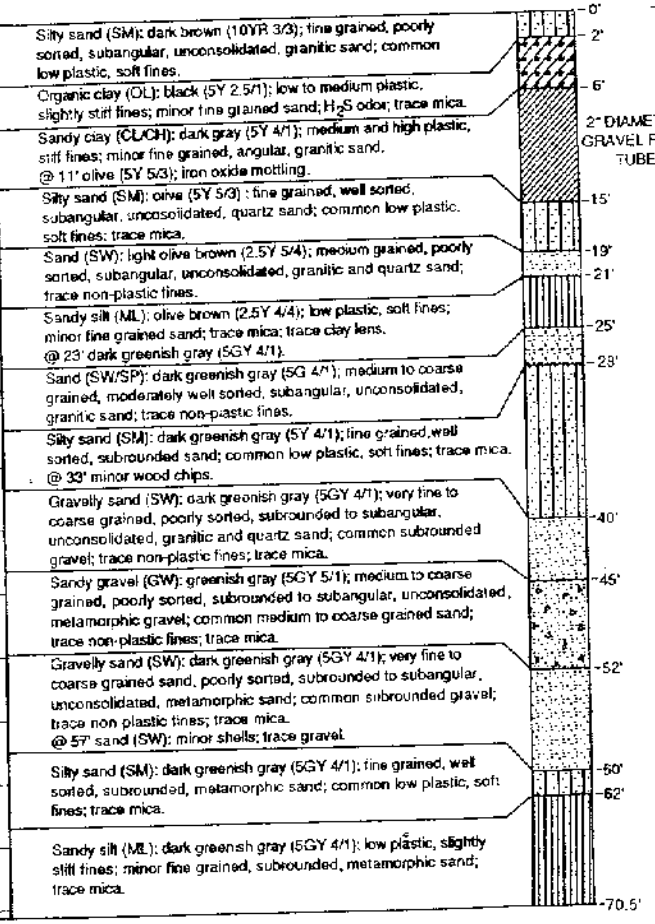
EW-1 C EXTRACTION WELL DESIGN/ LITHOLOGIC LOG

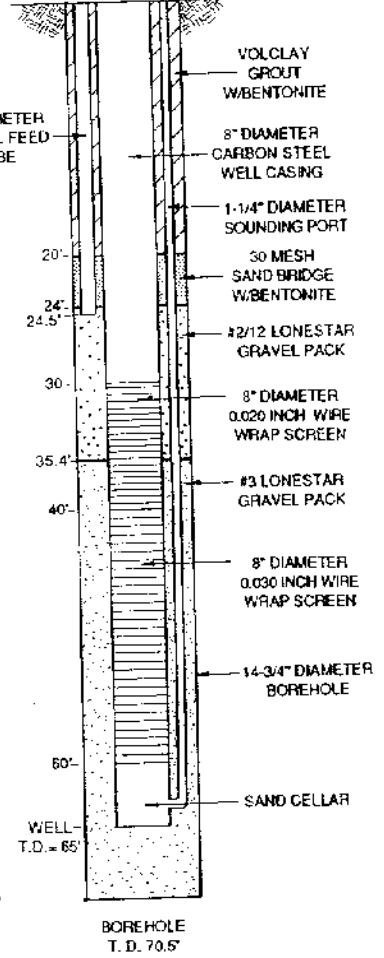
GEOPHYSICAL LOGS.



LITHOLOGIC DESCRIPTION



WELL DESIGN



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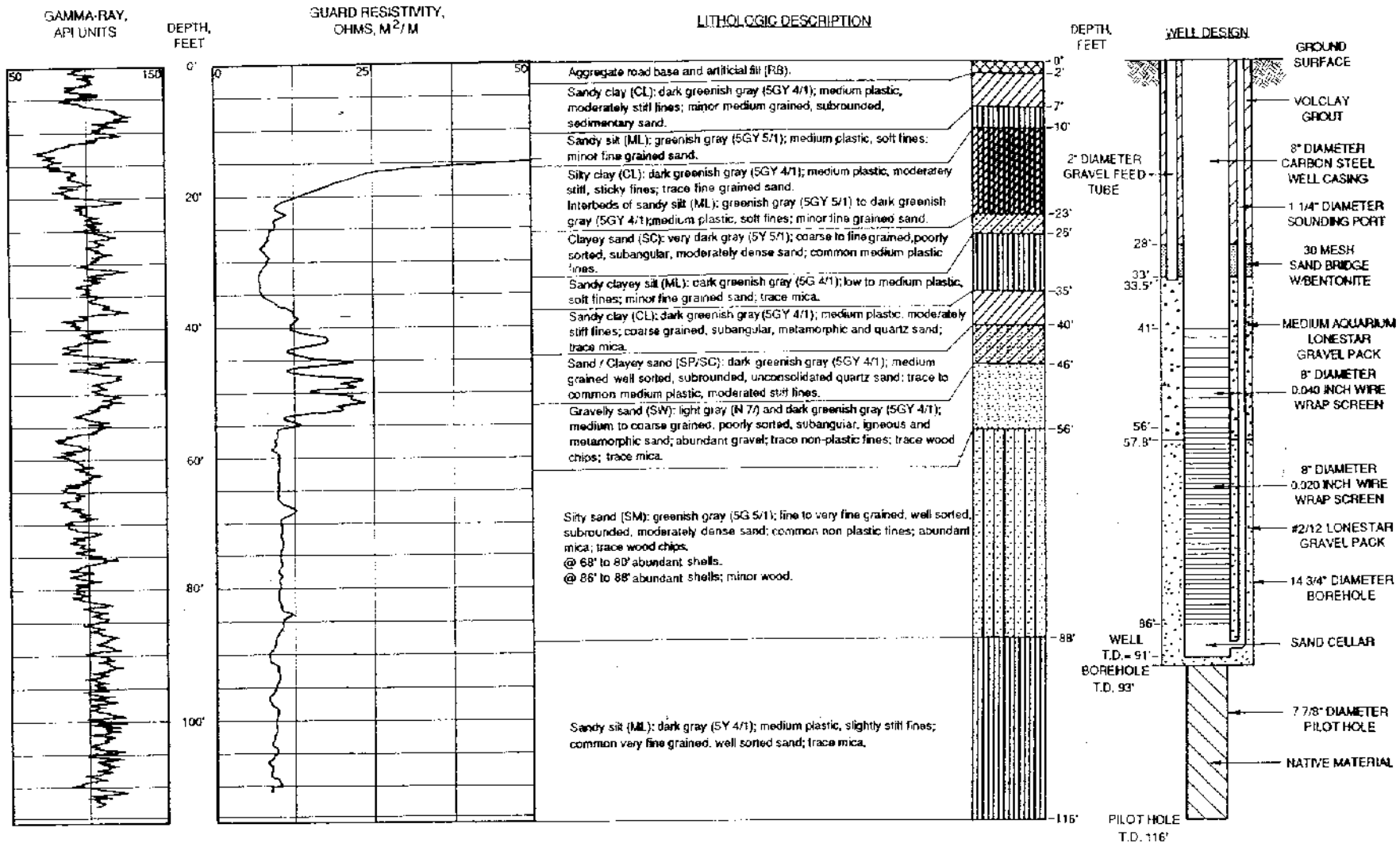
EW-3 EXTRACTION WELL
DESIGN / LITHOLOGIC LOG

