REPORT OF WELL INSTALLATION
EXXON RETAIL SITE 7-0210
7840 AMADOR VALLEY BOULEVARD
DUBLIN, CALIFORNIA

Prepared for

Exxon Company, U.S.A.

Prepared by

EA Engineering, Science, and Technology

August 1992
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Prepared for

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Prepared by

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John Dowdakin — 28 Oct 92

John Dowdakin
Environmental Scientist — Date

28 Oct 92

Terry R. Winsor, R.G. #4719
Manager, UST Services — Date

August 1992

CONTENTS

SITE CONTACTS

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1. INTRODUCTION

At the request of Exxon Company, U.S.A., EA Engineering, Science, and Technology (EA) installed four groundwater monitoring wells and collected soil and groundwater samples to assess the nature and extent of petroleum hydrocarbons in the subsurface of Exxon Retail Site (RS) 7-0210, Dublin, California. Because petroleum hydrocarbons were found in closure soil samples collected when the underground storage tanks (USTs) were replaced in October 1991, Exxon requested that EA do a Phase I investigation of soils and groundwater.

1.1 SITE SETTING AND LOCATION

Exxon RS 7-0210 is an active service station located at 7840 Amador Valley Boulevard, on the southeast corner of the intersection of Amador Valley Boulevard and Regional Street (Figures 1 and 2), approximately one-half mile west of Interstate 680 and one-half mile north of Interstate 580. Three grades of Exxon Unleaded gasoline are stored in double-walled fiberglass-reinforced plastic (FRP) USTs and dispensed from pumps at two pump islands (Figure 3).

The immediate vicinity of the site is commercial, consisting of shopping malls and parking lots. A Unocal service station with USTs is located on the southwest corner of the intersection (Figure 2).

Exxon RS 7-0210 is located within the Dublin subbasin, which is the west part of the Livermore Valley Basin at the foot of the Dublin Hills (DWR 1963). The sediments filling the Livermore Valley Basin consist of thick gravel deposits interbedded with sand and clay (Pleistocene to Pliocene age). The site is approximately 360 feet above sea level (USGS 1961).

The nearest surface water is an unnamed intermittent stream that originates in the hills northwest of the site and flows 1,000 feet to the north of it. Dublin Creek, also an intermittent stream, flows 2,500 feet south of the site. Both streams flow in an easterly direction (USGS 1961).

1.2 SITE HISTORY

Exxon RS 7-0210 was owned and operated by Texaco until 1988, when it was purchased by Exxon. In February 1990, Exxon Company, U.S.A. replaced product dispensers and installed a vapor recovery system. In October 1991, Exxon replaced three 8,000-gallon single-walled steel underground storage tanks with 12,000-gallon double-walled fiberglass-reinforced plastic tanks. The piping was also upgraded to double-walled FRP. The locations of the present and the former tanks are indicated in Figure 3. Two 1/4-inch holes were found in the bottom of the Regular Unleaded tank and one 1/2-inch hole was found in the bottom of the Extra Unleaded tank.

2. PREVIOUS INVESTIGATIONS

2.1 INVESTIGATIVE BORING

On 16 October 1991, Alton Geoscience conducted a preliminary soil assessment by drilling and sampling one soil boring (SB1, Figure 4) approximately 10 feet southeast of the UST field. Three soil samples collected from the boring at depths of 6 feet, 10.5 feet, and 16 feet below ground surface were analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g) by EPA Method 8015 and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020. TPH-g at a concentration of 69 mg/kg was found in the sample collected 16 feet below ground surface from a silty clay soil (Table 1) (Alton Geoscience 1991). The drilling log of the exploratory boring is included in Appendix A.

2.2 REPLACEMENT OF UNDERGROUND STORAGE TANKS

EA collected required closure samples from native soils beneath the single-walled steel underground storage tanks and at the sidewalls of the tank pit when the tanks were replaced in October 1991 (EA 1991). Because TPH-g concentrations up to 1,000 mg/kg were measured in closure samples TG1-TG8 (see Figure 4 and Table 2), additional soils were excavated down to groundwater (16 feet below ground surface), where soil samples TG9–TG11 were collected; a TPH-g concentration of 300 mg/kg was measured in sample TG9, which was collected 16 feet below ground surface, approximately 2–3 feet immediately below TG4, the sample in which 1,000 mg/kg TPH-g had been found. The soil exposed in the excavation to 12 feet below ground surface was brown silty clay which contained varying amounts of sand, gravel, and black organics. Soil samples were also collected from the piping trenches (samples PL1–PL6, Figure 4 and Table 2).

3. METHODS OF INVESTIGATION

3.1 SCOPE OF WORK

On 13 and 14 May 1992, four groundwater monitoring wells, MW1–MW4 (Figure 5), were installed to investigate the distribution of petroleum hydrocarbons in the soil and groundwater beneath Exxon RS 7-0210. The wells were installed, and the soil and groundwater sampled, in accordance with EA's standard protocols (Appendix B), which are consistent with requirements of site investigations of the Alameda County Health Agency, Division of Hazardous Materials and of the Alameda County Flood Control and Water Conservation District, Zone 7.

3.2 BOREHOLE DRILLING

EA contracted West Hazmat Drilling Corporation of Hayward (C-57 License 554979) to install the wells. The boreholes for the wells were drilled with a truck-mounted rotary drill and 10.25-inch outside-diameter hollow-stem augers. MW1 was installed approximately 15 feet southeast of the edge of the former UST tank field in the anticipated downgradient direction of the tank field; an attempt was made to locate MW1 closer to (within 10 feet) the south edge of the tank field near Alton Geoscience's SB1, but pea gravel at least 2 feet thick was encountered just below the asphalt at the proposed drilling location. MW2 and MW3 were installed further away (downgradient) from the tank field, in the southeast and southwest corners of the site property, respectively, so that the groundwater/hydraulic gradient could be triangulated and to assess the potential extent of hydrocarbon dispersion. MW4 was installed upgradient of the tank field on the north side of the site, along Amador Valley Boulevard, to umpire the gradient.

The boreholes were drilled to depths of 25–28 feet below ground surface. Water was first encountered in the boreholes of MW1 and MW4 14–14.5 feet below ground surface, and static water remained at that depth. First water was encountered 15 feet below ground surface in MW2 and rose to 14.25 feet. First water was encountered in MW3 at 18 feet below ground surface and rose to 16 feet.

3.3 SOIL SAMPLING

Undisturbed soil samples were collected for laboratory analysis at 5-foot intervals in accordance with standard EA protocols (Appendix B). From each borehole one sample taken from immediately above saturated soil and one sample taken at about 11 feet below ground surface were selected for laboratory analysis. The samples were submitted under chain of custody to Pace Incorporated, where they were analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g) and as diesel (TPH-d) and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by California DHS-modified EPA Method 8015 and EPA Method 8020. The samples from MW1 were also analyzed for organic (tetraethyl) lead by California DHS Method 338.

3.4 GROUNDWATER MONITORING WELL INSTALLATION

The four boreholes were completed as groundwater monitoring wells using procedures described in Appendix B. The wells were constructed with 4-inch Schedule 40 PVC, flush-threaded casing. Screened casing, 13–15 feet long and consisting of 0.020-inch slots, was placed in each well so that 10 feet of casing extended 10 feet below static water and 5 feet extended above it. A filter pack of No. 3 Monterey sand was placed in the annular space around the well screen to 0.5–1 foot above the top of the screen. A 1.5-foot layer of bentonite pellets was placed on top of the sand pack and hydrated with water, and the well was sealed from the bentonite plug to the surface with neat cement grout.

3.5 WELL DEVELOPMENT

The wells were developed on 18 May 1992 by surging for 15 minutes with a valved surge block and purging water and suspended sediments with a bailer (MW1, MW4) or a submersible pump (MW2, MW3) until five casing volumes were removed or the well dewatered. The complete process was repeated twice. All purge water was contained on the site in properly labeled 55-gallon drums.

3.6 WELL SURVEY

On 18 May 1992, the tops of the well casings at the site were surveyed relative to a common datum (the top of the fire hydrant at the northwest corner of the site, assigned an elevation of 100.00 feet). A record of the surveying data and calculations is included with other field notes in Appendix C. The tops of the well casings were marked at the survey points to provide a reference point for future water level measurements.

3.7 GROUNDWATER SAMPLING

Groundwater samples were collected from the wells on 21 May 1992 in accordance with standard EA protocols (Appendix B) and submitted to Pace Incorporated. The samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g) and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by DHS-modified EPA Method 8015 and EPA Method 8020. Purging/sampling field forms are included in Appendix C.

4. RESULTS

4.1 HYDROGEOLOGY

The undisturbed soil samples collected during borehole drilling indicate that the soil section beneath the site consists of unconsolidated alluvial sediments. Unsaturated silts and very fine sands were found to depths of 8–14 feet below ground surface; an unsaturated clay 4–6.5 feet thick lies beneath the silts/sands. Saturated permeable material consisting chiefly of sand and gravel 4–13 feet thick was found beneath the clay. In MW2–MW4, saturated clay was found underlying the sand and gravel. Figure 6 shows the location of the geologic cross-section that is presented as Figure 7. (Figure 8 is a detail of the tank pit and boring SB1 extracted from earlier investigations.) Detailed descriptions of the soil are provided in the drill logs, included in Appendix A.

During the drilling of wells MW1–MW4 first water was encountered in the sand and gravel between 14 and 18 feet below ground surface. The water level in MW3 rose two feet in the borehole after saturated soil was encountered, suggesting that the groundwater around MW3 is hydraulically confined. A 0.75-foot rise of water in the borehole of MW2 suggests slight confining conditions in the southeast corner of the station. The aquifer in the vicinity of MW1 and MW4 appears to be unconfined.

The elevations of the tops of casing measured on 18 May were used to calculate groundwater elevations and the direction of the hydraulic gradient, based on depths to water measured on 21 May 1992. Figure 9 shows the relative elevations of groundwater and the approximate downgradient direction at the time of well sampling on 21 May. At that time the gradient of the static water table was toward the southeast at a gradient of 0.003. A summary of well gauging and groundwater elevation data is included as Table 3.

4.2 SOIL SAMPLE ANALYSIS

Soil samples collected during borehole drilling were analyzed by Pace for TPH-g and BTEX; the soil samples collected from MW1 were also analyzed for organic lead. No petroleum hydrocarbons at concentrations equal to or greater than method detection limits were found in any samples collected during borehole drilling. Organic lead concentrations in samples collected from MW1 were at or slightly greater than the method detection limit, 0.25 mg/kg at 10.5–11 feet and 0.2 mg/kg at 14–14.5 feet. Copies of the laboratory analytical reports for soil sampling are included as Appendix D, and the results are summarized in Table 4.

4.3 GROUNDWATER SAMPLE ANALYSIS

Groundwater in the wells was sampled on 21 May 1992 and analyzed for TPH-g and BTEX by Pace. No petroleum hydrocarbons at concentrations equal to or greater than method detection

limits were found in any of the groundwater samples. Copies of the laboratory analytical reports for groundwater sampling are included as Appendix E, and the results are summarized in Table 5.

5. SUMMARY

At the request of Exxon Company, U.S.A., EA conducted a soil and groundwater investigation at Exxon RS 7-0210, 7840 Amador Valley Boulevard, Dublin, California. The results of the investigation indicate the following:

- The sequence of general soil types beneath the surface of the site is (from the surface down) unsaturated silt and fine sand; unsaturated clay; permeable, saturated sand and gravel; and saturated clay.

- Groundwater at the site is hydraulically confined in the southern part of the site and unconfined in the northern and central parts. The approximate hydraulic gradient at the site is toward the southeast with a magnitude of 0.003.

- No petroleum hydrocarbons at concentrations greater than or equal to method detection limits were found either in soil samples collected during borehole drilling or in groundwater samples collected from the wells. Petroleum hydrocarbons identified by closure samples collected when the tanks were replaced do not appear to have impacted groundwater at Exxon RS 7-0210.

REFERENCES

Alton Geoscience. 1991. Preliminary Soil Assessment Report at Exxon RS 7-0210.

DWR (Department of Water Resources). 1963. Alameda County Investigation. March.

EA (EA Engineering, Science, and Technology). 1991. Report of Closure Sampling, Exxon Retail Site 7-0210. Prepared for Exxon Company, U.S.A., Construction and Maintenance. EA, Lafayette, California.

USGS (U.S. Geological Survey). 1961. Dublin, California, 15-Minute Topographical Quadrangle. USGS, Denver.

Alton Geoscience
1991

Need Report +

FIGURES

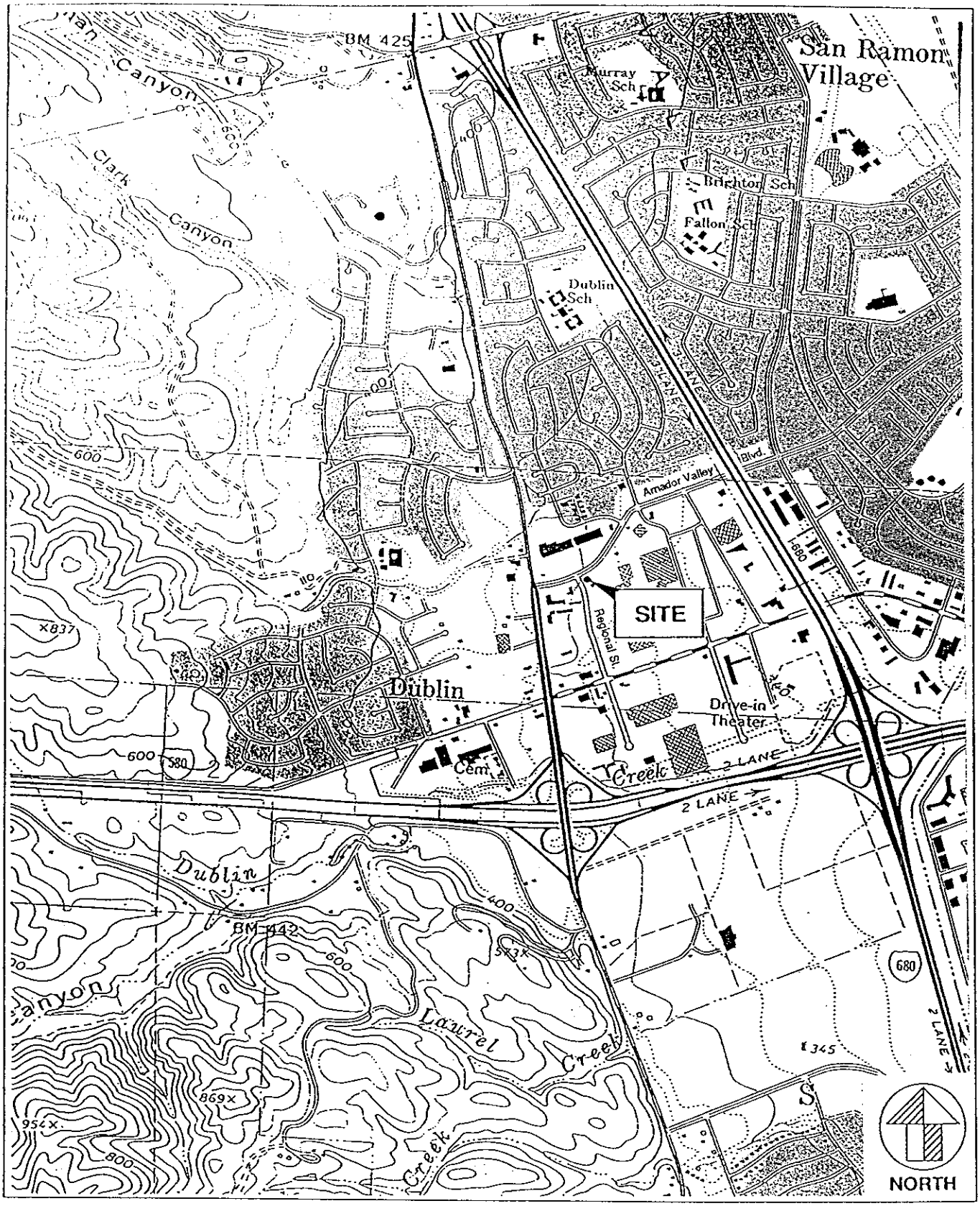

Figure 1. Location and topography, Exxon RS 7-0210, 7840 Amador Valley Boulevard, Dublin, California.

