RESNA
Working to Restore Nature

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SCOTSMAN CORPORATION
6055 Scarlet Court
Dublin, California

FOURTH QUARTER MONITORING REPORT
March 8, 1993

Report Prepared for:

First Interstate Bank of California
707 Wilshire Blvd., W7-22
Los Angeles, California 90017

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No. 5076
REN 6/93
STATE OF CALIFORNIA

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EXECUTIVE SUMMARY

The fourth quarter monitoring results for the groundwater remediation project at the former Scotsman facility at 6055 Scarlet Court, Dublin, California, was completed on the week of February 8, 1993 (Plates 1 and 2). Results of the analysis indicates that all of the wells in the vicinity of the former plume location remain clean. It is shown that the groundwater elevations recorded for February, 1993 are the highest since March, 1990. Gradient calculations also demonstrate that at least three wells are located in the downgradient direction from the former plume location. The last five quarterly monitoring reports for the wells remaining near the plume location have shown that hydrocarbon concentrations have remained below California drinking water standards since September, 1991. Based on this information, closure of the site is recommended.

1.0 BACKGROUND

On October 23, 1987, two 500 gallon gasoline storage tanks were removed from the Scotsman facility located at 6055 Scarlet Court in Dublin, California. The water table was observed near the tank bottoms at six and one-half feet. During the removal, corrosion was noted on the tanks and one of the tanks was described as having a hole by the fill point. Laboratory analysis of soil samples collected during the removal were reported to contain substantial levels of hydrocarbons. Based on this preliminary assessment, the Alameda County Department of Environmental Health ordered a site investigation.

On December 9, 1988, *Groundwater Resources, Inc. (GRI)*, now *RESNA Industries, Inc. (RESNA)*, performed a preliminary site investigation to determine if the soil and groundwater around the former tank locations had been impacted. It was determined that the soil around the tanks had minimal impact, however the groundwater below was reported to have significant levels of hydrocarbons. This report was submitted to the Alameda County Department of Environmental Health. The Department requested that further work be performed to establish aquifer characteristics and further define the extent of the groundwater hydrocarbon plume. In addition, monthly water level readings and bi-monthly water samples were to be collected and reported on a quarterly basis. On May 24, 1989, *GRI (RESNA)* constructed a series of groundwater monitoring wells to determine the groundwater gradient and to assess the extent of downgradient hydrocarbon migration. The report titled "Site Characterization Report, June 30, 1989" states that the hydrocarbon plume had migrated downgradient of the tank location. The recommendedation was made in the report that a series of boreholes be drilled to the groundwater around the suspected plume so that water samples could be collected and a determination of the extent of the plume could be made. An addendum to the report was sent to Alameda County recommending that one of the downgradient boreholes be completed as a monitoring well so that a qualitative groundwater sample could be collected. Verbal approval of the plan was received on October 3, 1989. This phase of the site characterization was completed on November 30, 1989. A report titled "Site Characterization Report and Remediation Plan, December 20, 1989" was submitted to the Alameda County Department of Environmental Health. This report demonstrated that the plume had been defined and recommended the installation of a recovery well and startup of groundwater remediation. Approval of the plan was received on January 23, 1990.

Full operation of the treatment system began on April 13, 1990. On June 6, 1991, the installation of two additional recovery wells was proposed. The wells RW-2 and RW-3 were installed on July 18, 1991. A subsequent review of the project showed that the groundwater plume had been reduced to a small area around MW-1, MW-6 and RW-2. On April 13, 1992 a plan was submitted for the excavation of the soil around the three affected monitoring wells. The excavation of the soil was completed on August 20, 1992. Soil samples collected from the sidewalls of the excavation were all reported to be below detection levels. A groundwater monitoring report for the third quarter of 1992 was submitted to Alameda County on December 1, 1992. The report showed the results of the latest monitoring event and requested closure of the site based on the historic record of clean analysis for the remaining wells. A letter from Alameda County, dated January 6, 1993, was received stating that closure cannot be recommended until it can be shown that existing wells remain in the verified downgradient.

