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RESNA
Working To Restore Nature

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TRANSMITTAL

TO: Ms. Pamela Evans
Alameda County Health Care
Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94612

DATE: January 26, 1994
PROJECT NUMBER: F1587.33
SUBJECT: Crown Metal/Pacific International
Steel Facility

FROM: Richard A. Garlow
TITLE: Senior Project Geologist

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	January 26, 1994	Fourth Quarter 1993, Quarterly Groundwater Monitoring Report, Crown Metal/Pacific International Steel Facility, 16526 Worthley Drive, San Lorenzo, California.

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REMARKS:

Copies: 1 to RESNA project file.


Richard A. Garlow, Senior Project Geologist

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Fourth Quarter 1993

at
Pacific International Steel Facility
16525 Worthley Drive
San Lorenzo, California

For

Crown Metal Manufacturing
765 South State Route 83
Elmhurst, Illinois

Project No. F1587.33
January 1994

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January 26, 1994
Project No. F1587.33

Mr. Richard C. Ernest
Crown Metal Manufacturing
765 South State Route 83
Elmhurst, IL 60126-4700

Subject: Quarterly Groundwater Monitoring, Fourth Quarter 1993,
Pacific International Steel Facility,
16525 Worthley Drive, San Lorenzo, California.

Mr. Ernest:

At the request of Crown Metal Manufacturing (Crown Metal), RESNA Industries Inc. (RESNA), has completed this report of the results of Fourth Quarter 1993 quarterly groundwater monitoring at the subject site in the City of San Lorenzo, Alameda County, California (see Plate 1).

During this quarterly monitoring event, depth to groundwater measurements were collected in all existing monitoring wells (MW-1, MW-2, MW-4, MW-5, MW-6, MW-7 and MW-8) and well RW-1. Well MW-3 was destroyed in August 1989. Well RW-1 is part of a groundwater remediation system installed by RESNA and put into operation in January 1991. The groundwater remediation system consists of pumping the groundwater from well RW-1 through two 55-gallon drums containing activated carbon and then discharging the treated groundwater into the sanitary sewer. Monthly monitoring of this groundwater remediation system is discussed in a separate report. In June 1993, analytical results of the groundwater remediation system effluent indicated a benzene breakthrough of the system carbon drums had occurred. As a result, the system was shut down on June 14, 1993.

Problems in obtaining replacement carbon and repairing the system pump delayed restart of the groundwater remediation system. After necessary repairs were made, the groundwater remediation system was started up on September 15, 1993, to obtain water samples. Analytical results of the water samples indicated that 1.5 parts per billion (ppb), was present in the influent water but benzene was not detected (<0.50 ppb) in the effluent water. After discussing these results with Ms. Susan Keach of the Oro Loma Sanitary District on September 21, 1993, RESNA was granted permission to restart the groundwater

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Pacific International Steel Facility, San Lorenzo, California

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remediation system. On September 23, 1993, the groundwater remediation system was restarted.

At the time of our quarterly sampling on November 30, 1993, the groundwater remediation system was not operating due to electrical problems. Because recovery well RW-1 is connected to the system and the system was not running, it was not possible to obtain a water sample directly from the well, or from the influent sample port of the system. As a result, well RW-1 was sampled at the influent sample port after the remediation system was back in operation on December 16, 1993.

Groundwater samples were not collected from monitoring wells MW-1, MW-4, MW-5, MW-6, and MW-7, as approved by the Alameda County Health Care Services Agency (ACHCSA) (ACHCSA, March 25, 1991). A groundwater sample was not collected from monitoring well MW-8, as approved by the ACHCSA (ACHCSA, May 8, 1992). Annual sampling of monitoring well MW-8 is conducted during the first quarter.

Groundwater Sampling

Before sampling, RESNA measured the depth to groundwater levels in wells RW-1 and MW-2 with an electric sounding tape and well MW-2 was checked for the presence of free-phase hydrocarbons using a clear acrylic bailer. No free-phase hydrocarbons were observed. Groundwater samples were collected in accordance with RESNA's field protocol (see Appendix A). Equipment rinse water and groundwater removed from the well were placed in drums approved by the Department of Transportation. A copy of the well purge data sheet for well MW-2 is included in Appendix B.