0 1,600 3,200
Feet

ENVIRONMENTAL SERVICES
Western Division

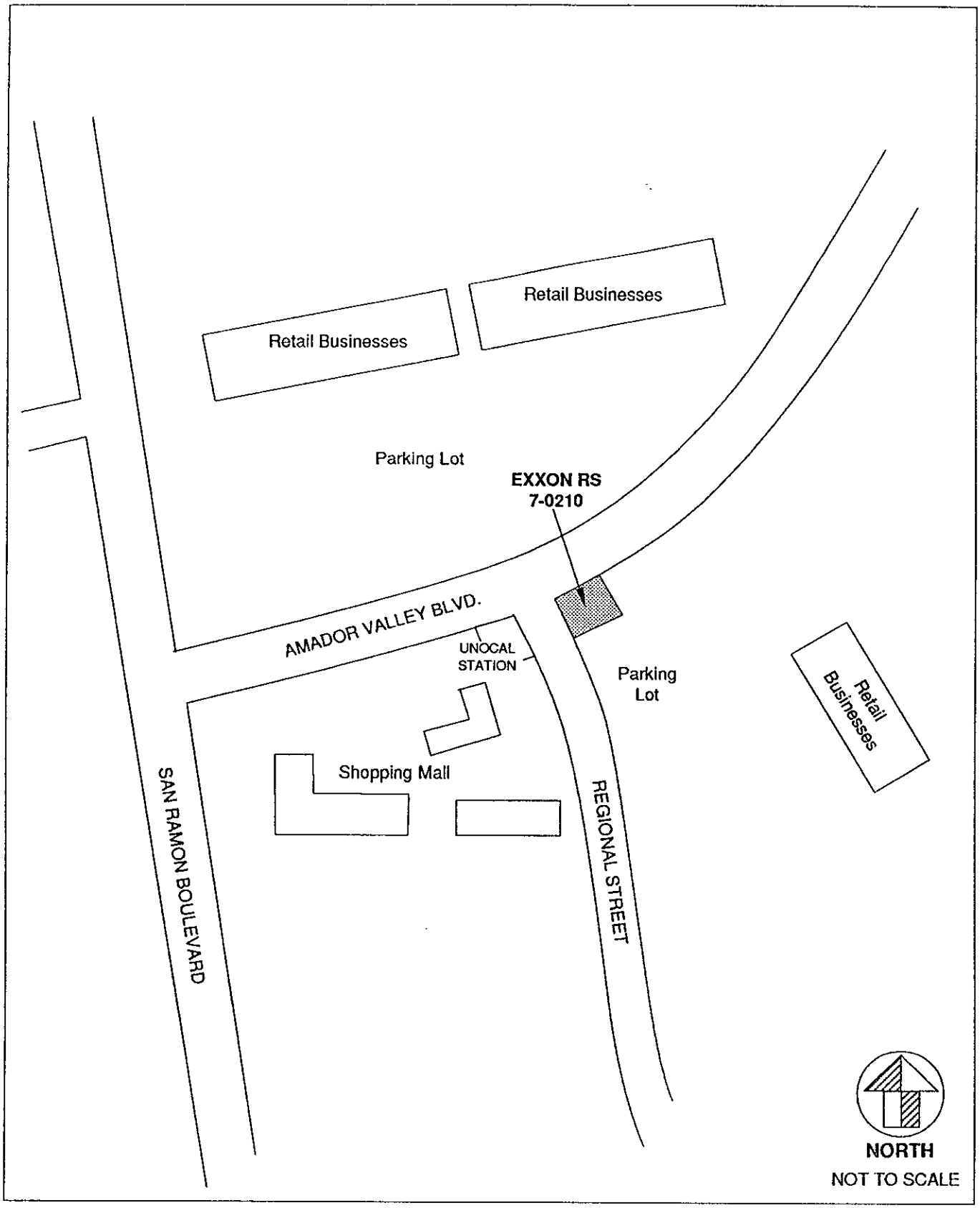

Figure 2. Land use and site vicinity, Exxon RS 7-0210, 7840 Amador Valley Blvd., Dublin, California.

Drawn	RK	Date	6/10/92
Reviewed		Date	
Rev. 1		Date	
Final		Date	8/00/92

MDRW/7-0210/ROI/JUN92

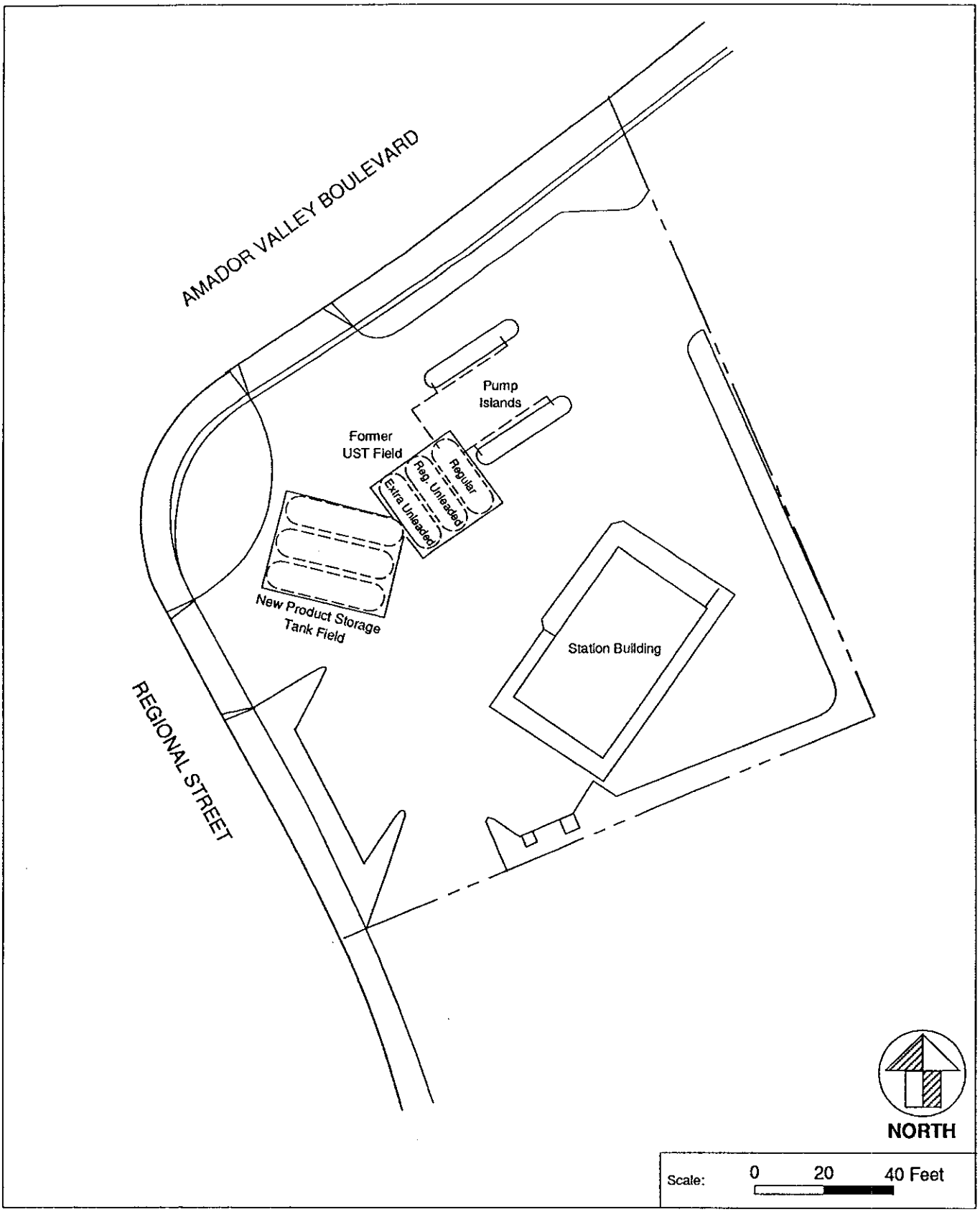

Figure 3. Location of the present and former storage tank fields, Exxon RS 7-0210, 7840 Amador Valley Road, Dublin, California.

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Reviewed		Date	
Rev. 1		Date	
Final		Date	28 Oct 92

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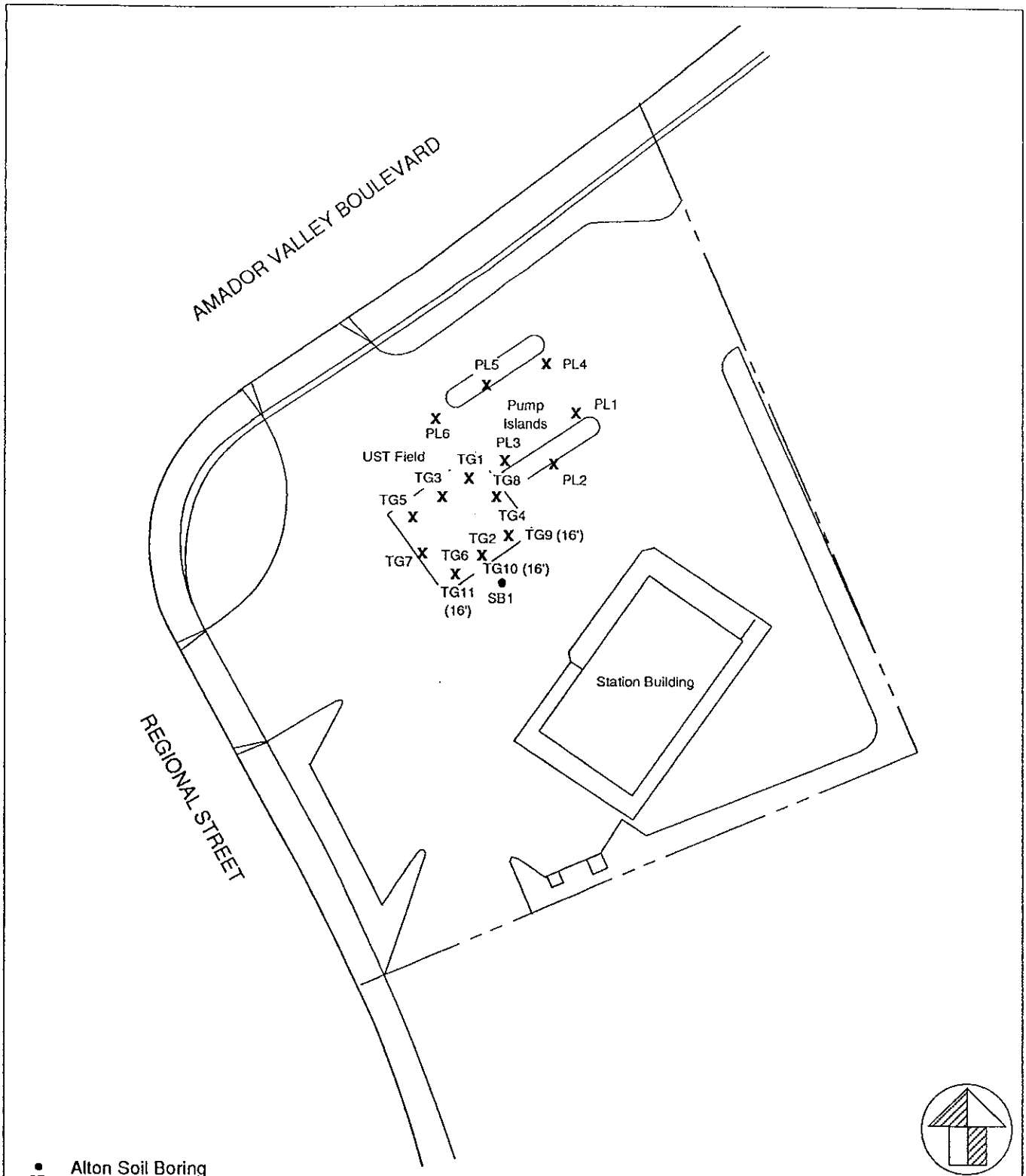

Figure 4. Location of soil boring SB1 (16 October 1991) and soil closure samples collected from the former product storage tank field and piping trenches (30 October 1991), Exxon RS 7-0210, Dublin, California.

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Reviewed		Date	
Rev. 1		Date	
Final	TRW	Date	28 Oct 92

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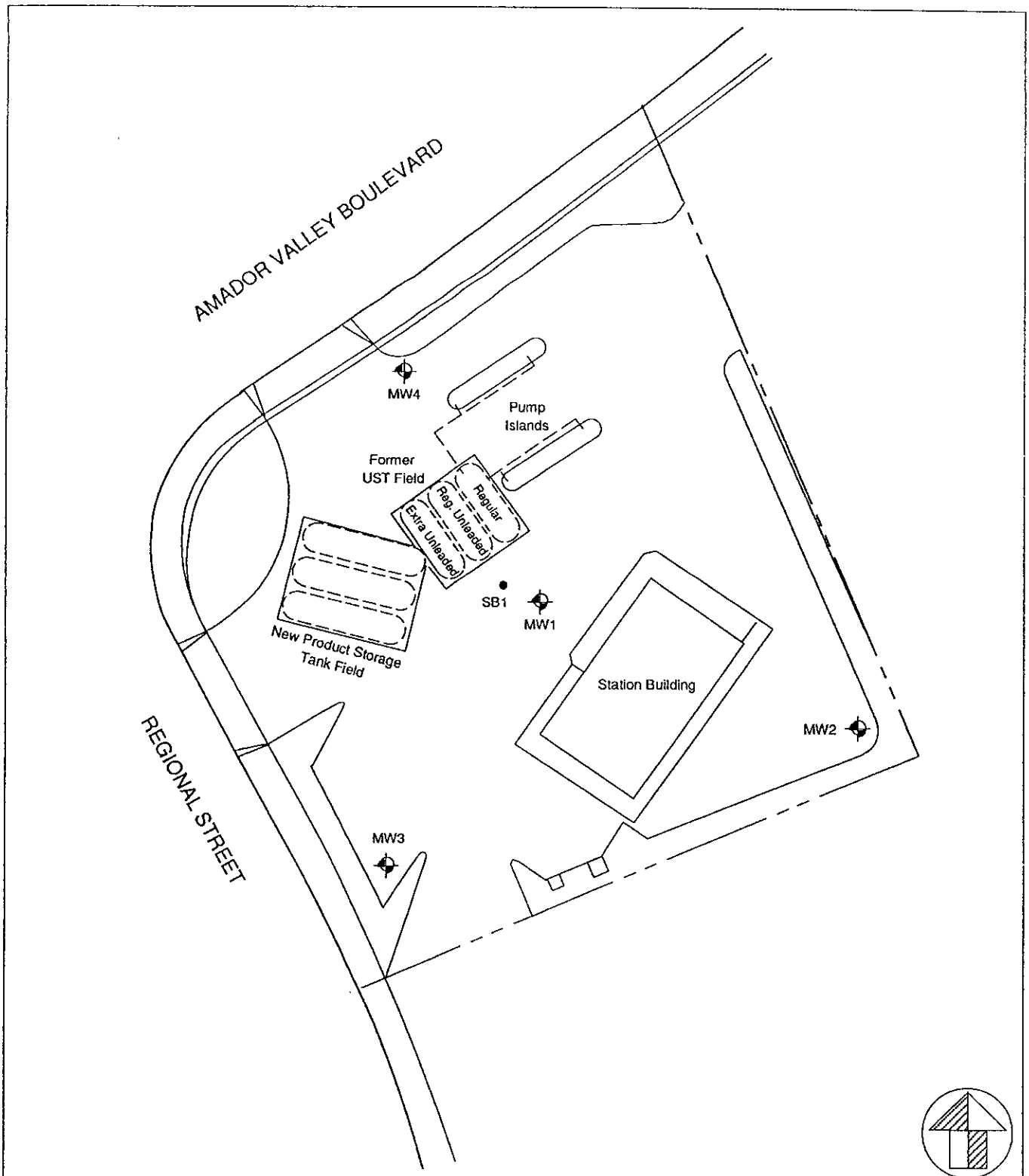

Figure 5. Locations of groundwater monitoring wells, Exxon RS 7-0210, 7840 Amador Road, Dublin, California.

Drawn	RK	Date	6/10/92
Reviewed		Date	
Rev. 1		Date	
Final	TRO	Date	7/20/92

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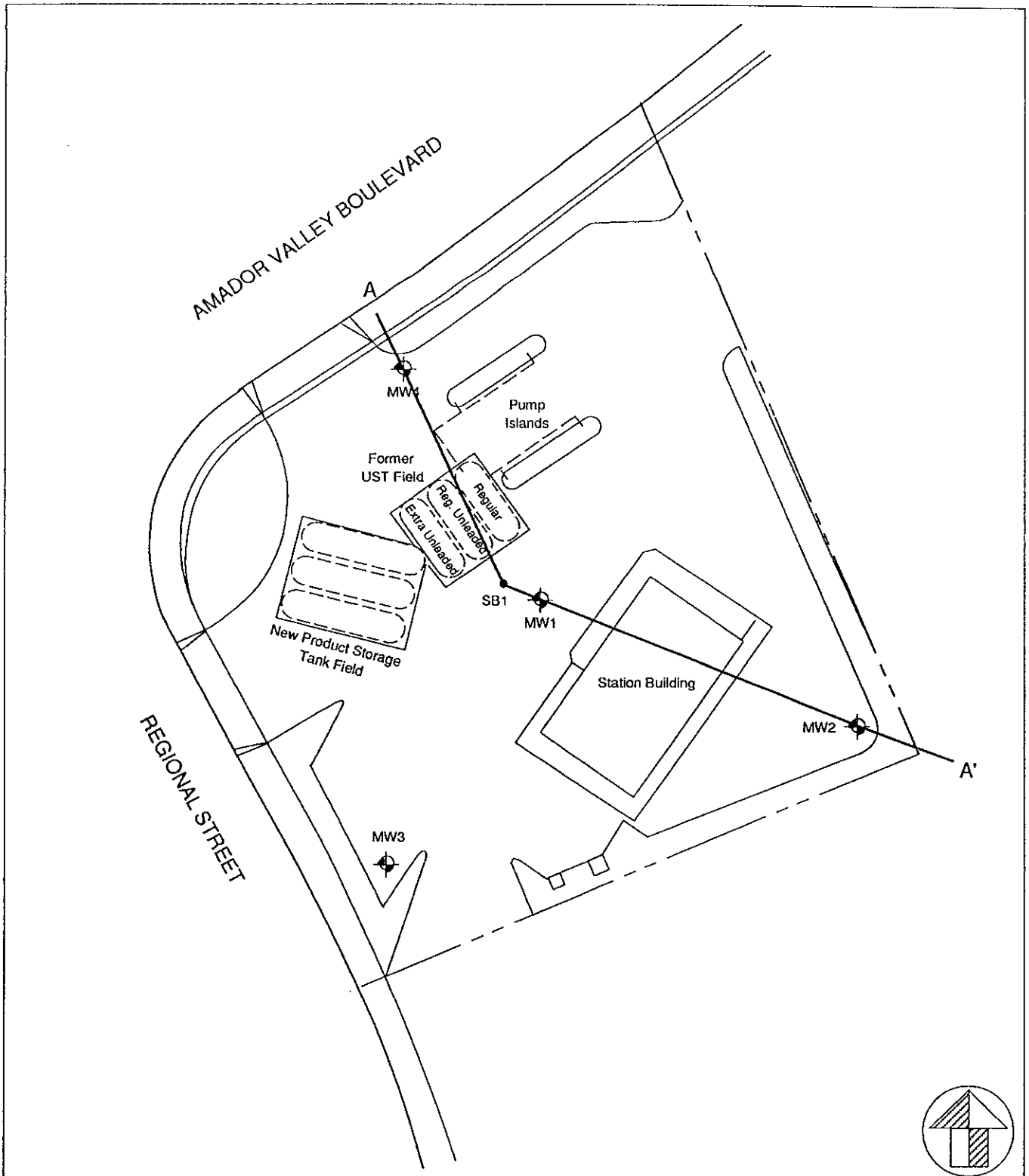

Figure 6. Site plan showing locations of existing monitoring wells and geologic cross-section at A-A', Exxon RS 7-0210, 7840 Amador Valley Road, Dublin, California.