2.0 FINDINGS

2.1 Quarterly Sampling Results

On February 8 and 11, 1993 the four monitoring wells located in the former plume location were sampled. MW-5 and MW-7 were purged a minimum of three well volumes or until dry using a 12 volt submersible pump. RW-1 and RW-3 contained dedicated pumps which were used to purge these wells. Samples were retrieved from each well using disposable bailers. RW-1 and RW-3 were sampled on February 8, while MW-5 and MW-7 were sampled on February 11. Each sample was collected in two 40 ml VOA bottles, labeled, chilled and transported to a state certified laboratory for analysis. All samples were analyzed for BTX&E and TPH (gasoline). The results from the sampling indicate that all of the wells remain free from detectable hydrocarbons (Table 1). A copy of the laboratory analysis is presented in Appendix A.

2.2 Groundwater Elevation and Gradient

A chart of the historic groundwater elevations for selected wells is presented on Plate 4. It is apparent from the chart that the measurements recorded on February 11, 1993 are the highest since March, 1990. A list of the groundwater elevations for February 11, 1993 is presented in Table 2 on page 4.

A groundwater gradient map is presented on Plate 5. Two groundwater gradient calculation were made using the groups (MW-7, MW-5, RW-1 and MW-7, MW-8, MW-4). Due to the close proximity of the first group of wells, the error of the calculation is greater. The second group of wells has greater separation, therefore the calculation is considered more reliable. Both gradient directions generally agree, however, and show that the groundwater gradient continues to trend in a Southwesterly direction. Using these calculated groundwater flow directions, it is shown that MW-5, MW-8 and MW-4 are all in the general down gradient direction from the former plume location.

TABLE 1
Analytical Results • February 8 and 11, 1993

Sample ID.	*Benzene*	*TPH*
(ppb)	*(ppb)*	
MW-5	ND	ND
MW-7	ND	ND
RW-1	ND	ND
RW-3	ND	ND

ND = No Detection

TABLE 2
Groundwater Elevation • February 11, 1993

WELL	*WELL ELEVATION*	*WATER ELEVATION*	*DEPTH TO WATER*
MW-2	329.49	326.47 ft msl	3.02 ft
MW-3	327.69	324.77 ft msl	2.92 ft
MW-4	329.02	323.67 ft msl	5.35 ft
MW-5	328.44	323.77 ft msl	4.67 ft
MW-7	328.78	323.95 ft msl	4.83 ft
MW-8	328.54	323.57 ft msl	4.97 ft
RW-1	328.94	323.90 ft msl	5.04 ft
RW-3	329.36	323.80 ft msl	5.56 ft