Hydrogeology

Evaluation of depth to groundwater level measurements indicate that generally, the groundwater surface dropped an average of 0.15 foot (ranging from 0.07 foot in well MW-1 to 0.38 foot in well RW-1) since last quarter (August 20, 1993); except for groundwater in well MW-4, which rose 0.37 foot. Based on August 20, 1993, depth to groundwater levels, interpreted groundwater elevation contours shown on Plate 2, indicate that the groundwater flow direction is generally to the south-southeast with gradients ranging from about 0.001 to 0.005.

Laboratory Analyses and Results

The groundwater samples from wells RW-1, MW-2 and a bailer blank (BB-1) were analyzed by Sequoia Analytical Laboratories, a state-certified laboratory located in Redwood City, California. The samples were analyzed for the presence of total petroleum hydrocarbons as gasoline (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using

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Environmental Protection Agency (EPA) Methods 5030/8015/8020. Low concentrations of toluene (1.3 ppb) and total xylenes (1.9 ppb) were detected in the bailer blank from the November 30, 1993 sampling. It is not known if these compounds were introduced during sampling or analytical activities. The results of these analyses are shown in Table 1. Copies of the laboratory analytical reports and chain-of-custody records are included in Appendix B.

Reporting Requirements

At your request, a copy of this report has been forwarded by RESNA to the following agencies:


Mr. Richard Heitt
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612-3429

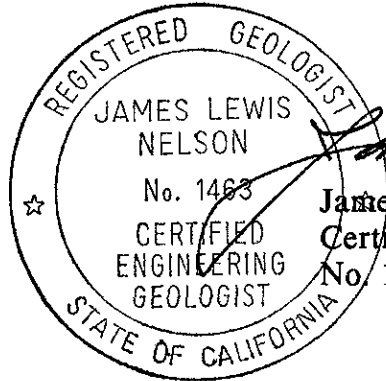
Ms. Pamela Evans
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94612


Fourth Quarter 1993 Quarterly Report
Pacific International Steel Facility, San Lorenzo, California

January 26, 1994
F1587.33

Sincerely,
RESNA Industries Inc.


Richard A. Garlow
Senior Project Geologist




James L. Nelson
Certified Engineering Geologist
No. 1463

Enclosures: References Cited

- Plate 1: Site Vicinity Map
- Plate 2: Groundwater Elevation Contour Map (11/30/93)

- Table 1: Cumulative Results of Groundwater Sampling and Analyses

- Appendix A: Field Protocol
- Appendix B: Field Report/Data Sheets, Well Purge Data Sheet, Laboratory Reports and Chain-of-Custody Records

cc: Mr. James Lewis, Pacific International Steel
Mr. Richard Heitt, California Regional Water Quality Control Board
Ms. Pamela Evans, Alameda County Health Care Services Agency