Drawn	RK	Date	6/10/92
Reviewed		Date	
Rev. 1		Date	
Final	TKW	Date	7/20/92

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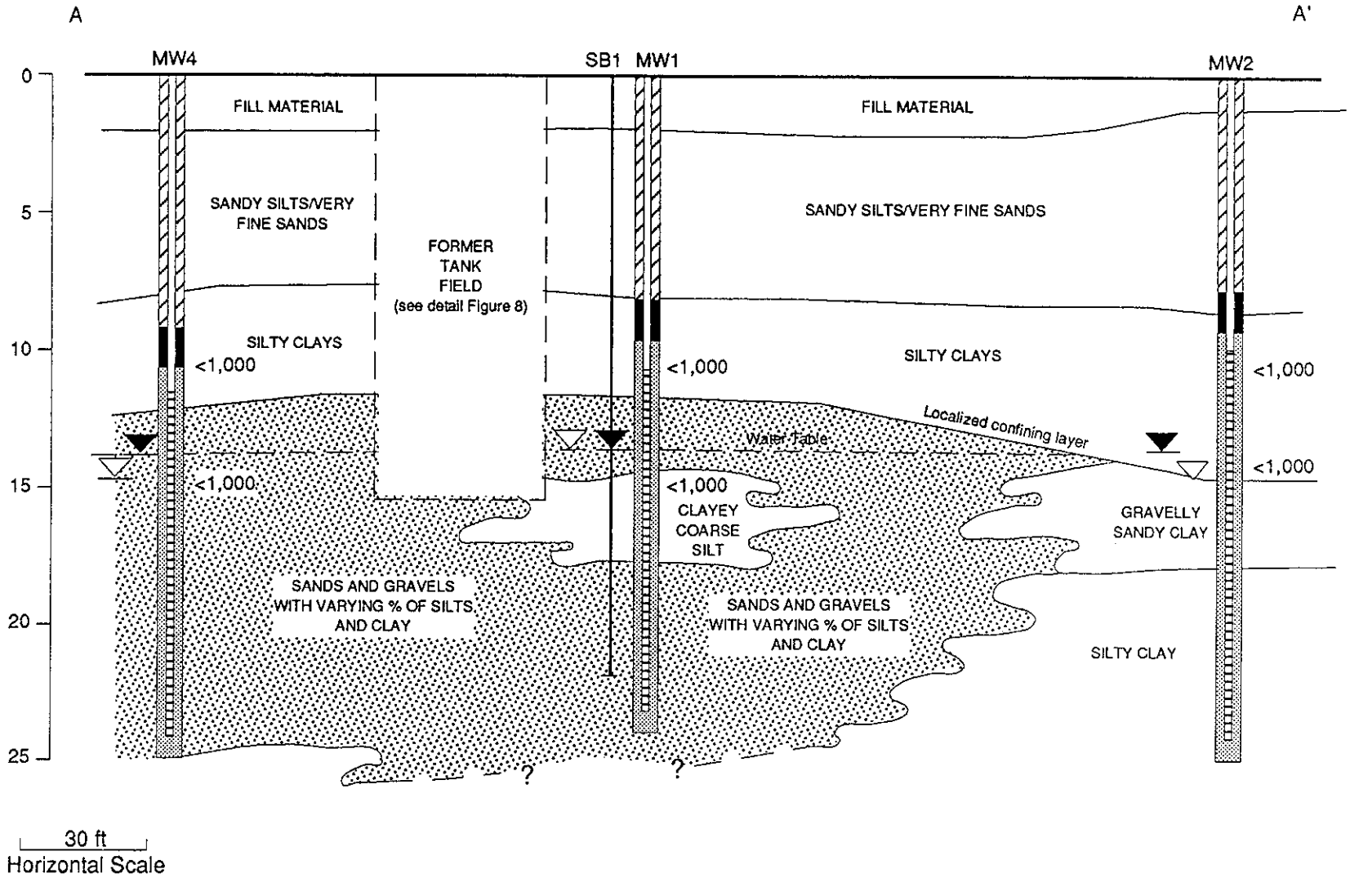


Figure 7. Schematic geologic cross-section A-A' with concentrations (µg/L) of TPH-g in soil samples collected at indicated boreholes and depths, Exxon RS 7-0210, Dublin, California.

Drawn	RK	Date	6/15/92
Reviewed		Date	
Rev. 1		Date	
Final	TKJ	Date	6/22/92

MDRW/7-0210/ROI/JUN92

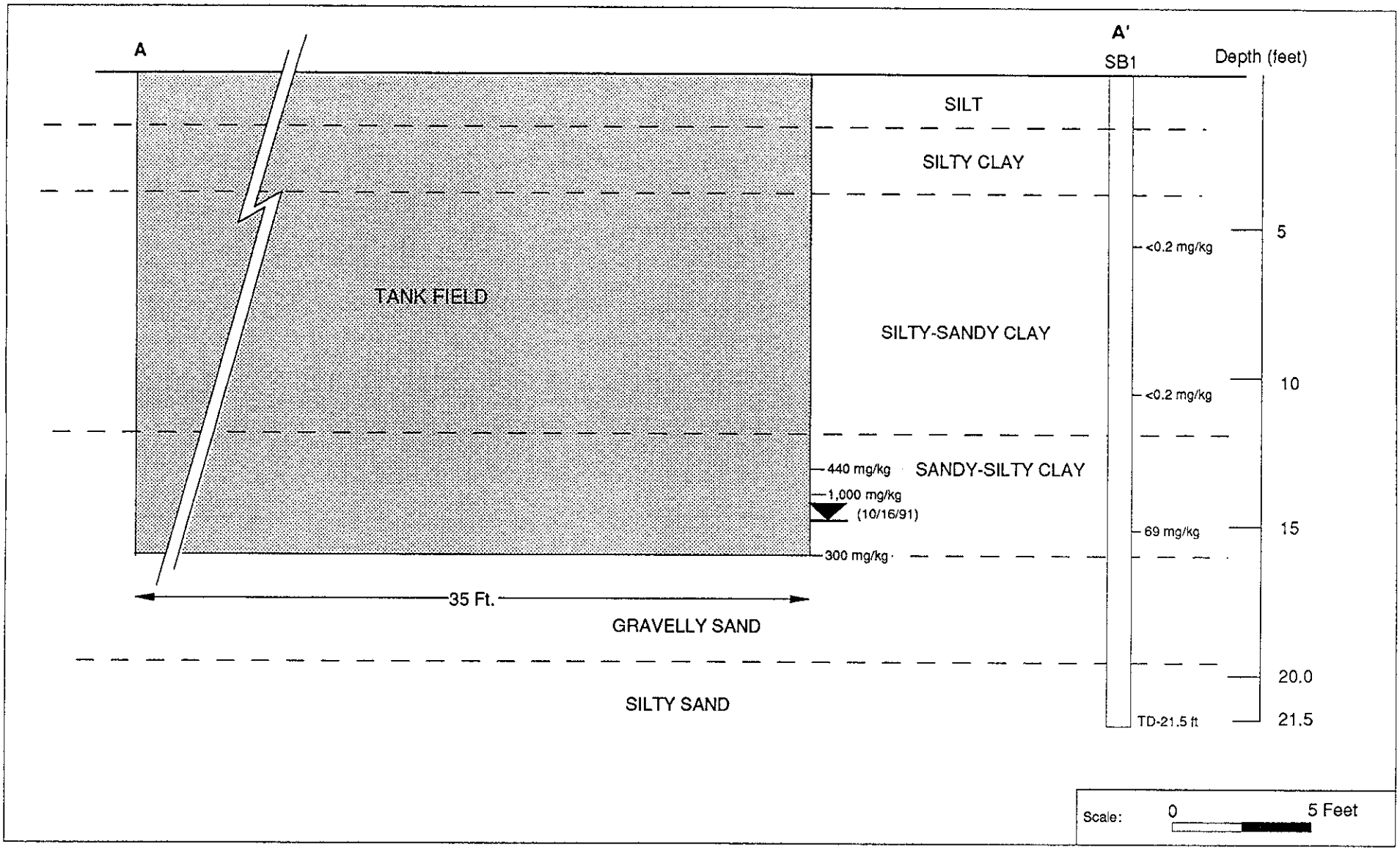


Figure 8. Geologic cross-section A-A', with concentrations of TPH-g in soil samples collected at indicated locations, , Exxon RS 7-0210, 7840 Amador Valley Road, Dublin, CA.

Drawn	RK	Date	6/10/92
Reviewed		Date	
Rev. 1		Date	
Final	TKL	Date	8 Oct 92

MDRW/0210/ROI/JUN92

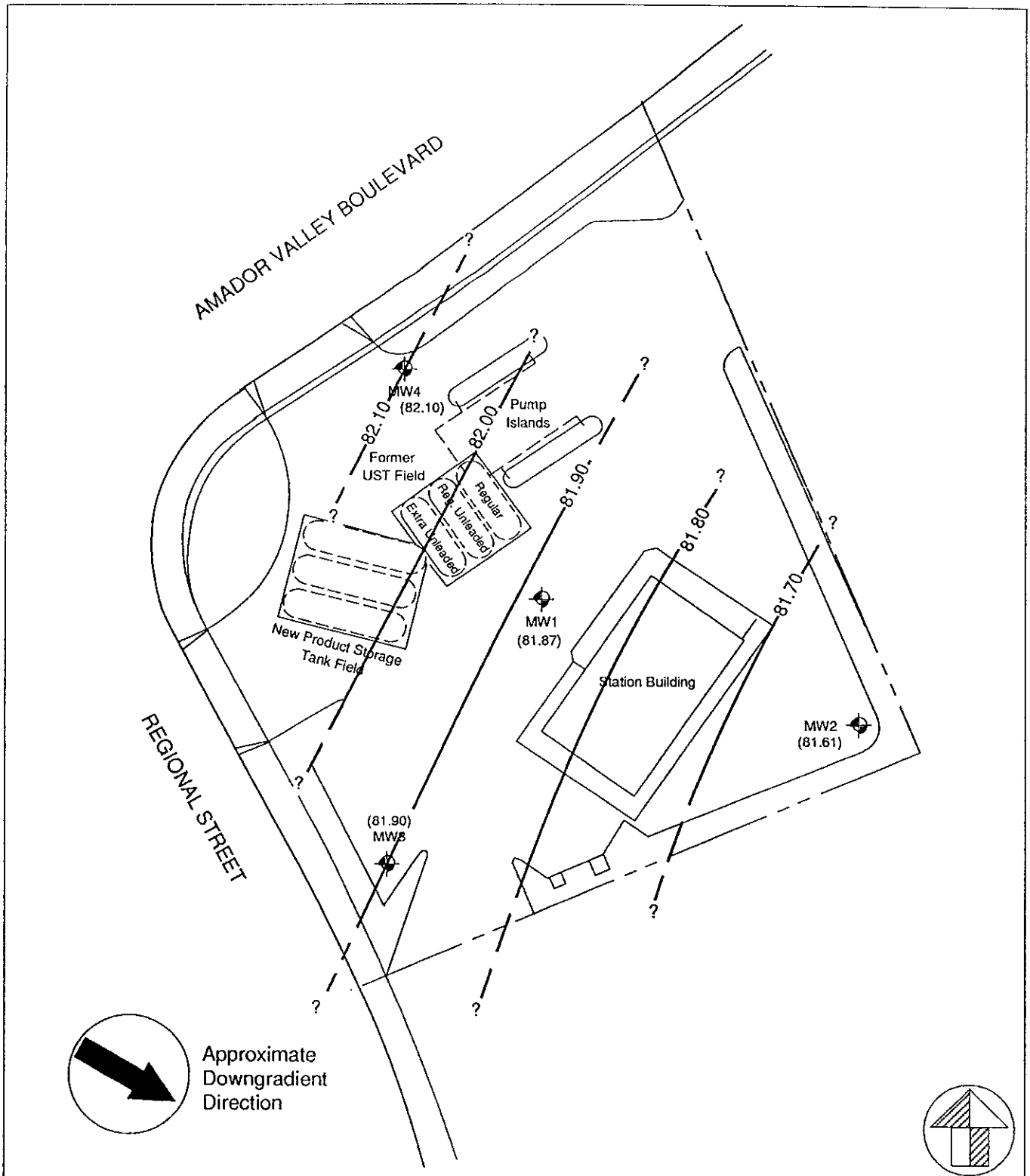


Figure 9. Elevations of groundwater (in feet, relative to a common datum) and indicated approximate direction of hydraulic gradient, Exxon RS 7-0210, Dublin, California, 21 May 1992.

Drawn	RK	Date	6/10/92
Reviewed		Date	
Rev. 1		Date	
Final	TKW	Date	10/14/92

MDRW/7-0210/ROI/JUN92

TABLES

TABLE 1 CONCENTRATIONS (mg/kg) OF PETROLEUM HYDROCARBONS IN SOIL SAMPLES COLLECTED FROM A SOIL BORING DRILLED BY ALTON GEOSCIENCE, EXXON RS 7-0210, DUBLIN, CALIFORNIA, 16 OCTOBER 1991

Sample No.	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH-g
SB-1	5.5–6	<0.001	<0.001	<0.001	<0.001	<0.2
SB-1	10–10.5	<0.001	<0.001	<0.001	<0.001	<0.2
SB-1	15.5–16	0.045	0.150	0.670	2	69

TABLE 2 CONCENTRATIONS (mg/kg) OF PETROLEUM HYDROCARBONS IN SOIL CLOSURE SAMPLES COLLECTED FROM THE FORMER TANK PIT (TG) AND PRODUCT LINES (PL), EXXON RS 7-0210, DUBLIN, CALIFORNIA, 30 OCTOBER 1991

Sample No.	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH-g	TPH-d
TG1	12	<0.005	<0.005	0.009	0.007	<1.0	NA
TG2	13	0.25	0.75	3.2	14	440	<5.0
TG3	15	0.023	0.074	0.064	0.21	7.5	NA
TG4	14	1.2	8.8	17	98	1,000	<5.0
TG5	15	0.025	<0.005	0.037	0.044	13	NA
TG6	14	0.046	<0.005	0.13	0.075	21	<5.0
TG7	13	<0.005	<0.005	<0.005	0.038	<1.0	NA
TG8	15	<0.005	<0.005	<0.005	<0.005	<1.0	NA
TG9	16	0.68	0.69	5.7	21	300	NA
TG10	16	0.010	<0.005	0.052	0.13	2.8	NA
TG11	16	<0.005	<0.005	<0.005	<0.005	<1.0	<5.0
PL1	2.5	<0.005	<0.005	<0.005	<0.005	<1.0	NA
PL2	2.5	<0.005	<0.005	<0.005	<0.005	<1.0	NA
PL3	2.5	<0.005	<0.005	<0.005	<0.005	<1.0	NA
PL4	2.5	<0.005	<0.005	<0.005	<0.005	<1.0	NA
PL5	2.5	<0.005	<0.005	<0.005	<0.005	<1.0	NA
PL6	2.5	<0.005	<0.005	<0.005	<0.005	<1.0	NA

NA Not analyzed for this constituent.

TABLE 3 DEPTHS AND RELATIVE ELEVATIONS OF WATER IN GROUNDWATER MONITORING WELLS, EXXON RS 7-0210, DUBLIN, CALIFORNIA, 21 MAY 1992

Well Number	Elevation[a] Top of Casing	Depth to Water	Elevation[a] Top of Groundwater
MW1	96.32	14.45	81.87
MW2	95.91	14.30	81.61
MW3	97.95	16.05	81.90
MW4	96.69	14.59	82.10

a. Elevation relative to a common datum: top of fire hydrant at northwest corner of the site, assigned an elevation of 100.00 feet.