3.0 RECOMMENDATIONS

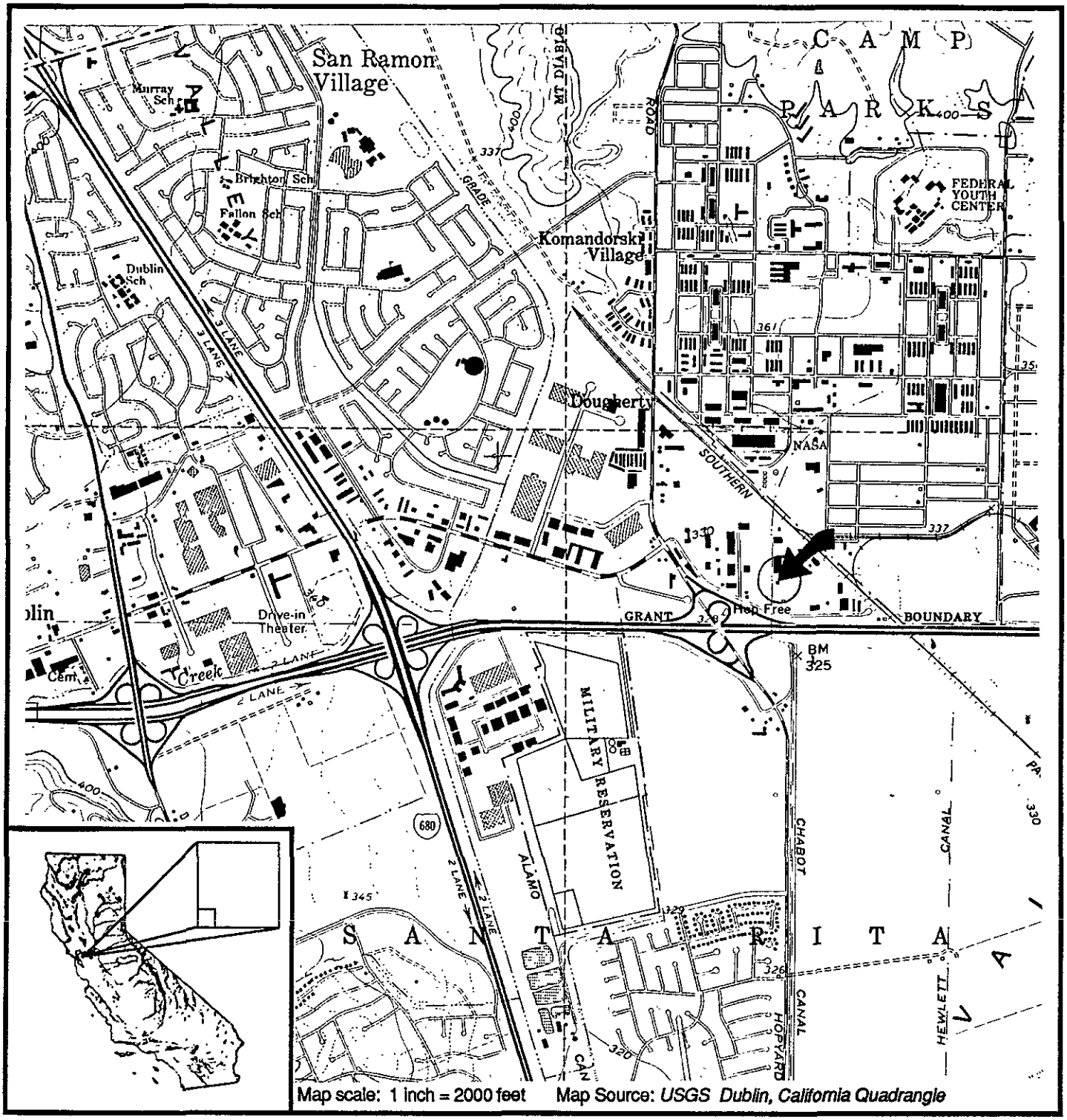
A review of the last five quarterly monitoring reports for the remaining wells has shown that all of the wells have been reported to have hydrocarbon concentrations below detection since September, 1991 (see Table 3). The only exception is MW-5, sampled on April 23, 1992, which had been reported clean for the four months proceeding and all subsequent sampling events. The concentrations for BTX&E in the April, 1992 analysis for MW-5 was below the California Drinking Water Standard. There is presently no standard set for total petroleum hydrocarbons, however, the reported level of 110 ppb is well below the limits for the volatile constituents toluene, ethylbenzene, and xylene. Since all of the wells have been below detection in the last five quarterly sampling events, with the one exception, it can be shown that a historic trend of clean analysis has been established.

Based on the data presented, closure of the site is recommended. In addition, it is recommended that all remaining wells be destroyed in a manner approved by the Zone 7 Flood Control District.

TABLE 3
Quarterly Hydrocarbon Concentrations • September 1991 to February 1993

DATE	*MW-2*	*MW-3*	*MW-4*	*MW-5*	*MW-7*	*MW-8*	*RW-1*	*RW-3*
Benzene (ppb)								
TPH (ppb)								
9/17/91	ND	ND	NA	ND	ND	ND	ND	NA
	ND	ND	NA	ND	ND	ND	ND	NA
4/23/92	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	110 TPH-G	ND	ND	ND	ND
7/10/92	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
10/21/92	ND	ND	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND	ND	ND
2/11/93	NA	NA	NA	ND	ND	NA	ND	ND
	NA	NA	NA	ND	ND	NA	ND	ND