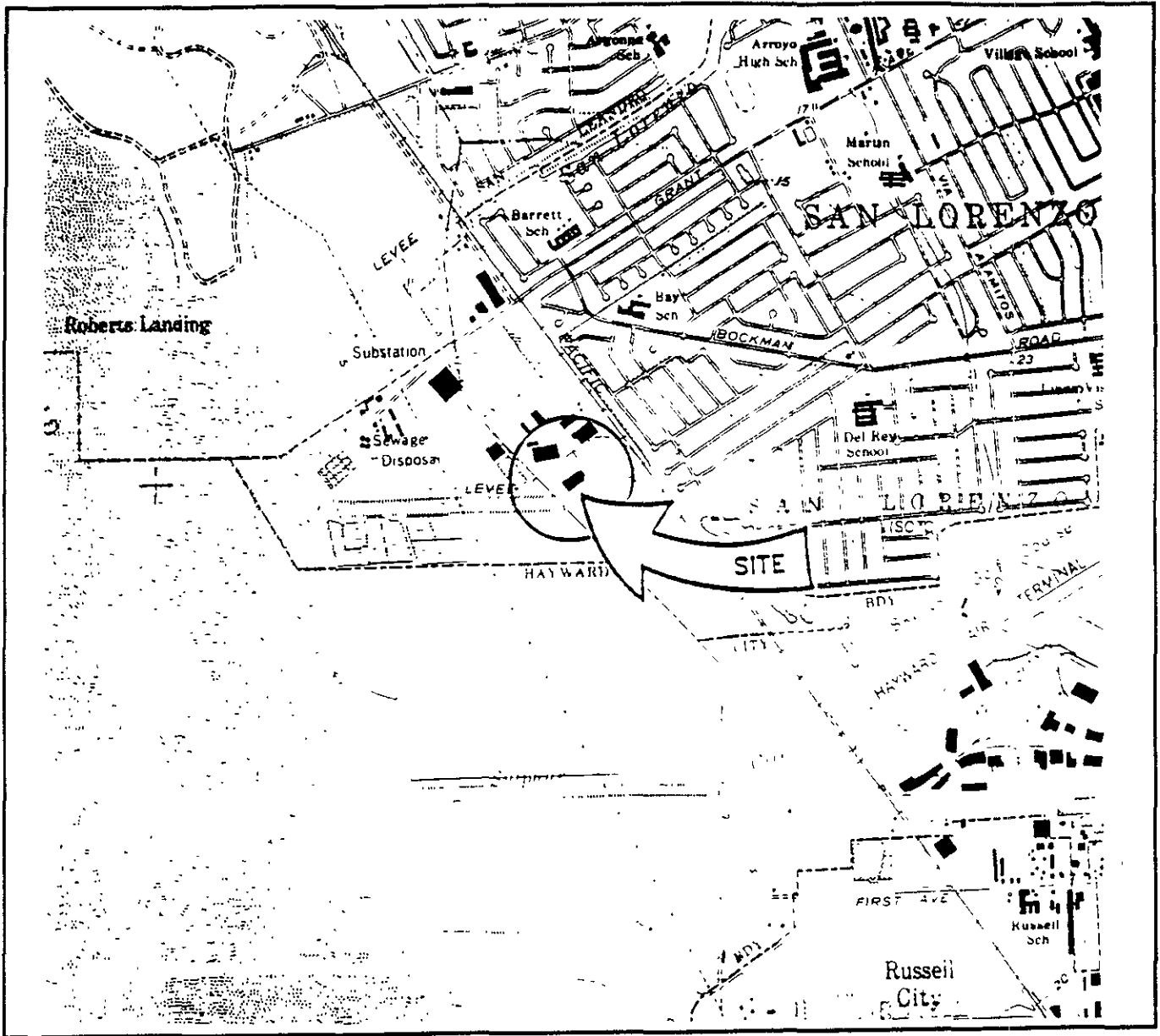
Fourth Quarter 1993 Quarterly Report
Pacific International Steel Facility, San Lorenzo, California

January 26, 1994
F1587.33

References Cited

Alameda County Health Care Services Agency, March 25, 1991, Letter from Ms. Pamela J. Evans, Hazardous Materials Specialist, to Mr. Richard Earnest, Crown Metal Manufacturing Company, at Pacific International Steel, 16525 Worthley Avenue, San Lorenzo, California 94580.

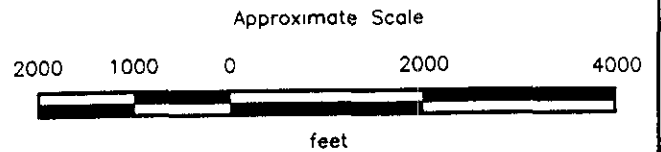
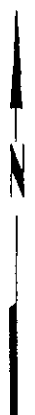
Alameda County Health Care Services Agency, May 8, 1992, Letter from Mr. Scott O. Seery, CHMM, Senior Hazardous Materials Specialist, to Mr. Richard Earnest, Crown Metal Manufacturing Company, at Pacific International Steel, 16525 Worthley Avenue, San Lorenzo, California 94580.