TABLE 4 CONCENTRATIONS (µg/kg) OF PETROLEUM HYDROCARBONS IN SOIL SAMPLES, EXXON RS 7-0210, DUBLIN, CALIFORNIA, 13–14 MAY 1992

Well No.	Sample Depth (feet)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH-g	Organic Lead
MW1	10.5–11	<5.0	<5.0	<5.0	<5.0	<1,000	250
	14–14.5	<5.0	<5.0	<5.0	<5.0	<1,000	200
MW2	11–11.5	<5.0	<5.0	<5.0	<5.0	<1,000	NA
	14.5–15	<5.0	<5.0	<5.0	<5.0	<1,000	NA
MW3	11–11.5	<5.0	<5.0	<5.0	<5.0	<1,000	NA
	15.5–16	<5.0	<5.0	<5.0	<5.0	<1,000	NA
MW4	11–11.5	<5.0	<5.0	<5.0	<5.0	<1,000	NA
	14.5–15	<5.0	<5.0	<5.0	<5.0	<1,000	NA

NA Not analyzed for this constituent.

TABLE 5 CONCENTRATIONS (µg/L) OF PETROLEUM HYDROCARBONS IN GROUNDWATER SAMPLES, EXXON RS 7-0210, DUBLIN, CALIFORNIA, 21 MAY 1992

Sample No.	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH-g
MW1	<0.5	<0.5	<0.5	<0.5	<50
MW2	<0.5	<0.5	<0.5	<0.5	<50
MW3	<0.5	<0.5	<0.5	<0.5	<50
MW4	<0.5	<0.5	<0.5	<0.5	<50
Rinse blank	<0.5	0.5	<0.5	<0.5	<50
Trip blank	<0.5	0.5	<0.5	<0.5	<50

APPENDIX A

Soil Boring Logs and Completion Details

ALTON GEOSCIENCE
LOG OF EXPLORATORY BORING

PROJECT NO. 30-0602 DATE DRILLED 10-16-91
CLIENT EXXON COMPANY, U.S.A.
LOCATION AMADOR VALLEY RD., DUBLIN
LOGGED BY M. TAYLOR APPROVED BY

BORING NO SB-1

Page 1 of 1

FIELD SKETCH OF BORING LOCATION:

(SEE SITE DIAGRAM)

DRILLING METHOD HOLLOW STEM AUGER HOLE DIAM. 4"
SAMPLER TYPE SPLIT-SPOON
DRILLER WEST HAZMAT DRILLING

WATER LEVEL	15'		
DATE	10-16-91		
TIME	11:30 AM		

BLOWS PER 1/2 FOOT	CGI (PPM)	SAMPLE	DEPTH	PENETROMETER TONS/SQ. FT	BORING CLOSURE	USCS	PROFILE	DESCRIPTION
								ASPHALT
	0		2			CH		SILTY CLAY, with gravel, dk. brown, moist
	0		4			ML		SANDY SILT; with gravel, brown, moist
						SM		SILTY SAND, with gravel, brown, moist
8, 8, 9	0		6	0		SW		GRAVELLY SAND, brown, m. dense, moist
9, 10, 11	0		8	2.25		CL		SILTY CLAY, brown, very stiff, moist
			10					
4, 5, 7				2.0				SILTY CLAY, with some sand, greenish brown, stiff, moist
			12					
			14					
4, 6, 8	25		16	2.0		CL		▽ SILTY CLAY, greenish brown, stiff, wet
			18			SW		GRAVELLY SAND, brown, m. dense, wet
				NEAT CEMENT				
10, 6, 2			20	0		SM		SILTY SAND, brown, loose, wet
			22					BORING TERMINATED @ 21.5'
			24					
			26					
			28					
			30					
			32					
			34					
			36					

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

CLIENT	SITE NUMBER	LOCATION
Exxon Company U.S.A.	RS 7-0210	7840 Amador Valley Rd. Dublin, CA

DRILLING AND SAMPLING METHODS: 10.25" Hollow Stem Auger; 2" Split Spoon Sampler

LOG OF SOIL BORING MW1

Coordinates:

Elevation top of casing:

Casing below surface:

				DRILLING START	DRILLING FINISH
WATER LEVEL	14.15				
TIME	17:25			TIME 15:00	TIME 17:50
DATE	4/14/92			DATE 5/14/92	DATE 5/14/92
REFERENCE	TOC				

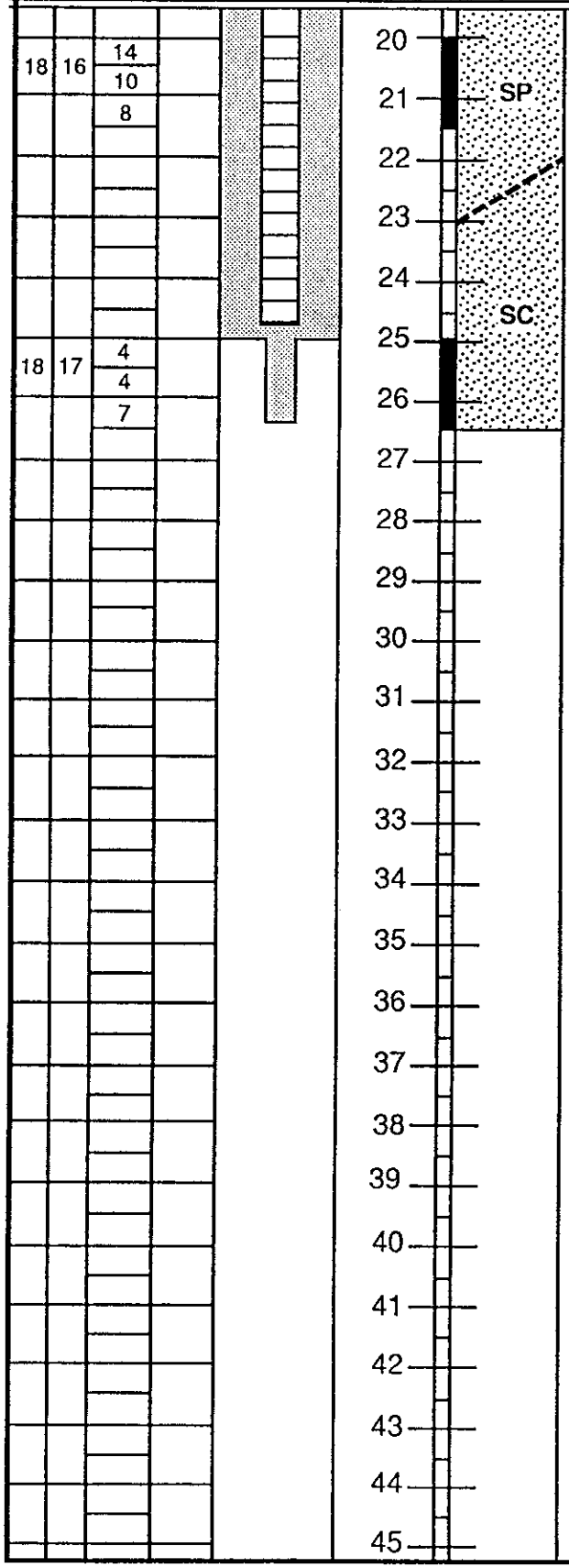
SURFACE CONDITIONS: Dry asphalt.

DESCRIPTION by: J. Dowdakin

REGISTERED GEOLOGIST — ROBERT R. WINSOR — No. 4719 — STATE OF CALIFORNIA

Inches Driven	Inches Recover	Blows/6" Sampler	OVA Reading	WELL DETAIL	DEPTH (Feet)	GRAPHIC LOG	DESCRIPTION
					0		Asphalt.
					1	GM	Silty sand and gravelly fill.
					2		
					3	OL	Sandy,clayey silt, black, moist, semi-friable, no odor. Occasional (25%) gravel to 1/2 cm., some precipate nodules.
					4		
18	14	4 4	0		5	SM	Very fine silty sand with pockets of coarse sand grains, greenish-brown, moist, no odor.
		6			6		
					7		
					8		
					9		
18	14	5 7	0		10	CL	Silty clay with occasional coarse sand grains (5%), greenish-brown, moist, stiff, semi-plastic, no odor.
		9			11		
					12		
					13		
		4			14	SC	Clayey sand and gravel, gravel to 2 cm. 30%, greenish-grey, saturated, very slight weathered HC odor. Decreasing gravel with depth.
18	15	7 7	1		15		
18	14	4 7	1		16	ML	Clayey coarse silt, greenish-grey, wet to saturated, semi-plastic, weathered HC odor, 10% gravel to 3 cm.
		7			17		
					18		
					19	SW	
					20		

LOG OF SOIL BORING **MW1**	CLIENT	SITE NUMBER	LOCATION
	Exxon Company U.S.A.	RS 7-0210	7840 Amador Rd. Dublin, CA

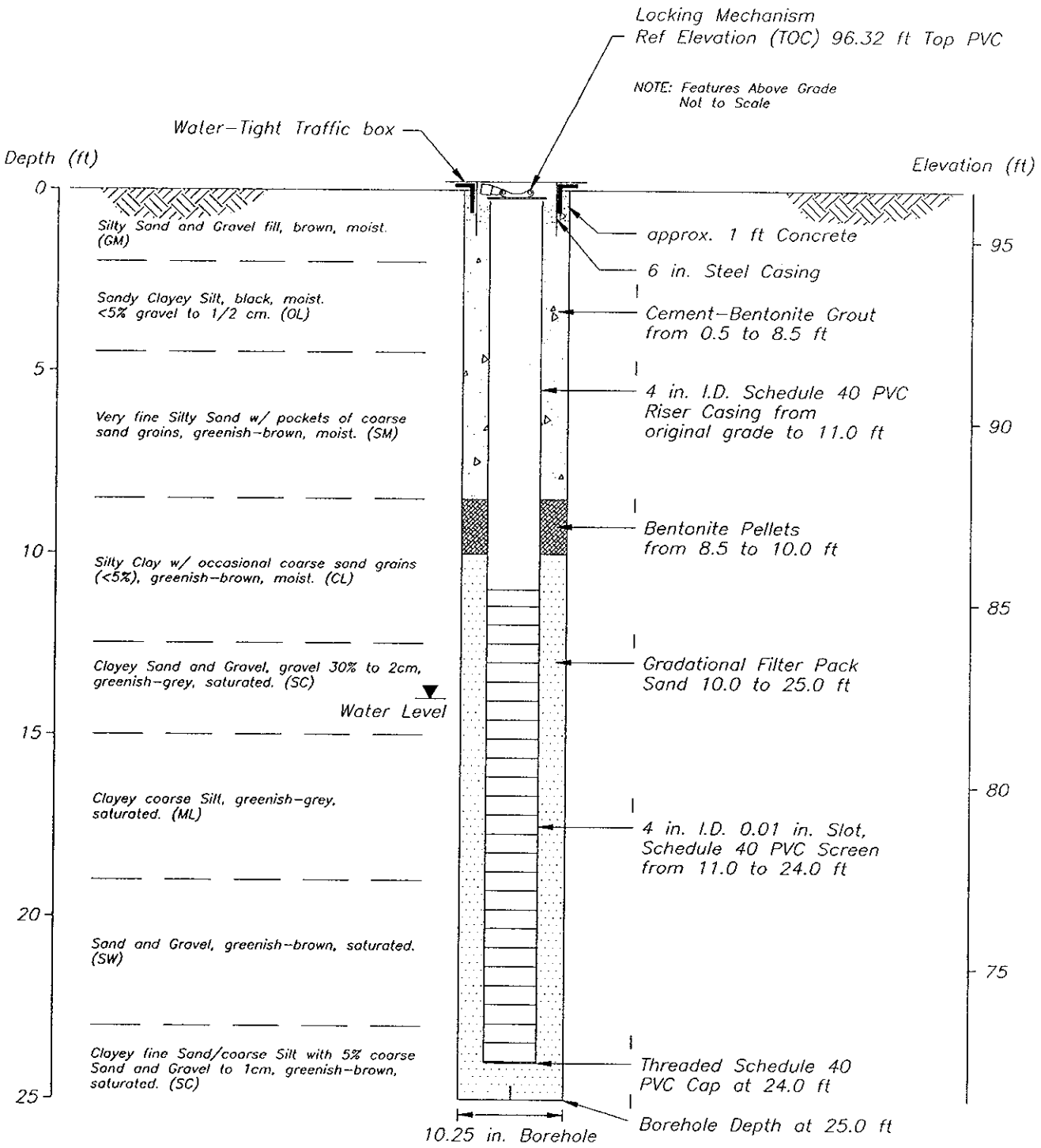


Sand and gravel, greenish-brown, saturated, no odor.

Clayey, very fine sand/coarse silt with 5% coarse sand and gravel to 1 cm., greenish-brown, saturated, no odor.

WELL NO: MW1

WELL COMPLETION DIAGRAM



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Client: EXXON

Location: DUBLIN, CA

Site: RS 7-0210

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LOG OF SOIL BORING MW2

Coordinates:

Elevation top of casing:

Casing below surface:

CLIENT	SITE NUMBER	LOCATION
Exxon Company U.S.A.	RS 7-0210	7840 Amador Valley Rd. Dublin, CA

DRILLING AND SAMPLING METHODS: 10.25" Hollow Stem Auger; 2" Split Spoon Sampler

				DRILLING START	DRILLING FINISH
WATER LEVEL	14.9	14.25			
TIME	16:00	9:30		TIME 15:30	TIME 18:00
DATE	5/13/92	5/14/92		DATE 5/13/92	DATE 5/13/92
REFERENCE	Surf.	TOC			

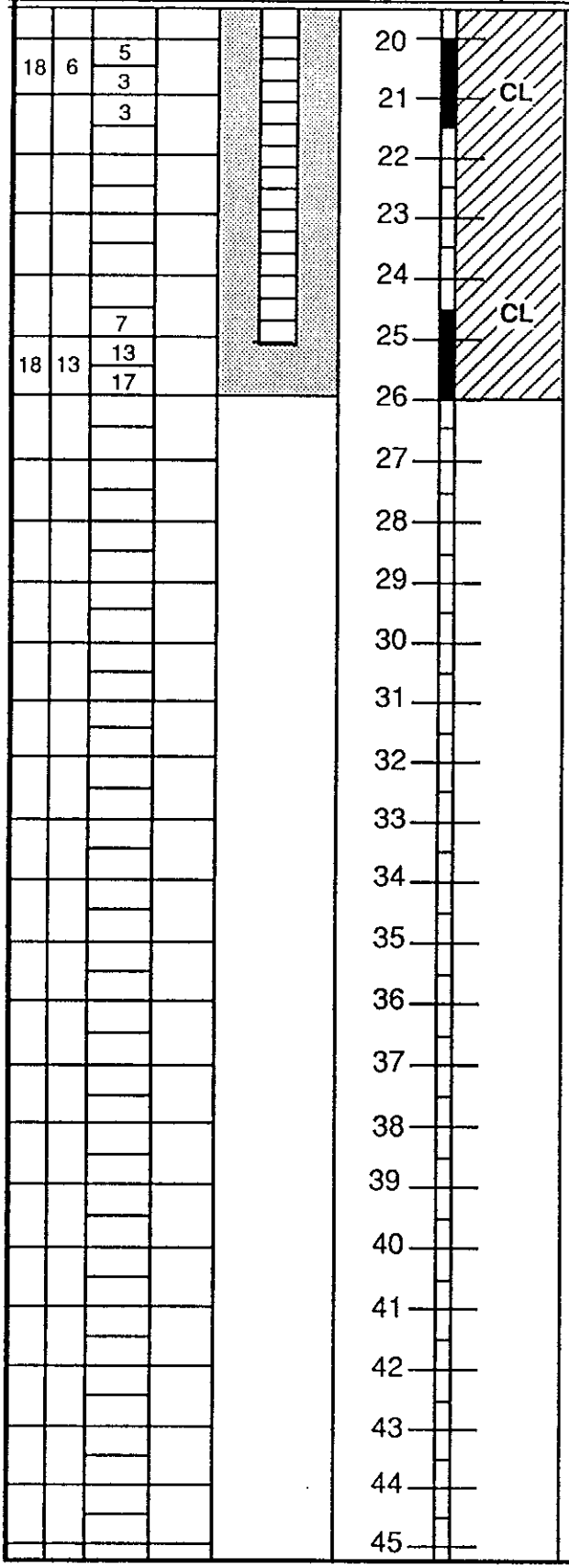
SURFACE CONDITIONS: Dry asphalt.