NA = Not Analyzed; ND = No Detection



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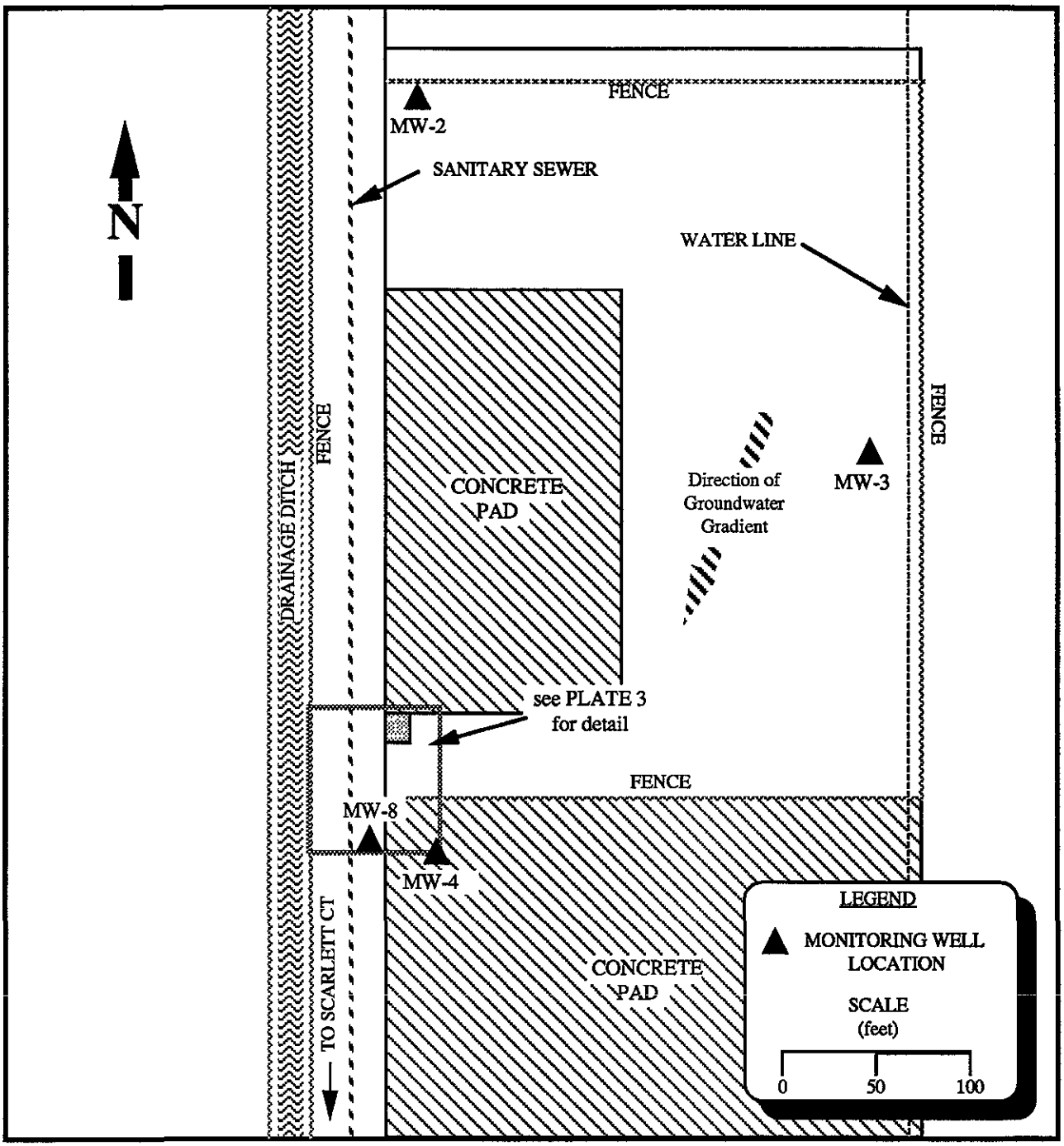
DATE: 02-18-93
PROJECT NUMBER: B7172.42