Base. U.S. Geological Survey
 7.5-Minute Quadrangles
 San Leandro, California.
 Photorevised 1980

LEGEND

○ = Site Location

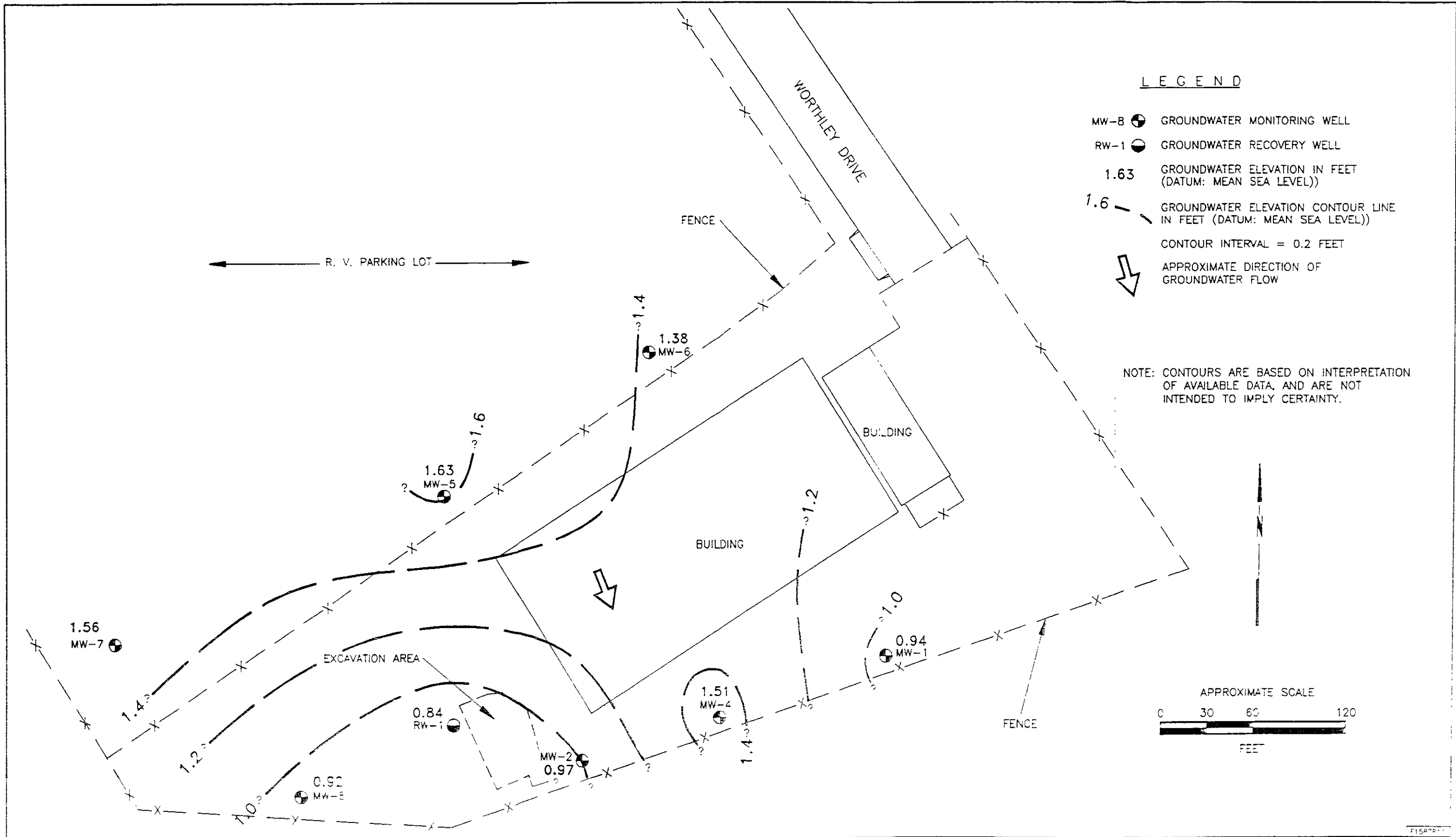


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SITE VICINITY MAP
 Crown Metal Mfg. - Pacific Intl' Steel
 16525 Worthley Drive
 San Leandro, California

PLATE
 1

PROJECT F1587.33



GROUNDWATER ELEVATION CONTOUR MAP (11/30/93)
 Crown Metal Mfg. - Pacific International Steel
 16525 Worthley Drive
 San Lorenzo, California