DESCRIPTION by: J. Dowdakin

REGISTERED GEOLOGIST J. DOWDAKIN No. 4719 STATE OF CALIFORNIA

Inches Driven	Inches Recover	Blows/6" Sampler	OVA Reading	Depth (Feet)	Graphic Log	Description
				0		Asphalt and base rock.
				1		
				2	OL	Sandy silt, black with brown streaking, moist, friable, no odor.
				3		Gravelly lens at 3-3 1/2 ft.
				4		
18	9	5, 4, 4	0	5	ML	Coarse silt/very fine sand with occasional coarse sand grains, greenish-brown, soft, moist, no odor.
				6		
				7		
				8		
				9		
18	13	5, 7, 10	0	10	CL	Silty clay, grey-brown, soft, semi-plastic, moist, no odor.
				11		
				12		
				13		
18	12	5, 10, 10	0	14 ▼	CL	As above, but increasing silt and moisture content.
18	14	7, 7, 7	0	15 ▽		Gravelly, sandy clay, gravel to 1 cm. 30%, brown, wet, no odor. Colored layers of clayey sand and gravel with less moisture content.
				16	CL/GC	
				17		
				18		
				19	CL	
				20		

LOG OF SOIL BORING **MW2**	CLIENT	SITE NUMBER	LOCATION
	Exxon Company U.S.A.	RS 7-0210	7840 Amador Rd. Dublin, CA

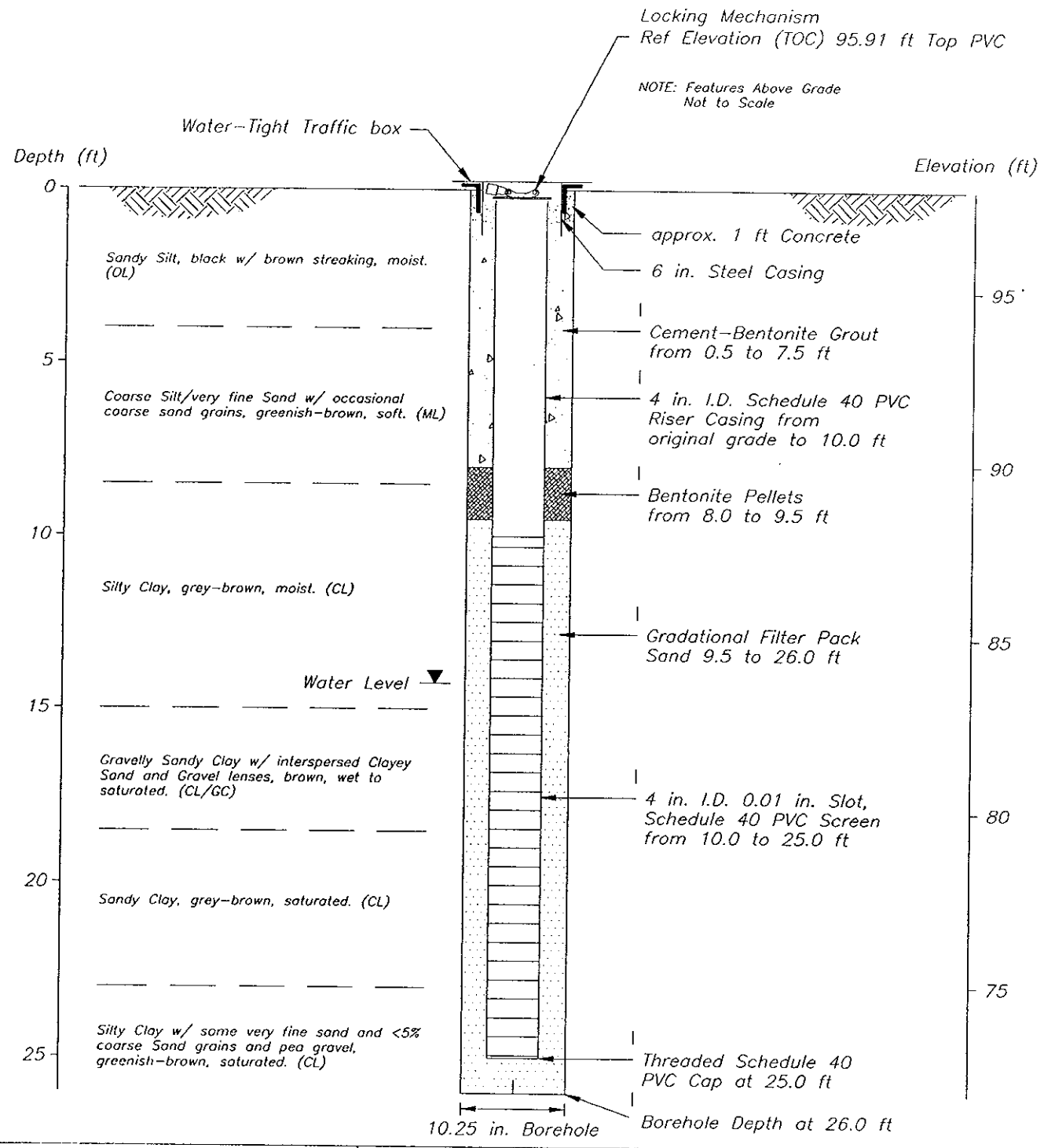


Sandy clay, sand size varies in lenses, very fine to fine, grey-brown, saturated, soft, no odor.

Silty clay with some very fine sand and occasional (<5%) coarse sand and pea gravel, green-brown, saturated, plasitc, soft.

WELL NO: MW2

WELL COMPLETION DIAGRAM



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Client: EXXON

Location: DUBLIN, CA

Site: RS 7-0210

EA® EA ENGINEERING, SCIENCE, AND TECHNOLOGY

LOG OF SOIL BORING MW3

Coordinates:

Elevation top of casing:

Casing below surface:

CLIENT	SITE NUMBER	LOCATION
Exxon Company U.S.A.	RS 7-0210	7840 Amador Valley Rd. Dublin, CA

DRILLING AND SAMPLING METHODS: 10.25" Hollow Stem Auger; 2" Split Spoon Sampler

				DRILLING START	DRILLING FINISH
WATER LEVEL	~18.0	16.4	16.00		
TIME	8:40	9:40	16:40	TIME	TIME
DATE	5/14/92	5/14/92	5/14/92	DATE	DATE
REFERENCE	Surf.	TOC	TOC		

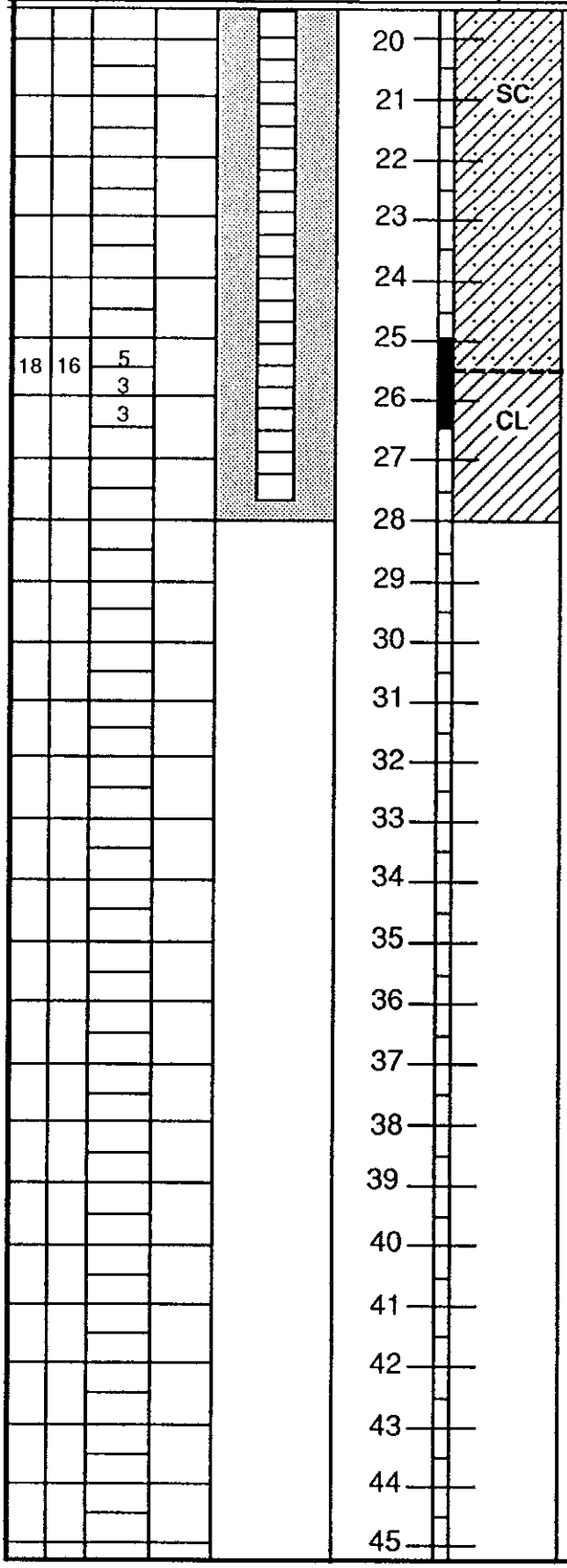
SURFACE CONDITIONS: Dry asphalt.

REGISTERED GEOLOGIST J.J. DOWDAKIN No. 4719 STATE OF CALIFORNIA

DESCRIPTION by: J.J. Dowdakin

Inches Driven	Inches Recover	Blows/6" Sampler	OVA Reading	WELL DETAIL	DEPTH (Feet)	GRAPHIC LOG	DESCRIPTION
					0		Asphalt.
					1	OL	Sandy silt, black, moist, no odor.
					2		
					3		
					4		Gravelly lens at 3 1/4 - 4'.
18	14	7/- 7/5	0		5	SL	Silty sand, brown, moist, no odor.
18	14	7/11 -/11	0		6		As above, but coarser. (Note: No liners in splitspoon sample taken 5 - 6.5'. Section resampled 5.5-7', but possibly disturbed.)
					7		
					8		
					9		
18	14	7 11	0		10	ML	Clayey silt, greenish-brown, moist, semi-friable, no odor, black flecks and root casts.
		13			11		
					12		
					13	SM	Silty sand, brown, very moist, no odor.
		9			14		Silty, sandy clay with 10% gravel to 1 cm., brown, very moist, no odor.
18	12	13 14	0		15		
18	14	5 10	0		16	CL	As above, but increasing moisture content.
		21 3			17		
18	15	5 5	0		18	SC	Clayey fine sand, brown, saturated, no odor.
18	15	9 5	0			SM	Well-graded silty sand, brown, saturated, no odor.
		7			19	SC	Clayey fine sand, brown, saturated, no odor.
					20		

LOG OF SOIL BORING **MW3**	CLIENT	SITE NUMBER	LOCATION
	Exxon Company U.S.A.	RS 7-0210	7840 Amador Rd. Dublin, CA

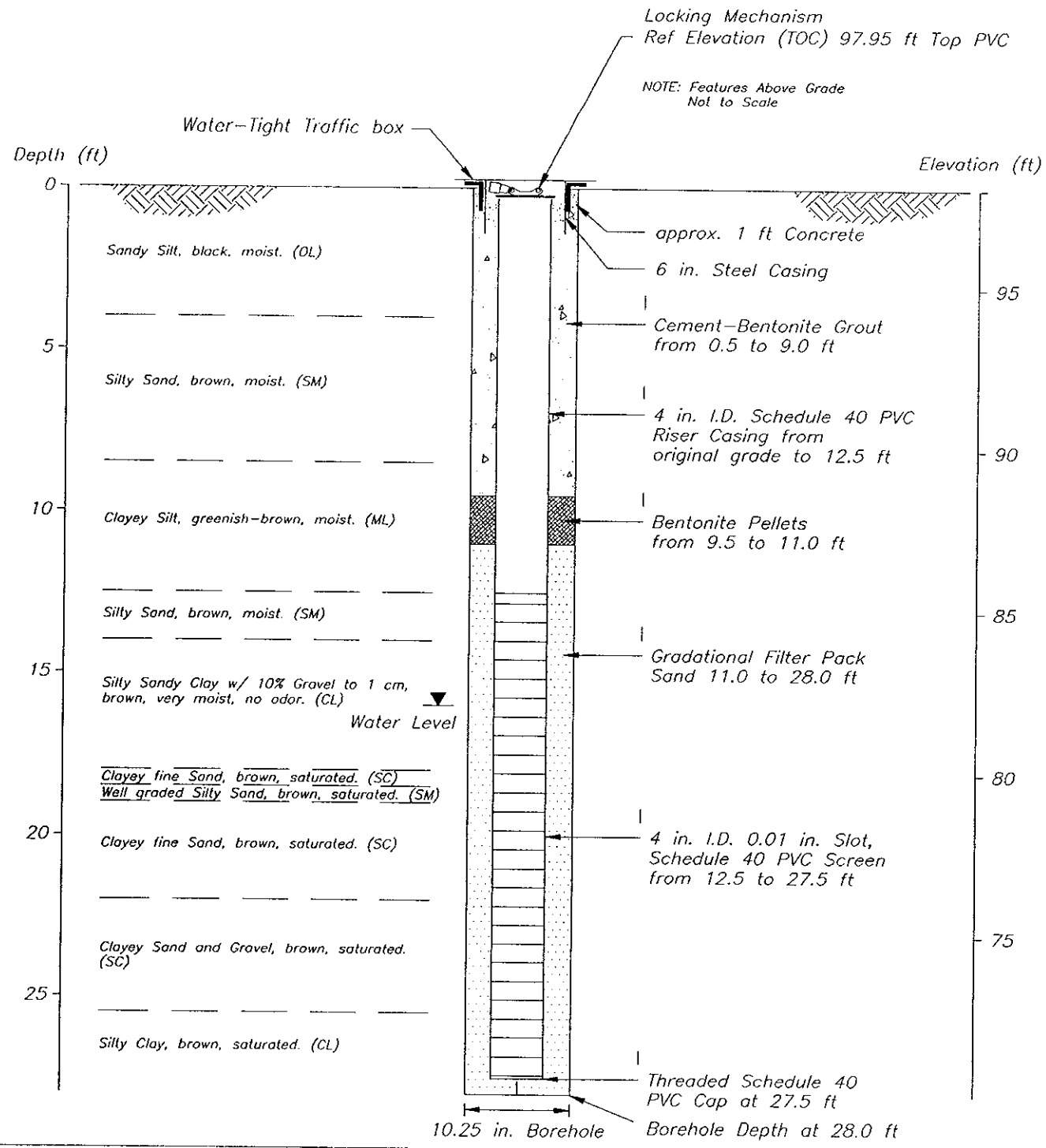


Clayey sand and gravel, gravel to 1 cm., brown, saturated, no odor.

Silty clay, brown, saturated, no odor, increasing softness with depth.

WELL NO: MW3

WELL COMPLETION DIAGRAM



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Client: EXXON

Location: DUBLIN, CA

Site: RS 7-0210

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

LOG OF SOIL BORING **MW4**

Coordinates:

Elevation top of casing:

Casing below surface:

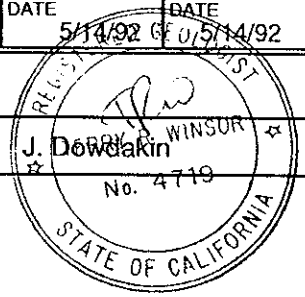
CLIENT	SITE NUMBER	LOCATION
Exxon Company U.S.A.	RS 7-0210	7840 Amador Valley Rd. Dublin, CA

DRILLING AND SAMPLING METHODS: 10.25" Hollow Stem Auger; 2" Split Spoon Sampler

				DRILLING START	DRILLING FINISH
WATER LEVEL	14.8	14.5			
TIME	12:30	15:30		TIME 10:30	TIME 14:15
DATE	5/14/92	5/14/92		DATE 5/14/92	DATE 5/14/92
REFERENCE	Surf.	TOC			

SURFACE CONDITIONS: Dry asphalt.

DESCRIPTION by: J. Dowdakin



Inches Driven	Inches Recover	Blows/6" Sampler	OVA Reading	WELL DETAIL	DEPTH (Feet)	GRAPHIC LOG
					0	
					1	GM
					2	
					3	OL
					4	
18	12	10	0		5	
		10			6	ML
		10			7	
					8	
					9	
18	12	5	0		10	
		8			11	CL
		8			12	
					13	
		5			14	SM
18	7	7	0		15	
		7				
18	8	4	0		16	SC
		4			17	
		4			18	
					19	SM
					20	

Asphalt.

Sandy, silty gravel fill.

Sandy silt, brownish-black, moist, no odor.

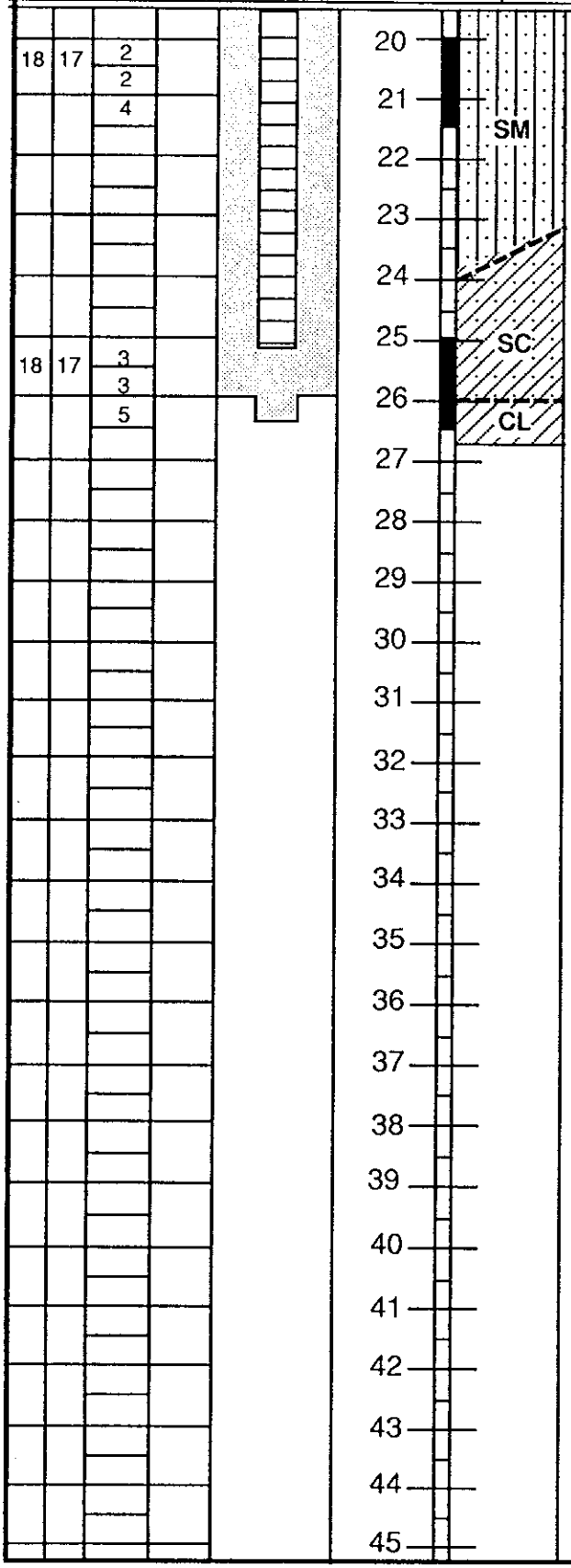
Sandy silt, grey-brown, dry to moist, no odor.