SCOTSMAN CORPORATION
6055 SCARLET CT.
DUBLIN, CALIFORNIA

LOCATION MAP

PLATE
1



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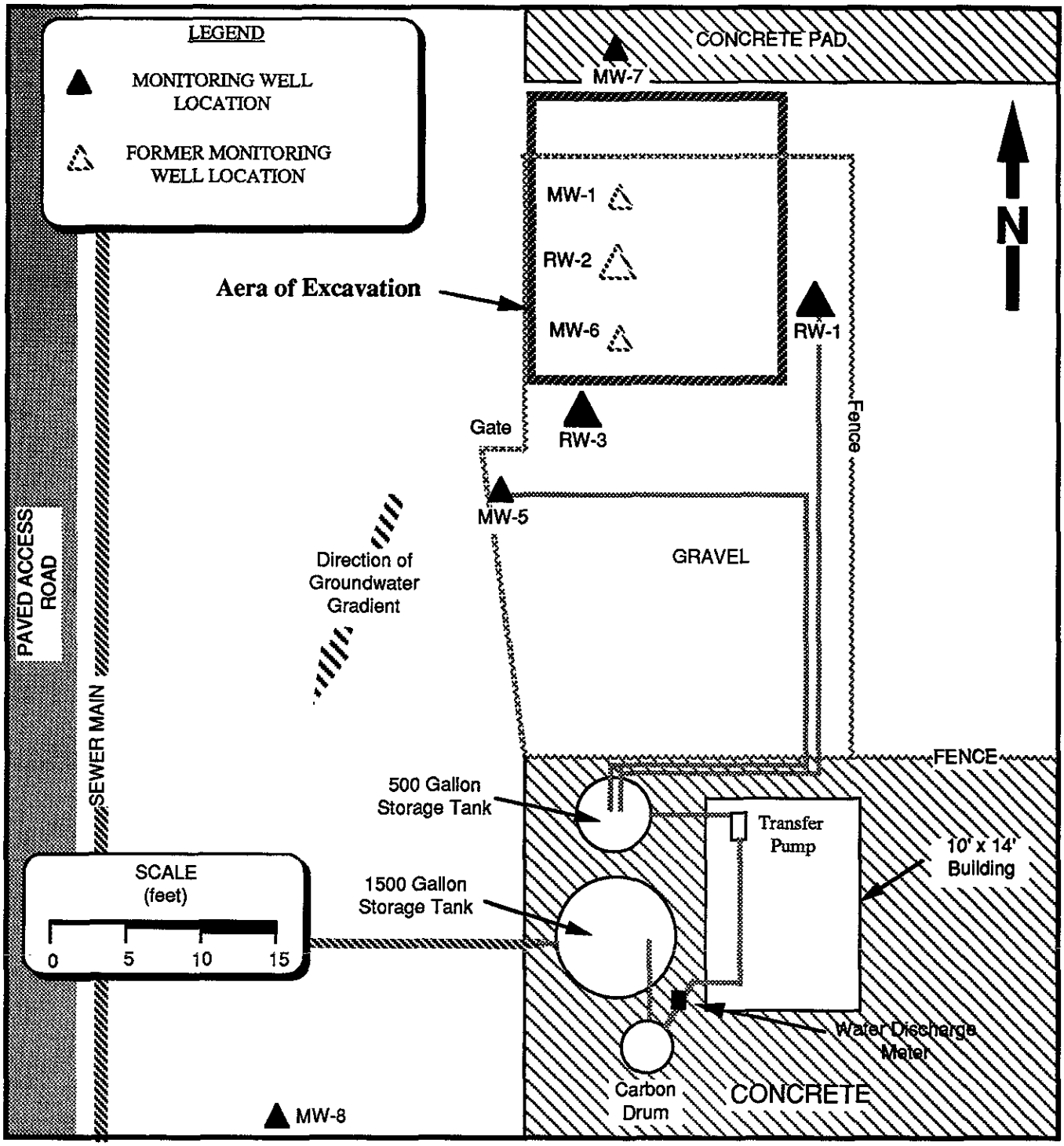
8-3-92

SCOTSMAN CORP.
DUBLIN, CA.