PLATE

2

PROJECT F1587.33

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)
MW-1	07/14/87	ND	ND	ND	---	ND	8.86	7.56	
	11/24/87	ND	ND	ND	---	9.0		7.51	
	02/29/88	ND	ND	ND	---	ND		7.18	
	05/25/88	ND	ND	ND	---	ND		7.40	
	08/10/88	ND	ND	ND	ND	ND		7.85	
	11/29/88	ND	ND	ND	ND	ND		7.86	
	02/07/89	ND	ND	ND	ND	ND		7.43	
	05/12/89	ND	1.4	ND	ND	ND		7.23	
	08/04/89	ND	ND	ND	ND	ND		8.17	
	11/14/89	ND	ND	ND	---	---		7.93	
	01/03/90	---	---	---	---	---		7.77	
	02/22/90	ND	ND	ND	ND	ND		7.28	
	05/17/90	---	---	---	---	---		7.62	
	08/17/90	---	---	---	---	---		7.91	
	11/06/90	---	---	---	---	---		8.01	
	02/01/91	ND	ND	ND	ND	ND		8.00	0.86
	05/01/91	---	---	---	---	---		7.36	1.50
	08/08/91	---	---	---	---	---		8.17	0.69
	11/15/91	---	---	---	---	---		8.17	0.69
	02/12/92	---	---	---	---	---		6.75	2.11
	05/21/92	---	---	---	---	---		---	---
	11/13/92	---	---	---	---	---		8.00	0.86
	02/24/93	---	---	---	---	---		5.74	3.12
	05/28/93	---	---	---	---	---		7.36	1.50
	08/20/93	---	---	---	---	---		7.85	1.01
11/30/93	---	---	---	---	---	7.92	0.94		

TABLE I
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)
MW-2	07/14/87	110	1.2	1.9	---	2.0	9.17	7.79	
	11/24/87	3,600	82	47	---	13		7.73	
	02/29/88	800	ND	ND	---	ND		7.26	
	05/25/88	250	ND	ND	---	ND		7.45	
	08/10/88	260	ND	ND	ND	ND		7.90	
	11/29/88	870	9.0	ND	1.0	1.0		8.20	
	02/07/89	710	16	ND	ND	ND		7.47	
	05/12/89	260	2.8	0.76	1.3	3.0		7.27	
	08/04/89	360	ND	ND	ND	0.48		8.23	
	11/14/89	85	ND	3.5	0.36	2.5		8.08	
	01/03/90	---	---	---	---	---		7.95	
	02/22/90	120	ND	ND	1.5	0.55		7.47	
	05/17/90	240	ND	ND	ND	ND		7.70	
	08/17/90	130	ND	2.9	1.2	0.68		8.00	
	11/06/90	170	0.37	1.2	2.0	1.5		8.30	
	02/01/91	57	ND	ND	ND	0.73		8.15	1.02
	05/01/91	220	1.5	0.42	0.53	0.54		7.56	1.61
	08/08/91	710	4.1	0.84	ND	0.71		8.95	0.22
	11/15/91	630	2.3	ND	3.1	0.86		8.26	0.91
	02/12/92	580	5.9	1.2	0.52	ND		7.02	2.15
	05/21/92	790	26	5.4	ND	ND		7.89	1.28
	11/13/92	230	ND	ND	ND	ND		8.29	0.88
	02/24/93	400	17	ND	ND	ND		5.75	3.42
	05/28/93	110	<0.50	<0.50	<0.50	<0.50		7.56	1.61
	08/20/93	1,000	<0.50	0.75	1.1	5.4		8.01	1.16
11/30/93	590	<0.50	<0.50	3.8	2.3	8.20	0.97		