Silty clay, greenish-brown moist, no odor, semi-plastic, some fine root casts and white precipitate.

Silty sand with 20% gravel to 1 cm, brown, moist to wet, no odor.

Clayey sand, brown, saturated, no odor.

LOG OF SOIL BORING **MW4**	CLIENT	SITE NUMBER	LOCATION
	Exxon Company U.S.A.	RS 7-0210	7840 Amador Rd. Dublin, CA



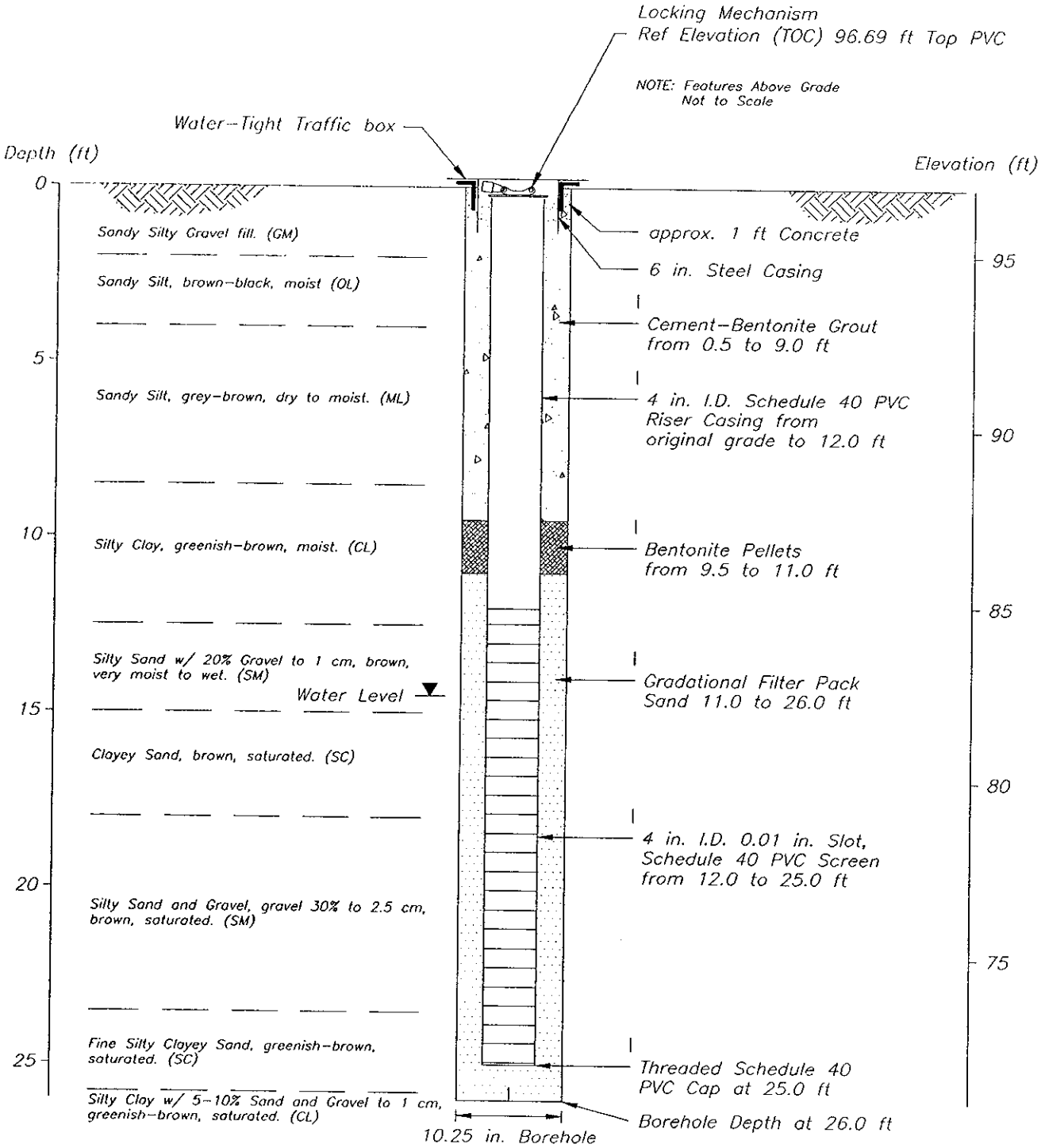
Silty sand and gravel, gravel 30% to 2 1/2 cm., brown, saturated, no odor.

Fine silty/clayey sand, greenish-brown, semi-stiff, saturated, no odor.

Silty clay with some sand and gravel to 1 cm (<10%), greenish-brown, semi-stiff, saturated, no odor.

WELL NO: MW4

WELL COMPLETION DIAGRAM



ENGINEERING, SCIENCE, AND TECHNOLOGY

Client: EXXON

Location: DUBLIN, CA

Site: RS 7-0210

APPENDIX B

Protocols for Well Drilling, Completion, Development, and Sampling

APPENDIX B

PROTOCOLS FOR WELL DRILLING, COMPLETION, DEVELOPMENT, AND SAMPLING

B.1 DRILLING

The boreholes are drilled with a truck-mounted rotary drill, using hollow-stem continuous-flight augers. The diameter of the augers is selected to provide an annular space between the boring wall and the well casing of no less than two inches. The borehole is drilled 10 feet below the static water level but will not be allowed to penetrate a competent clay layer that might act as an effective aquitard: drilling is terminated after two consecutive samples indicate comparable, apparently impermeable clays below static water.

All augers, sampling rods, samplers, and other pieces of downhole equipment are steam cleaned before drilling begins and before each new borehole is drilled. All drill cuttings and fluids from the steam cleaning are contained on the site in sealed 55-gallon drums. The drums are labeled with the borehole number, site description (including owner's name), depth interval of soil contents, date, and monitoring equipment readings. The drill cuttings are disposed of at proper facilities on the basis of soil sample analysis.

A log of drilling and the borehole are recorded by an EA geologist overseeing the drilling operations and well installation. The boring logs, which are signed and dated by the geologist, contain detailed geological information, including descriptions of the soils classified according to the Unified Soil Classification System, blow counts, OVA readings, moisture content of the soils, and initial and static water levels.

B.2 SOIL SAMPLING

Soil samples are collected at 5-foot intervals and at any substantial change of soil type, beginning at 5 feet below ground surface, with a 2-inch-diameter, 18-inch modified California split-spoon sampler containing three 6-inch brass liners. The sampler and liners are steam cleaned before use in each hole; they are scrubbed in deionized water and Alconox detergent and rinsed with deionized water after use at each sampling interval. Soil samples are collected to the total depth of the borehole unless heaving sand is encountered. Every attempt is made to collect a soil sample just above or at the water table.

At each sample depth, the sampler is driven 18 inches ahead of the augers into undisturbed soil. When the sampler is retrieved, either the lowermost or the middle sample liner is removed and the ends of the tube are covered with aluminum foil and sealed with plastic caps, which are secured to the liner with tape. The soil-filled liner is labeled with the location, sample number, date, time, depth, sampler, and borehole number. The samples are placed in zip-lock bags and stored in a cooler containing ice.

Soil is removed from the other two liners and examined. The soil is scanned with a Foxboro Century 128 organic vapor analyzer with a flame ionization detector (FID), and the OVA readings are noted on the logs. The soil is examined and classified according to the Unified Soil Classification System.

Soil samples are delivered, under chain of custody, to a laboratory certified by the California Department of Health Services (DHS) for hazardous materials analyses. The samples are analyzed for petroleum hydrocarbons in accordance with Table 2 of the "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites" (RWQCB 1990).

B.3 WELL INSTALLATION

The boreholes are completed as groundwater monitoring wells. The wells are constructed by installing Schedule 40 PVC flush-threaded casing through the inner opening of the auger. The screened interval consists of slotted casing of the appropriate slot size, placed from 10 feet below the water table to 5 feet above it. A threaded end plug or a slip cap secured with a stainless steel screw is placed on the bottom of the well.

A filter pack of clean sand of appropriate size is placed in the annular space around the well screen to approximately two feet above the top of the screen. The sand is placed through the inner opening of the augurs as they are slowly removed. The sand is sealed by adding 1-2 feet of bentonite pellets and hydrating them with deionized water. A surface seal is then created by placing a cement grout containing less than 5 percent bentonite from the bentonite spacer to the surface with a tremie pipe or grout pump.

The well is finished at the surface with a slightly raised, 12-inch-diameter traffic-rated, water-tight steel traffic box set in concrete. The traffic box is secured against unauthorized entry with a cap that requires a special wrench to open; the casing is further secured with a locking well cap.

A proposed well completion is shown in Figure B-1.

B.4 WELL DEVELOPMENT

The wells are developed 2-3 days after completion. Development consists of surging the screened interval of the well with a 4-inch flapper valve surge block for approximately 15 minutes. The well is then purged, with a submersible electric pump, centrifugal pump, air-lift pump, or PVC bailer, of 2-6 casing volumes of water. The surging and pumping are repeated until the water is free of silt and apparent turbidity, for a maximum of 4 hours.

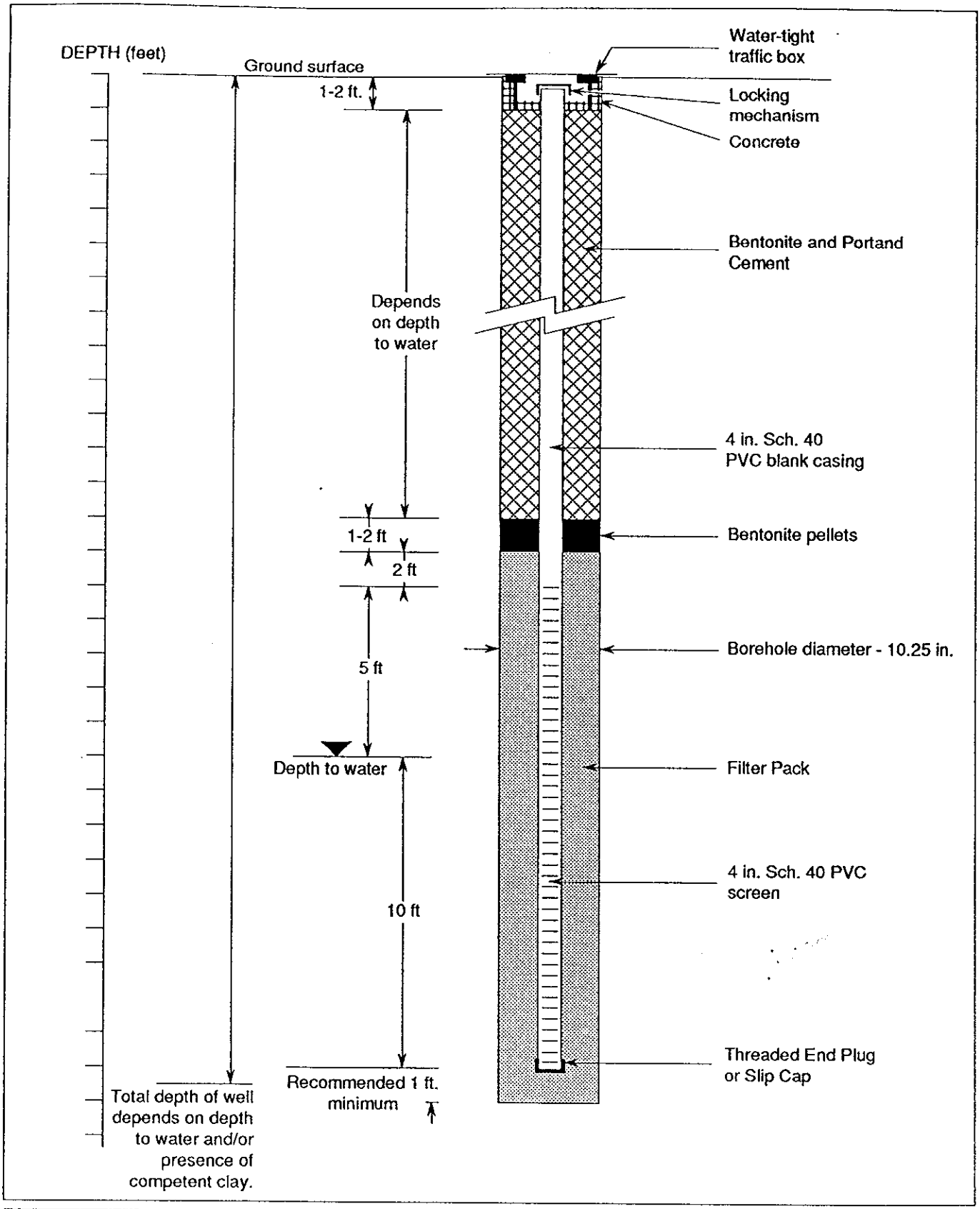


Figure B-1. Representative details of standard construction of groundwater monitoring well.

A record of the purging methods and volumes of water purged is maintained. All purge water is contained on the site in properly labeled 55-gallon drums. Purged water is disposed of at an appropriate facility on the basis of the laboratory analytical results.

B.5 WELL SURVEY

The elevation of the top of the well casing is surveyed relative to an established datum with a Lietz C-3 automatic level and a stadia rod. A small notch is cut in the top of the well casing to mark the survey point, to ensure that this point is used for all future water level measurements. A loop originating and ending at the datum is closed to ±0.01 feet according to standard methods (Brinker and Wolfe 1977).

B.6 GROUNDWATER SAMPLING

The new wells are sampled no less than 24 hours after development.

B.6.1 Sampling Equipment Preparation

To the extent possible, well measurement and sampling equipment is constructed of inert material. Sampling bailers are made of Teflon. Stainless steel submersible or airlift pumps, surface centrifugal pumps with dedicated polyethylene tubing, or PVC bailers are used to purge the well prior to sampling, depending on the depth to water. All sampling equipment is decontaminated in the following manner prior to introduction into each well:

1. Bailers, pumps, suspension rope and lines, and well sounding tapes are rinsed thoroughly with clean, fresh water to remove dust and dirt.

2. All equipment is cleaned with Alconox detergent and deionized (DI) water inside and out. The equipment may be cleaned offsite and stored and transported in steam-cleaned and protected inert containers. Fluids that have been used to decontaminate equipment on the site are stored with other purge water. Nitrile gloves are worn at all times during sample equipment cleaning, handling, and sample collection.

3. All equipment is thoroughly rinsed with deionized (DI) water immediately after cleaning.

4. All equipment is thoroughly rinsed with DI water twice before insertion into a well.

5. Bailers and pumps are suspended on clean, DI-water-rinsed lengths of polypropylene rope. The rope is discarded after each well.

B.6.2 Presampling Measurements

Prior to purging and sampling, the depth to standing water and the total depth of the well are measured with a decontaminated optical or sonic interface probe. A decontaminated clear acrylic bailer is then inserted into the well to just below the static water level and removed to confirm the presence or absence of any floating liquid-phase hydrocarbons. These presample measurement data are recorded on a Record of Well Gauging and Purging and used to calculate the volume of standing water in the well (one well casing volume). Measurements are made to the nearest 0.01 foot and referenced to the survey reference point on the well casing.

B.6.3 Well Purging

To ensure that the sample collected is as representative as possible of groundwater in the aquifer, standing water in the well and the surrounding sand pack is purged. Between four and six casing volumes of well water are purged to ensure that all stagnant water has been removed. The well is purged with a submersible, airlift, or surface pump or with a bailer, decontaminated as described above in Section B.6.1.

Should the well pump dry after the casing is initially dewatered, purging is discontinued and the well allowed to recover. Purging is continued to obtain the desired purge volume.

Field parameters of pH, temperature, and electrical conductance are measured as the well is purged. Measurements are taken and recorded approximately every five gallons. If any of the three field parameters has not stabilized by the time the 4-6 casing volumes have been purged, additional well water is pumped until the parameters have stabilized (but no more than 10 casing volumes). "Stabilized" is defined as a change in the reading amounting to less than 10 percent of the previous reading.

All purge water is contained in 55-gallon drums labeled with well number, date, contents, and facility identification. After the well has been purged of the required volume of water, the purging equipment is removed. A Teflon sampling bailer is used to collect four separate samples for presample field parameter measurements, to confirm field parameter stability and, therefore, representative aquifer samples.

B.6.4 Well Sampling

All samples are collected with a Teflon bailer cleaned as discussed in Section B.6.1. The bailer is operated by hand on a new, 1/4-inch polypropylene rope or on Teflon-coated stainless steel wire. The sampling personnel wear clean Nitrile gloves during sampling operations and while handling sample bottles.

The collected groundwater samples are emptied from the bailer with a bottom-emptying device directly into the sample bottles. The samples are collected in either 40-ml glass VOA vials or

1-liter amber bottles with Teflon-lined septum caps. The sample bottles contain appropriate preservatives, typically hydrochloric acid. The samples are contained in the containers free of headspace (i.e., with no air bubbles).

The filled sample containers are labeled with well number, date, location, sampler's initials, and preservative in indelible ink, and the sample labels are covered with clear waterproof tape.

The sample vials are placed in an iced cooler for delivery to a DHS-certified laboratory for analysis. Standard chain-of-custody procedures are followed.