PLOT PLAN

PLATE
2



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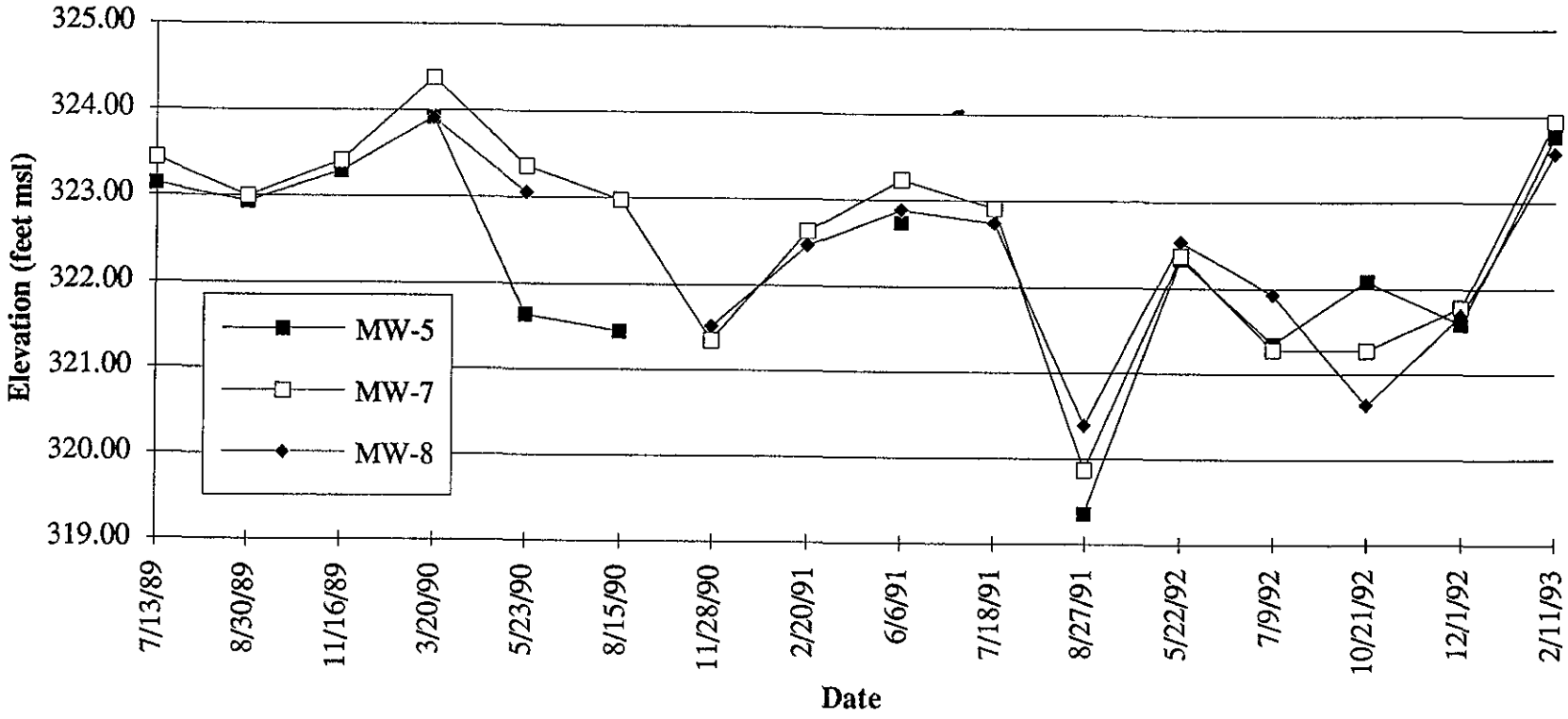
9-14-92

SCOTSMAN CORP. DUBLIN, CA.

PLOT PLAN DETAIL

PLATE

3



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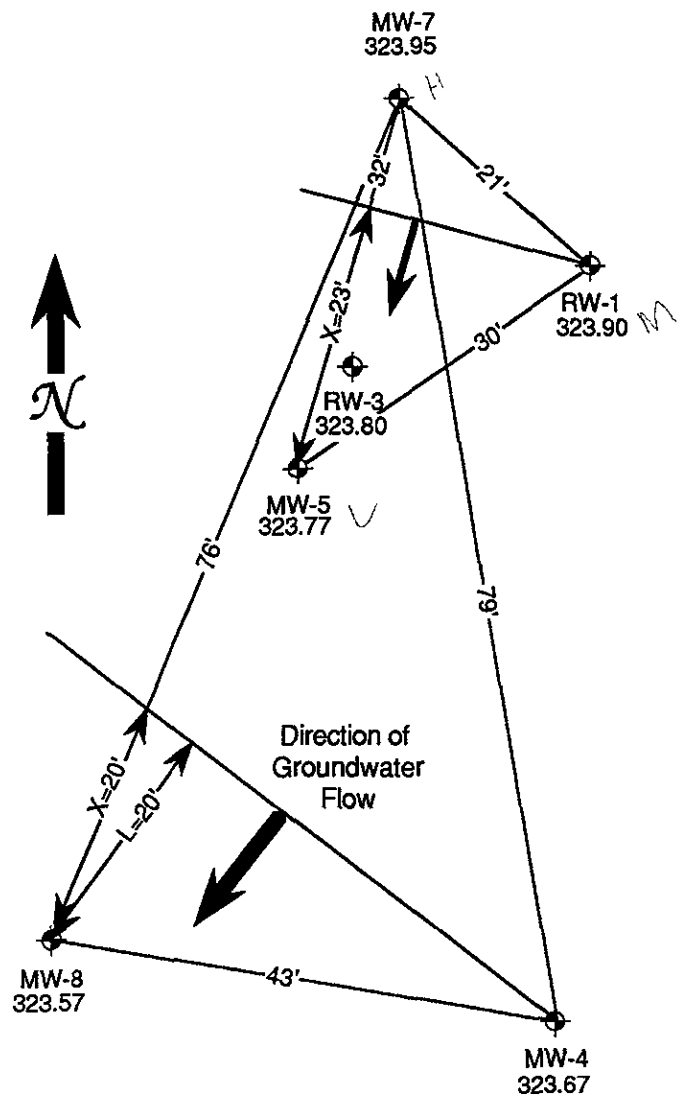
DUBLIN, CA.