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)	
MW-3	07/14/87	260	ND	1.0	---	2.0	8.54	7.09		
	11/24/87	8,900	1,700	3.0	---	12		7.11		
	02/29/88	9,300	1,600	93	---	99		6.57		
	05/25/88	11,000	140	16	---	34		6.80		
	08/10/88	4,600	23	4.8	140	3.0		7.20		
	11/29/88	16,000	3,900	11	600	40		7.41		
	02/07/89	---	---	---	---	---		NA		
	05/12/89	2,500	ND	5.6	ND	2.7		6.64		
	08/04/89	2,900	800	7.5	96	ND		7.38		
	11/14/89			Well Destroyed in August 1989						
	MW-4	07/14/87	ND	ND	ND	---		ND	8.48	7.25
11/24/87		60	ND	0.65	---	7.6	6.97			
02/29/88		ND	ND	ND	---	ND	6.54			
05/25/88		ND	ND	ND	---	ND	6.36			
08/10/88		---	---	---	---	---	NA			
11/29/88		ND	0.87	ND	ND	ND	6.85			
02/07/89		ND	ND	ND	ND	ND	6.26			
05/12/89		ND	ND	ND	ND	0.76	6.55			
08/04/89		---	---	---	---	---	NA			
11/14/89		---	---	---	---	---	---			
02/22/90		ND	ND	ND	ND	ND	6.67			
05/17/90		---	---	---	---	---	---			
08/17/90		---	---	---	---	---	7.30			
11/06/90		---	---	---	---	---	7.15			

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)
MW-4 (cont.)	02/01/91	ND	ND	ND	ND	ND	8.48	6.85	1.63
	05/01/91	---	---	---	---	---		6.73	1.75
	08/08/91	---	---	---	---	---		---	---
	11/15/91	---	---	---	---	---		7.45	1.03
	02/12/92	---	---	---	---	---		6.55	1.93
	05/21/92	---	---	---	---	---		6.62	1.86
	11/13/92	---	---	---	---	---		7.45	1.03
	02/24/93	---	---	---	---	---		4.28	4.20
	05/28/93	---	---	---	---	---		---	---
	08/20/93	---	---	---	---	---		7.34	1.14
	11/30/93	---	---	---	---	---		6.97	1.51
MW-5	07/14/87	ND	ND	ND	---	ND	9.11	7.06	---
	11/24/87	ND	ND	ND	---	7.2		7.24	---
	02/29/88	ND	ND	ND	---	ND		6.75	---
	05/25/88	ND	---	---	---	---		---	---
	08/10/88	---	ND	ND	ND	ND		7.35	---
	11/29/88	ND	ND	ND	ND	ND		---	---
	02/07/89	ND	ND	ND	ND	ND		7.02	---
	05/12/89	ND	ND	ND	ND	0.84		6.69	---
	08/04/89	ND	ND	ND	ND	ND		7.52	---
	11/14/89	ND	ND	ND	ND	ND		7.51	---
	01/03/90	ND	---	---	---	---		7.42	---
	02/21/90	ND	ND	ND	ND	ND		6.85	---
	05/17/90	---	---	---	---	---		7.09	---
	08/17/90	---	---	---	---	---		7.36	---

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)
MW-5 (cont.)	11/06/90	---	---	---	---	---	9.11	7.65	
	02/01/91	ND	ND	ND	ND	ND		7.63	1.48
	05/10/91	---	---	---	---	---		6.68	2.43
	08/08/91	---	---	---	---	---		7.65	1.46
	11/15/91	---	---	---	---	---		7.52	1.59
	02/12/92	---	---	---	---	---		6.43	2.68
	05/21/92	---	---	---	---	---		6.92	2.19
	11/13/92	---	---	---	---	---		7.63	1.48
	02/24/93	---	---	---	---	---		5.15	3.96
	05/28/93	---	---	---	---	---		6.53	2.58
	08/20/93	---	---	---	---	---		7.17	1.94
	11/30/93	---	---	---	---	---		7.48	1.63
MW-6	07/14/87	ND	ND	ND	---	ND	9.19	---	
	11/24/87	---	---	---	---	---		---	
	01/05/88	ND	ND	ND	---	ND		---	
	02/29/88	ND	ND	ND	---	ND		7.19	
	05/25/88	ND	ND	ND	ND	ND		7.33	
	08/10/88	ND	ND	ND	ND	ND		7.50	
	11/29/88	ND	ND	ND	ND	ND		7.93	
	02/07/89	ND	ND	ND	ND	ND		7.56	
	05/12/89	ND	ND	ND	ND	ND		7.16	
	08/04/89	ND	ND	ND	ND	ND		7.94	
	11/14/89	ND	ND	ND	ND	ND		8.92	
	01/03/90	ND	---	---	---	---		7.89	
02/21/90	---	ND	ND	ND	ND	7.28			