B.6.5 Blanks

In addition to the groundwater samples, a trip blank and a decontamination blank are analyzed during each sampling round. A 40-ml glass VOA bottle with a Teflon septum lid, filled with DI water at the laboratory, functions as a trip blank. This trip blank travels with the sample kit from the laboratory to the facility and back to the laboratory again in the sample cooler. The blank is analyzed for the same parameters as the samples to indicate if the samples have been contaminated, from whatever source, during the trip from the site to the laboratory.

A decontamination blank is prepared in the field during well sampling. After the first well is sampled, DI water is poured into the clean, rinsed sampling bailer that is to be used for sampling the next well. This DI water is then emptied, as a sample, into a preserved 40-ml VOA bottle for analysis with the samples and trip blank. The decontamination blank indicates if any of the samples are contaminated from the sampling equipment or decontamination process.

B.6.6 Sample Analysis

All groundwater well samples, the trip blank, and the decontamination blank are analyzed by the laboratory according to Table 2 of the "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites," typically for Total Petroleum Hydrocarbons as gasoline (TPH-g) by DHS-modified EPA Method 8015 and for the aromatic hydrocarbons benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020.

APPENDIX C

Field Forms

EA ENGINEERING

FIELD SUMMARY REPORT

Client and Station #: EXXON 7-0210

EA Project #: 81002.23

Sample Team: KH, KL

Date: 5·18 and 5·21

Number of Drums on Site: Water ~~5~~ 8 Soil ~~15~~ 12 Empty 0

Summary:

The four new wells were developed on 5·18 and sampled 5·21 for TPh-gas and BTXE. All wells were quite silty, with MW1 being extremely high in siltiness, so high in fact it clogged the sub pump and had to be finished by hand bailing. Pump may also have had other, electrical problems. The site was surveyed for well elevations on 5/21.

WELL SURVEY REPORT

Project Number: 81002.23 | Station Number: 7-0210 | Date: 5/18/92

Client: EXXON | Personnel: KH, KL

Site Location: 7840 Amador Valley Rd. Dublin

BACKSIGHT (+)	INSTRUMENT HEIGHT (ft)	FORESIGHT (-)	ELEVATION (ft msl)	OBJECT
			100.00	B.M. - Fire hydrant
1.95	101.95			
		5.63	96.32	MW1
5.86	102.18			
		4.23	97.95	MW3
4.26	102.21			
		6.30	95.91	MW2
4.80	100.71			
		4.02	96.69	MW4
5.41	102.10			
		2.10	100.00	B.M. - Fire hydrant

BENCHMARK (BM): ____

DATUM IS: [X] ARBITRARY [ ] ACTUAL

COMMENTS: ____

MONITORING WELL DATA FORM

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

Project Number: 81002.23 | Station Number: 7-0710

Client: Exxon | Samplers: K Logue K Hughes | Date: 5.21.92

Site Location: 7840 Amador Valley Rd. Dublin

MONITORING WELL NUMBER	ELEVATION TOP OF CASING	DEPTH TO WATER	DEPTH TO PRODUCT	ELEVATION TOP OF GROUNDWATER	APPARENT PRODUCT THICKNESS	STICK UP (+) DOWN (-)	DEPTH TO BOTTOM
MW1		14.45	—				23.64
MW2		14.30	—				25.10
MW3		16.05	—				27.60
MW4		14.59	—				24.99

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5·18·92

PROJECT NAME: 7-0210 WELL NUMBER: MW1

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

STATIC WATER LEVEL: 14.42

WATER LEVEL MEASUREMENT METHOD:

TIME START PURGE:

TIME END PURGE:

TIME SAMPLED:

MEASURING POINT DESCRIPTION:

PURGE METHOD:

PURGE DEPTH:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
							2	(4)	6		
	23.52 soft bottom		14.42		9.10		0.16	0.64	1.44		6g

TIME	13:15	~~1340~~					
VOLUME PURGED (gal)	19gal						
PURGE RATE (gpm)	HAND	and sub	pump				
TEMPERATURE (°C)							
pH							
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)							
DISSOLVED OXYGEN (mg/l)							
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR	M-d BRN						
ODOR							
DEPTH TO WATER DURING PURGE (ft)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	YES						

Comments: water was exceptionally high in sediment. Depth to water 19.41', bottom 23.64' at 1440. Sub pump clogged with suspended sediments, had to be cleaned repeatedly. Intermediate measurements: DW 22.60', DB 23.65' at 13:15 dewatered again at 1455, 2 more gallons. Final gauge: DW 20.20, DB 23.65 at 16:15

(over..)

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

Date: 5-18-92

PROJECT NAME: Exxon 7-0210 WELL NUMBER: MW 1

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

SAMPLE DATA:

TIME SAMPLED:

DEPTH SAMPLED (ft):

SAMPLING EQUIPMENT:

COMMENTS:

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 50 g

DISPOSAL METHOD: drum

DRUM DESIGNATION(S)/VOLUME:

COMMENTS:

WELL HEAD CONDITIONS CHECKLIST (Circle YES or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: YES NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES NO

WELL CASING OK?: YES NO

COMMENTS:

GENERAL

WEATHER CONDITIONS:

TEMPERATURE (specify °C/°F):

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

COMMENTS:

c.c. Project Manager:

Job File:

Other:

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5·18·92

PROJECT NAME: 7-0210 WELL NUMBER: MW2

PROJECT NUMBER: 8100 2.23 PERSONNEL: KH, KL

STATIC WATER LEVEL: 14.27

WATER LEVEL MEASUREMENT METHOD:

TIME START PURGE:

TIME END PURGE:

TIME SAMPLED:

MEASURING POINT DESCRIPTION:

PURGE METHOD:

PURGE DEPTH:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
	25.10 soft		14.27		10.83		2	(4)	6		69
							0.16	0.64	1.44		

TIME							
VOLUME PURGED (gal)							
PURGE RATE (gpm)							
TEMPERATURE (°C)							
pH							
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)							
DISSOLVED OXYGEN (mg/l)							
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR							
ODOR							
DEPTH TO WATER DURING PURGE (ft)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?							

Comments: Dewatered at 1407, 22 gal. DW 22.35 DB 25.06. Well cleaned up at 15:35 after 50 gal Total. Final gauge DW 14.49 DB 2509 at 1610.

(over..)

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

Date: 5.18.92

PROJECT NAME: 7-0210 WELL NUMBER: MW2

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

SAMPLE DATA:

TIME SAMPLED:

DEPTH SAMPLED (ft):

SAMPLING EQUIPMENT:

COMMENTS:

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 50

DISPOSAL METHOD:

DRUM DESIGNATION(S)/VOLUME:

COMMENTS:

WELL HEAD CONDITIONS CHECKLIST (Circle YES or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: YES NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES NO

WELL CASING OK?: YES NO

COMMENTS:

GENERAL

WEATHER CONDITIONS:

TEMPERATURE (specify °C/°F):

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

COMMENTS:

c.c. Project Manager:

Job File:

Other:

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5·18·92

PROJECT NAME: 7-0210 WELL NUMBER: MW3

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

STATIC WATER LEVEL:

WATER LEVEL MEASUREMENT METHOD:

TIME START PURGE:

TIME END PURGE:

TIME SAMPLED:

MEASURING POINT DESCRIPTION:

PURGE METHOD:

PURGE DEPTH:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
	27.67 soft 27.62		16.02 21.04 (22.25)		11.65		2	(4)	6		89
							0.16	0.64	1.44		

TIME	1220	1255					
VOLUME PURGED (gal)	30	55					
PURGE RATE (gpm)							
TEMPERATURE (°C)							
pH							
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)							
DISSOLVED OXYGEN (mg/l)							
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR	MED / BR	med / BRN					
ODOR							
DEPTH TO WATER DURING PURGE (ft)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?	NO	YES					

Comments: DW 25.43, DB 27.66 dewatered at 1255 after 55 gal.
Final gauge DW 1603 DB 27.66 at 1613

(over..)

Date: 5.18.92

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

PROJECT NAME: 7-0210 WELL NUMBER: MW #3

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

SAMPLE DATA:

TIME SAMPLED:

DEPTH SAMPLED (ft):

SAMPLING EQUIPMENT:

COMMENTS:

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 55

DISPOSAL METHOD: drum

DRUM DESIGNATION(S)/VOLUME:

COMMENTS:

WELL HEAD CONDITIONS CHECKLIST (Circle YES or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: YES NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES NO

WELL CASING OK?: YES NO

COMMENTS:

GENERAL

WEATHER CONDITIONS:

TEMPERATURE (specify °C/°F):

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

COMMENTS:

c.c. Project Manager:

Job File:

Other:

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5.18.92

PROJECT NAME: 7-0210 WELL NUMBER: MW4

PROJECT NUMBER: 81002.23 PERSONNEL: KH KL

STATIC WATER LEVEL:

WATER LEVEL MEASUREMENT METHOD:

TIME START PURGE:

TIME END PURGE:

TIME SAMPLED:

MEASURING POINT DESCRIPTION:

PURGE METHOD:

PURGE DEPTH:

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
	24.99 soft bottom		14.56		10.43		2	(4)	6		7.9
							0.16	0.64	1.44		

TIME	1335						
VOLUME PURGED (gal)	19 gal						
PURGE RATE (gpm)	HAND						
TEMPERATURE (°C)							
pH							
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)							
DISSOLVED OXYGEN (mg/l)							
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR	med GRY						
ODOR							
DEPTH TO WATER DURING PURGE (ft)							
NUMBER OF CASING VOLUMES REMOVED							
DEWATERED?							

Comments: DW 22.70, DB 24.99, dewatered 19 gal at 1335. Cleared up after 2.5 more gallons at 1500. Final gauge DW 14.59, DB 24.99 at 1617

(over..)

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

Date: 5-18-92

PROJECT NAME: 7-0210 WELL NUMBER: MW 4

PROJECT NUMBER: 8100 2.23 PERSONNEL: KH KL

SAMPLE DATA:

TIME SAMPLED:

DEPTH SAMPLED (ft):

SAMPLING EQUIPMENT:

COMMENTS:

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 22 g

DISPOSAL METHOD:

DRUM DESIGNATION(S)/VOLUME:

COMMENTS:

WELL HEAD CONDITIONS CHECKLIST (Circle YES or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: YES NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: YES NO

WELL CASING OK?: YES NO

COMMENTS:

GENERAL

WEATHER CONDITIONS:

TEMPERATURE (specify °C/°F):

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

COMMENTS:

c.c. Project Manager:

Job File:

Other:

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5.21.92

PROJECT NAME: Exxon 7-0210 WELL NUMBER: MW 1

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

STATIC WATER LEVEL: 14.45

WATER LEVEL MEASUREMENT METHOD: interface probe

TIME START PURGE: 1050

TIME END PURGE: 1150

TIME SAMPLED: 1245

MEASURING POINT DESCRIPTION: Top of casing

PURGE METHOD: hand bail

PURGE DEPTH: bottom

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
							2	4	6		
	23.64		14.45		9.19		0.16	0.64	1.44		5.8 x4 / 23gals

TIME	1050	1100	1110	1120	1150		
VOLUME PURGED (gal)	0	10	15	19	21		
PURGE RATE (gpm)	hand	bail					
TEMPERATURE (°C)	20	20.5	21	21	21.5		
pH	6.8	7.0	7.2	7.3	7.2		
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)	1150	1200	1200	1250	1150		
DISSOLVED OXYGEN (mg/l)	NOT APPLICABLE						
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR	low / clr	High / Br	High / Br	High / Br	High / Br	/	/
ODOR	N	N	N	N	N		
DEPTH TO WATER DURING PURGE (ft)	NOT	APPLICABLE					
NUMBER OF CASING VOLUMES REMOVED	0	1.7	2.6	3.3	3.6		
DEWATERED?	N	N	N	Yes	YES		

Comments:

(over..)

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

Date: 5.21.92

PROJECT NAME: EXXON-0210 WELL NUMBER: MW1

PROJECT NUMBER: 8102.23 PERSONNEL: KH, KL

SAMPLE DATA:

TIME SAMPLED: 1245

DEPTH SAMPLED (ft): bottom

SAMPLING EQUIPMENT: Teflon bailer

COMMENTS:

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS
MW1	3	VOA	HCl	/	40 ml	High	Br	Y	TPH-g BTXE	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 21

DISPOSAL METHOD: drum

DRUM DESIGNATION(S)/VOLUME: EA label

COMMENTS:

WELL HEAD CONDITIONS CHECKLIST (Circle YES,or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL

WEATHER CONDITIONS: clear

TEMPERATURE (specify °C/°F): 80° F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

COMMENTS:

c.c. Project Manager:

Job File:

Other:

12C

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5.21.92

PROJECT NAME: Exxon 7-0210 WELL NUMBER: MW2

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

STATIC WATER LEVEL: 14.30

WATER LEVEL MEASUREMENT METHOD: interface probe

TIME START PURGE: 1040

TIME END PURGE: 1056

TIME SAMPLED: 1120

MEASURING POINT DESCRIPTION: Top of casing

PURGE METHOD: hand bail

PURGE DEPTH: bottom

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
							2	4	6		
	25.10		14.30		10.8		0.16	0.64	1.44		6.9 / 27. gals

TIME	1040	1046	1051	1056			
VOLUME PURGED (gal)	0	10	21	27			
PURGE RATE (gpm)	HAND BAIL						
TEMPERATURE (°C)	20°	20°	20°	20°			
pH	7.0	7.0	7.0	7.0			
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)	1700	1700	1700	1700.			
DISSOLVED OXYGEN (mg/l)	NOT APPLICABLE						
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR	med BRN	med BRN	med BRN	med BRN	/	/	/
ODOR	NO	NO	NO	NO			
DEPTH TO WATER DURING PURGE (ft)	NOT applicable						
NUMBER OF CASING VOLUMES REMOVED	0	1.4	3	3.9			
DEWATERED?	NO	NO	NO	NO			

Comments:

(over..)

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

Date: 5/18/92

PROJECT NAME: Exxon 7-0210 WELL NUMBER: MW2

PROJECT NUMBER: 81002.23 PERSONNEL: KH, KL

SAMPLE DATA:

TIME SAMPLED: 1120

DEPTH SAMPLED (ft): bottom

SAMPLING EQUIPMENT: Teflon bailer

COMMENTS:

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS
MW2	3	VOA	HCl	/	40 ml	med	BRY	Y	TPH-g BTXE	

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 27

DISPOSAL METHOD: drum

DRUM DESIGNATION(S)/VOLUME: E.A. Label

COMMENTS:

WELL HEAD CONDITIONS CHECKLIST (Circle YES or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS:

GENERAL

WEATHER CONDITIONS: clear, hot

TEMPERATURE (specify °C/°F): 80°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING?

COMMENTS:

c.c. Project Manager:

Job File:

Other:

EA

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5-21-97

PROJECT NAME: Exxon 7-0210 WELL NUMBER: MW3

PROJECT NUMBER: 81002.23 PERSONNEL: KL KH

STATIC WATER LEVEL: 16.05

WATER LEVEL MEASUREMENT METHOD: Interface Probe.

TIME START PURGE: 1010

TIME END PURGE: 1030

TIME SAMPLED: 1040

MEASURING POINT DESCRIPTION: Top of Casing

PURGE METHOD: Hand Bailed.

PURGE DEPTH: Bottom

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
							2	(4)	6		
	27.60		16.05		11.55		0.16	0.64	1.44		7.3 / 29 gals

TIME	1010	1015	1023	1030			
VOLUME PURGED (gal)	0	10	20	30			
PURGE RATE (gpm)	Hand Bailed.						
TEMPERATURE (°C)	19.5	20	20	19.5			
pH	6.9	6.7	6.7	6.8			
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)	1100	1100	1050	1100			
DISSOLVED OXYGEN (mg/l)	NOT MEASURED						
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR	Low / Clr	High / Br	Med / Br	Med / Br	/	/	/
ODOR	N	N	N	N			
DEPTH TO WATER DURING PURGE (ft)	NOT MEASURED						
NUMBER OF CASING VOLUMES REMOVED	0	1.4	2.8	4.1			
DEWATERED?	N	N	N	N			

Comments:

(over..)

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

Date: 5-21-92

PROJECT NAME: Exxon 7-0210 WELL NUMBER: MW3

PROJECT NUMBER: 8100Z.23 PERSONNEL: KL KH

SAMPLE DATA:

TIME SAMPLED: 1040

DEPTH SAMPLED (ft): 22 FT

SAMPLING EQUIPMENT: Teflon Bailer

COMMENTS: None.

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS
MW3	3	VOA	HCL	W/A	40 ml	mod	Brn	Y-CS	TPH g BTEX	NO

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 30 gals.

DISPOSAL METHOD: 55 gal Drum.

DRUM DESIGNATION(S)/VOLUME: EH Labels.

COMMENTS: NO

WELL HEAD CONDITIONS CHECKLIST (Circle YES or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS: NO

GENERAL

WEATHER CONDITIONS: Hot

TEMPERATURE (specify °C/°F): 85°F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? NO

COMMENTS: NO

c.c. Project Manager:

Job File:

Other:

GROUNDWATER PURGE AND SAMPLE FORM

Date: 5-21-92.