GROUNDWATER ELEVATION CHART
(JULY 1989 TO FEBRUARY 1993)

PLATE
4



LEGEND

Monitoring well location

SCALE (feet)

0 10 20

CALCULATIONS
(MW-7, MW-5, RW-1)

GRADIENT

$$\frac{323.90' - 323.77'}{21'}$$

$$\frac{h_i}{L} = \frac{0.14'}{23'} = \frac{0.61'}{100'}$$

DIRECTION

$$\frac{323.90' - 323.77'}{323.95' - 323.77'} = \frac{X}{32'}$$

X = 23'

CALCULATIONS
(MW-7, MW-8, MW-4)

GRADIENT

$$\frac{323.67' - 323.57'}{20'}$$

$$\frac{h_i}{L} = \frac{0.10'}{20'} = \frac{0.50'}{100'}$$

DIRECTION

$$\frac{323.67' - 323.57'}{323.95' - 323.57'} = \frac{X}{76'}$$

X = 20'

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Project Number: B7172.42

2-16-93

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SHALLOW GROUNDWATER GRADIENT MAP
(February 11, 1993)

PLATE

5

APPENDIX A

Laboratory Analysis

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Tim Reed	Date Sampled:	02-08-93
	RESNA	Date Received:	02-11-93
	1500 South Union Ave.	BTEX Analyzed:	02-19-93
	Bakersfield, CA 93307	TPHg Analyzed:	02-19-93
Project:	11010.0L, Project #B7172-42	TPHd Analyzed:	NR
	Scotsman	Matrix:	Water

	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb	TPHg ppb	TPHd ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	50
SAMPLE Laboratory Identification						
RW-1 W1302191	ND	ND	ND	ND	ND*	NR
RW-3 W1302192	ND	ND	ND	ND	ND*	NR
Travel Blank W1302195	ND	ND	ND	ND	ND	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.
*Chromatogram contains a discrete peak that elutes between toluene and ethyl benzene.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

February 25, 1993
Date Reported

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Tim Reed	Date Sampled:	02-11-93
	RESNA	Date Received:	02-11-93
	1500 South Union Ave.	BTEX Analyzed:	02-16-93
	Bakersfield, CA 93307	TPHg Analyzed:	02-16-93
Project:	11010.0L, Project #B7172-42	TPHd Analyzed:	NR
	Scotsman	Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	50
SAMPLE Laboratory Identification						
MW-5 W1302193	ND	ND	ND	ND	ND*	NR
MW-7 W1302194	ND	ND	ND	ND	ND	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.
*Chromatogram contains a discrete peak that elutes between toluene and ethyl benzene.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

February 17, 1993
Date Reported

RESNA

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST 96002

PROJECT NO.	PROJECT NAME/SITE
717242	SCOTSMAN

SAMPLERS (SIGN) / (PRINT) TIM REED

SAMPLE IDENTIFICATION	DATE	TIME	COMP	GRAB	PRES. USED	ICED	NO. CONTAINERS	SAMPLE TYPE	BTEX (602/8020)	TPHg (8015)	TPHd (8015)	TOG 418.1/5520	601/8010	624/8240	625/8270				REMARKS
																Tim Reed by phone			
RW-1	2-8-93	3:00		X	HCl	X	2	W	X	X		unknown		2/19/93		9:00	AM		HOLD W1302 191
RW-3	"	"										11							HOLD 192
MW-5	2-11-93	1:00																	193
MW-7	"	2:20																	194
TRAVEL BLANK							1					11							HOLD 195

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
Tim Reed	2-11-93	17:40	
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
RELINQUISHED BY:	DATE	TIME	RECEIVED BY LABORATORY:

LABORATORY: RESNA

REQUESTED TURNAROUND TIME: NORMAL

RECEIPT CONDITION:

PLEASE SEND RESULTS TO: ~~TIM~~ RESNA - BAKERSFIELD

PROJECT MANAGER: TIM REED