GEOPHYSICAL LOGS



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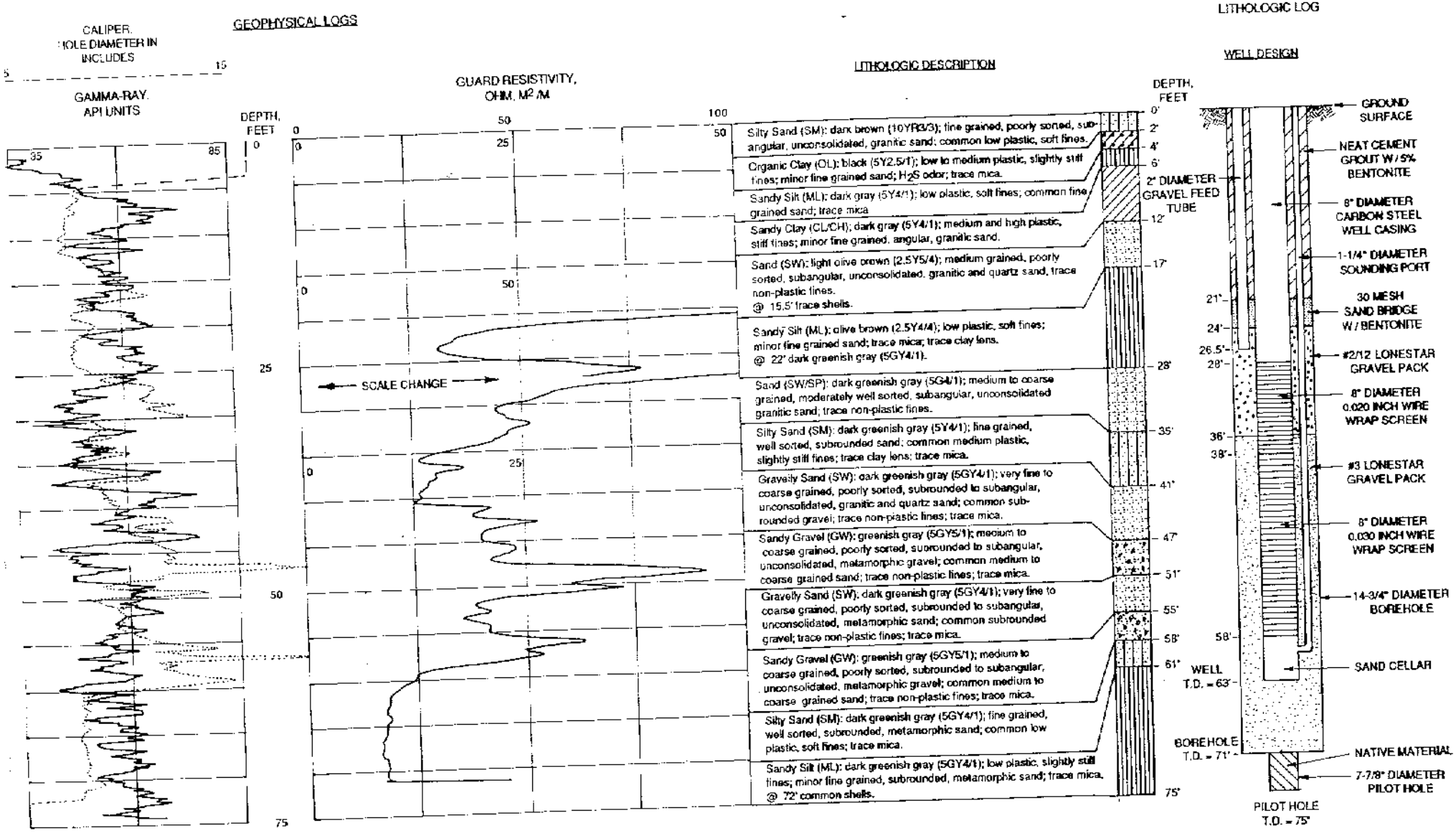
EW-9 EXTRACTION WELL DESIGN/ LITHOLOGIC LOG



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