PROJECT NAME: Exxon 7-0210 WELL NUMBER: MW4

PROJECT NUMBER: 81202.23 PERSONNEL: KL KH

STATIC WATER LEVEL: 14.59

WATER LEVEL MEASUREMENT METHOD: Interface Probe

TIME START PURGE: 1010

TIME END PURGE: 1030

TIME SAMPLED: 1100

MEASURING POINT DESCRIPTION: Top of Casing

PURGE METHOD: HAND Bailed 1 gals Bailer

PURGE DEPTH: Bottom

WELL VOLUME CALCULATION (FILL IN BEFORE PURGING)	TOTAL DEPTH (ft)	−	DEPTH TO WATER (ft)	=	WATER COLUMN (ft)	X	MULTIPLIER FOR CASING DIAMETER (in)			=	CASING VOLUME (gal)
							2	4	6		66
	24.99		14.59		10.40		0.16	0.64	1.44		26gals

TIME	1010	1015	1025	1030			
VOLUME PURGED (gal)	0	10	20	26			
PURGE RATE (gpm)	HAND BAILED						
TEMPERATURE (°C)	20°	20°	20°	20°			
pH	6.8	6.9	7.0	7.0			
SPECIFIC CONDUCTIVITY (uncorrected) (µmhos)	1750	1300	1300	1300			
DISSOLVED OXYGEN (mg/l)	NOT MEASURED						
eH (MV) Pt-AgCl ref.							
TURBIDITY / COLOR	High BRN	High BRN	High BRN	High BRN	/	/	/
ODOR	NO	NO	NO	NO			
DEPTH TO WATER DURING PURGE (ft)	NOT MEASURED						
NUMBER OF CASING VOLUMES REMOVED	0	1.5	3.0	3.9			
DEWATERED?	NO	NO	NO	NO			

Comments:

(over..)

5 drums 1550.1

GROUNDWATER PURGE AND SAMPLE FORM (cont.)

Date: 5·21·92

PROJECT NAME: Exxon 7-0216 WELL NUMBER: MW 4

PROJECT NUMBER: 81002-23 PERSONNEL: KL KH

SAMPLE DATA:

TIME SAMPLED: 1100

DEPTH SAMPLED (ft): 19ft

SAMPLING EQUIPMENT: Teflon Bailer

COMMENTS: NO

SAMPLE NO.	NO. OF CONTAINERS	CONTAINER TYPE	PRESERVATIVE	FIELD FILTRATION	VOLUME FILLED (ml or l)	TURBIDITY	COLOR	SHIPPED UNDER CHAIN OF CUSTODY AT 4°C (Y/N)	ANALYSIS REQUEST (METHOD)	COMMENTS
MW4	3	Voa	HCL	N/A	40 ml	Low	CLR	YES	TPHg BTEX	NO

PURGE WATER DISPOSAL NOTES:

TOTAL DISCHARGE (gal): 26 gals.

DISPOSAL METHOD: 55 gal. drum

DRUM DESIGNATION(S)/VOLUME: EA Labels.

COMMENTS: NO

WELL HEAD CONDITIONS CHECKLIST (Circle YES or NO -- if NO, add comments)

WELL SECURITY DEVICES OK (BOLLARDS, CHRISTY LID, CASING LID AND LOCK)?: (YES) NO

INSIDE OF WELL HEAD AND OUTER CASING DRY?: (YES) NO

WELL CASING OK?: (YES) NO

COMMENTS: NO

GENERAL

WEATHER CONDITIONS: Hot

TEMPERATURE (specify °C/°F): 85 °F

PROBLEMS ENCOUNTERED DURING PURGING OR SAMPLING? NO

COMMENTS: NO

c.c. Project Manager:

Job File:

Other:

APPENDIX D

Laboratory Reports of Soil Analysis

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REPORT OF LABORATORY ANALYSIS

May 22, 1992

Mr. John Dowdakin
EA Engineering
41 Lafayette Circle
Lafayette, CA 94594

RE: PACE Project No. 420515.509
Client Reference: Exxon 7-0210 (EE)

Dear Mr. Dowdakin:

Enclosed is the report of laboratory analyses for samples received May 15, 1992.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Carol Reid
Project Manager

Enclosures

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

EA Engineering
41 Lafayette Circle
Lafayette, CA 94594

May 22, 1992
PACE Project Number: 420515509

Attn: Mr. John Dowdakin

Client Reference: Exxon 7-0210 (EE)

Parameter	Units	MDL	PACE Sample Number: 70 0100780 Date Collected: 05/13/92 Date Received: 05/15/92 Client Sample ID: MW2 11- 11.5' Soil	DATE ANALYZED
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

11 Digital Drive
Novato, CA 94949
TEL: 415-883-6100
FAX: 415-883-2673

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
Page 2

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

Parameter	Units	MDL		DATE ANALYZED
PACE Sample Number:			70 0100798	
Date Collected:			05/13/92	
Date Received:			05/15/92	
Client Sample ID:			MW2 14.5-15' Soil	
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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FAX: 415-883-2673

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REPORT OF LABORATORY ANALYSIS

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

Parameter	Units	MDL	70 0100801 MW3 11-11.5 Soil	DATE ANALYZED
PACE Sample Number:			70 0100801	
Date Collected:			05/14/92	
Date Received:			05/15/92	
Client Sample ID:			MW3 11-11.5 Soil	
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
Page 4

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

Parameter	Units	MDL		
PACE Sample Number:			70 0100810	
Date Collected:			05/14/92	
Date Received:			05/15/92	
Client Sample ID:			MW3 15.5-16' Soil	
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Mr. John Dowdakin
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May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

PACE Sample Number:			70 0100828	
Date Collected:			05/14/92	
Date Received:			05/15/92	
Client Sample ID:			MW4 11-	
Parameter	Units	MDL	11.5 Soil	DATE ANALYZED
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
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May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

Parameter	Units	MDL	PACE Sample Number: 70 0100836 Date Collected: 05/14/92 Date Received: 05/15/92 Client Sample ID: MW4 14.5-15' Soil	DATE ANALYZED
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Page 7

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

Parameter	Units	MDL	PACE Sample Number: 70 0100844 Client Sample ID: MW1 10.5-11 Soil	DATE ANALYZED
Date Collected:			05/14/92	
Date Received:			05/15/92	
INORGANIC ANALYSIS				
ORGANIC LEAD IN SOIL; CA DHS METHOD #338				
Organic Lead, as Pb	mg/kg wet	0.2	0.25	05/21/92
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
Page 8

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

Parameter	Units	MDL		
PACE Sample Number:			70 0100852	
Date Collected:			05/14/92	
Date Received:			05/15/92	
Client Sample ID:			MW1 14-14.5' Soil	
INORGANIC ANALYSIS				
ORGANIC LEAD IN SOIL; CA DHS METHOD #338				
Organic Lead, as Pb	mg/kg wet	0.2	0.2	05/21/92
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/19/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	1000	ND	05/19/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/19/92
Benzene	ug/kg wet	5.0	ND	05/19/92
Toluene	ug/kg wet	5.0	ND	05/19/92
Ethylbenzene	ug/kg wet	5.0	ND	05/19/92
Xylenes, Total	ug/kg wet	5.0	ND	05/19/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

These data have been reviewed and are approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.
Regional Director

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REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
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QUALITY CONTROL DATA

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

Organic Lead, as Pb
Batch: 70 12535
Samples: 70 0100844, 70 0100852

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Organic Lead, as Pb	mg/kg wet	0.2	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Organic Lead, as Pb	mg/kg wet	0.2	5.0	101%	98%	3%

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference

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REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
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QUALITY CONTROL DATA

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

TPH GASOLINE/BTEX
Batch: 70 12482
Samples: 70 0100780, 70 0100798, 70 0100801, 70 0100810

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	200	375	99%	101%	2%
Benzene	ug/kg wet	1.0	40.0	100%	98%	2%
Toluene	ug/kg wet	1.0	40.0	103%	101%	1%
Ethylbenzene	ug/kg wet	1.0	40.0	105%	103%	1%
Xylenes, Total	ug/kg wet	1.0	80.0	104%	102%	1%

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference

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REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
Page 11

QUALITY CONTROL DATA

May 22, 1992
PACE Project Number: 420515509

Client Reference: Exxon 7-0210 (EE)

TPH GASOLINE/BTEX
Batch: 70 12486
Samples: 70 0100828, 70 0100836, 70 0100844, 70 0100852

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015)	ug/kg wet	200	282	105%	102%	2%
Benzene	ug/kg wet	1.0	40.0	101%	100%	0%
Toluene	ug/kg wet	1.0	40.0	102%	100%	1%
Ethylbenzene	ug/kg wet	1.0	40.0	101%	101%	0%
Xylenes, Total	ug/kg wet	1.0	80.0	102%	101%	0%

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference

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☐ Huntington Beach, CA, 5702 Bolsa Avenue, 92649 (714) 892-2565

Consultant's Name: EA Engineering

Page 1 of 1

Address: 41 Lafayette Circle Lafayette, CA

Site Location: Amador Valley Blvd, Dublin

Project #:

Consultant Project #: 81002.23

Consultant Work Release #: 91187264

Project Contact: John Dowdakin

Phone #: (510) 283-7077 Fax #: 283-3894

Laboratory Work Release #:

EXXON Contact: William Wang ☑ EE ☐ C&M

Phone # (510) 246-8768 Fax #:

EXXON RAS #: 7-0210

Sampled by (print): John Dowdakin

Sampler's Signature: John Dowdakin

Shipment Method: Courrier

Air Bill #:

Shipment Date: 5/15/92

TAT: ☐ 24 hr ☐ 48 hr ☐ 72 hr ☑ Standard (5 day)

ANALYSIS REQUIRED

Sample Condition as Received
Temperature ° C: NA
Cooler #: — VIA COURIER
Inbound Seal Yes No
Outbound Seal (Yes) No

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1	Organic Lead	COMMENTS
MW2 11-11.5	5/13 1545	Soil	Ice	1	10078.0	X				
MW2 14.5-15	" 1550				79.8	X				
MW3 11-11.5	5/14 0805				80.1	X				
MW3 15.5-16'	" 0815				81.0	X				
MW4 11-11.5	" 1105				82.8	X				
MW4 ~~14.5-15~~ 14-14.5	" 1110				83.6	X				
MW1 ~~10.5-11~~ 10-10.5	" 1515				84.4	X			X	
MW1 14-14.5'	" 1520				85.2	X			X	
E/3										

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time
[signature]	5/15	1540	[signature] - Pace	5/15	1540
[signature] - Pace	5/15	1700	[signature] / PACE	~~5/16/92~~	~~3:00PM~~ 5/15/92 5:00 PM

Additional Comments:

Distribution: White - Original Yellow - Exxon Pink - Lab Goldenrod - Consultant Field Staff

APPENDIX E

Laboratory Reports of Groundwater Analysis

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File John D.

REPORT OF LABORATORY ANALYSIS

May 29, 1992

RECEIVED
JUN 02 1992
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
WESTERN REGIONAL OPERATIONS

Mr. John Dowdakin
EA Engineering
41 Lafayette Circle
Lafayette, CA 94594

RE: PACE Project No. 420522.510
Client Reference: Exxon 7-0210

Dear Mr. Dowdakin:

Enclosed is the report of laboratory analyses for samples received May 22, 1992.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Carol Reid

Carol Reid
Project Manager

Enclosures

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REPORT OF LABORATORY ANALYSIS

EA Engineering
41 Lafayette Circle
Lafayette, CA 94594

May 29, 1992
PACE Project Number: 420522510

Attn: Mr. John Dowdakin

Client Reference: Exxon 7-0210

Parameter	Units	MDL	70 0150396 05/21/92 05/22/92 Rinse Blank	DATE ANALYZED
PACE Sample Number:				
Date Collected:				
Date Received:				
Client Sample ID:				
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/26/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND	05/26/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/26/92
Benzene	ug/L	0.5	ND	05/26/92
Toluene	ug/L	0.5	0.5	05/26/92
Ethylbenzene	ug/L	0.5	ND	05/26/92
Xylenes, Total	ug/L	0.5	ND	05/26/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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REPORT OF LABORATORY ANALYSIS

Mr. John Dowdakin
Page 2

May 29, 1992
PACE Project Number: 420522510

Client Reference: Exxon 7-0210

PACE Sample Number:			70 0150400	
Date Collected:			05/21/92	
Date Received:			05/22/92	
Client Sample ID:			MW1	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/26/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND	05/26/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/26/92
Benzene	ug/L	0.5	ND	05/26/92
Toluene	ug/L	0.5	ND	05/26/92
Ethylbenzene	ug/L	0.5	ND	05/26/92
Xylenes, Total	ug/L	0.5	ND	05/26/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Mr. John Dowdakin
Page 3

May 29, 1992
PACE Project Number: 420522510

Client Reference: Exxon 7-0210

PACE Sample Number:			70 0150418	
Date Collected:			05/21/92	
Date Received:			05/22/92	
Client Sample ID:			MW2	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/26/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND	05/26/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/26/92
Benzene	ug/L	0.5	ND	05/26/92
Toluene	ug/L	0.5	ND	05/26/92
Ethylbenzene	ug/L	0.5	ND	05/26/92
Xylenes, Total	ug/L	0.5	ND	05/26/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Mr. John Dowdakin
Page 4

May 29, 1992
PACE Project Number: 420522510

Client Reference: Exxon 7-0210

PACE Sample Number:			70 0150426	
Date Collected:			05/21/92	
Date Received:			05/22/92	
Client Sample ID:			MW3	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/26/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND	05/26/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/26/92
Benzene	ug/L	0.5	ND	05/26/92
Toluene	ug/L	0.5	ND	05/26/92
Ethylbenzene	ug/L	0.5	ND	05/26/92
Xylenes, Total	ug/L	0.5	ND	05/26/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Mr. John Dowdakin
Page 5

May 29, 1992
PACE Project Number: 420522510

Client Reference: Exxon 7-0210

PACE Sample Number:			70 0150434	
Date Collected:			05/21/92	
Date Received:			05/22/92	
Client Sample ID:			MW4	
Parameter	Units	MDL		DATE ANALYZED
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/26/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND	05/26/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/26/92
Benzene	ug/L	0.5	ND	05/26/92
Toluene	ug/L	0.5	ND	05/26/92
Ethylbenzene	ug/L	0.5	ND	05/26/92
Xylenes, Total	ug/L	0.5	ND	05/26/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

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Mr. John Dowdakin
Page 6

May 29, 1992
PACE Project Number: 420522510

Client Reference: Exxon 7-0210

Parameter	Units	MDL		DATE ANALYZED
PACE Sample Number:			70 0150442	
Date Collected:			05/21/92	
Date Received:			05/22/92	
Client Sample ID:			Travel Blank	
ORGANIC ANALYSIS				
TPH GASOLINE/BTEX				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	05/26/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND	05/26/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	05/26/92
Benzene	ug/L	0.5	ND	05/26/92
Toluene	ug/L	0.5	0.5	05/26/92
Ethylbenzene	ug/L	0.5	ND	05/26/92
Xylenes, Total	ug/L	0.5	ND	05/26/92

MDL Method Detection Limit
ND Not detected at or above the MDL.

These data have been reviewed and are approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.
Regional Director

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Mr. John Dowdakin
Page 7

QUALITY CONTROL DATA

May 29, 1992
PACE Project Number: 420522510

Client Reference: Exxon 7-0210

TPH GASOLINE/BTEX
Batch: 70 12700
Samples: 70 0150396, 70 0150400, 70 0150418, 70 0150426, 70 0150434
70 0150442

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	303	108%	96%	11%
Benzene	ug/L	0.5	40.0	111%	117%	5%
Toluene	ug/L	0.5	40.0	111%	115%	3%
Ethylbenzene	ug/L	0.5	40.0	101%	106%	4%
Xylenes, Total	ug/L	0.5	80.0	110%	117%	6%

MDL Method Detection Limit
RPD Relative Percent Difference

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(714) 380-9559

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P.O. Box 4415, Houston, TX 77210-4415

CHAIN OF CUSTODY

Consultant Name: EA Engineering
Address: 41 H LaFayette CR
Project Contact: J. Dandakin   Project #: 81002.23
Phone #: 510 283 7077   Fax #:
Consultant Work Release #: 91147181

Exxon Contact: Bill Wang   Phone #:
Site RAS #: 7-0210
Site Location: 7840 Amador Valley Rd. Dublin
Laboratory Work Release #:

Sampled by (please print): K Legge, K. Hughes
Sampler Signature: K Legge   Date Sampled: 5 21 92

Sample Description	Collection Date/Time	Matrix	Prsv.	# of Cont.	SOIL: TPH/GAS/BTEX EPA 8015/8020	SOIL: TPH/Diesel EPA 8015	SOIL: Organic Lead DHS Method	WATER: TPH/GAS/BTEX EPA 8015/602	WATER: TPH/Diesel EPA 8015	WATER: Organic Lead DHS Method	TRPH EPA 418.1	Total Oil & Grease SM 5520				Remarks
Rinse Blank	5-21-92/1110	W	HCL	3				X			015039.6					
MW 1	1245	W	HCL	3				X			015040.0					
MW 2	1120	W	HCL	3				X			015041.8					
MW 3	1040	W	HCL	3				X			015042.6					
MW 4	1100	W	HCL	3				X			015043.4					
Travel Blank		W		2				X			015044.2					

Cooler No.: B 29

Cooler Seal Intact: ☐ Yes ☒ No

Relinquished by/Affiliation	Accepted by/Affiliation	Date	Time
K Legge / EA Eng.	[signature] - Pace	5/22/92	1445
[signature] - Pace VIA COURIER	[signature] / PACE	5/22	1630

Turnaround Time (circle choice): 24 hr. / 48 hr. / 72 hr. / 96 hr. / (5 workday (standard)) — circled

Shipment Method:

Shipment Date:

Additional Comments:
• no temperature surrogate

Distribution: White - Original   Yellow - Exxon   Pink - Lab   Goldenrod - Consultant Field Staff

0105224