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)
MW-6 (cont.)	05/17/90	ND	---	---	---	---	9.19	7.89	
	08/17/90	---	---	---	---	---		7.68	
	11/06/90	---	---	---	---	---		8.05	
	02/01/90	ND	ND	ND	ND	ND		7.87	
	05/01/90	---	---	---	---	---		6.95	
	08/08/91	---	---	---	---	---		7.97	1.22
	11/15/91	---	---	---	---	---		7.92	1.27
	02/12/92	---	---	---	---	---		6.92	2.27
	05/21/92	---	---	---	---	---		7.11	2.08
	11/13/92	---	---	---	---	---		7.98	1.21
	02/24/93	---	---	---	---	---		5.61	3.58
	05/28/93	---	---	---	---	---		6.78	2.41
	08/20/93	---	---	---	---	---		7.60	1.59
11/30/93	---	---	---	---	---	7.81	1.38		
MW-7	01/03/90	---	---	---	---	---	8.41	8.06	
	01/09/90	ND	ND	ND	ND	ND		8.42	
	02/21/90	ND	ND	ND	ND	ND		6.63	
	05/17/90	ND	ND	ND	ND	ND		6.81	
	08/17/90	48	ND	ND	ND	ND		7.13	
	11/06/90	ND	ND	ND	ND	0.32		7.29	
	02/01/91	ND	ND	ND	ND	ND		7.20	1.21
	05/01/91	---	---	---	---	---		6.80	1.61
	08/08/91	---	---	---	---	---		7.15	1.26
	11/15/91	---	---	---	---	---		7.20	1.21
02/12/92	---	---	---	---	---	6.73	1.68		

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)	
MW-7 (cont.)	05/21/92	---	---	---	---	---	8.41	6.67	1.74	
	11/13/92	---	---	---	---	---		7.03	1.38	
	02/24/93	---	---	---	---	---		5.26	3.15	
	05/28/93	---	---	---	---	---		6.15	2.26	
	08/20/93	---	---	---	---	---		6.58	1.83	
	11/30/93	---	---	---	---	---		6.85	1.56	
MW-8	05/01/91	ND	ND	ND	ND	ND	8.52	7.67	0.85	
	08/08/91	ND	ND	ND	ND	ND		8.15	0.37	
	11/15/91	ND	ND	ND	ND	ND		7.94	0.58	
	02/12/92	ND	ND	ND	ND	ND		7.29	1.23	
	05/21/92	---	---	---	---	---		---	---	
	11/13/92	---	---	---	---	---		---	8.02	0.50
	02/24/93	ND	ND	ND	ND	ND		---	5.47	3.05
	05/28/93	---	---	---	---	---		---	6.85	1.67
	08/20/93	---	---	---	---	---		---	7.46	1.06
	11/30/93	---	---	---	---	---		---	7.60	0.92
RW-1	01/03/90	---	---	---	---	---	11.02	9.81		
	01/09/90	1,300	150	15	100	170		9.75		
	03/01/90	440	9.4	1.3	16	25		9.34		
	05/17/90	1,400	52	1.0	20	12		9.55		
	08/17/90	1,800	410	7.8	160	65		9.84		
	11/06/90	---	---	---	---	---		10.15		
	10/25/91	420	79	1.8	2.5	14		10.20	0.82	

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft aboveMSL)	Depth to Water (feet)	Groundwater Elevation (ft aboveMSL)
RW-1 System Influent	01/16/91	78	17	2.7	7.7	1.3	11.02	---	
	05/01/91	160	40	0.79	14	6.1		---	
	08/08/91	89	41	0.31	4.6	0.73		---	
	11/15/91	140	41	ND	1.3	0.44		---	
	02/12/92	260	78	0.73	6.6	8.2		---	
	05/21/92	57	20	ND	1.7	0.85		---	
	11/13/92	ND	ND	ND	ND	ND		---	
	01/08/93	ND	8	ND	0.78	0.59		---	
	01/29/93	64	22	ND	4.8	3.7		---	
	03/18/93	2,400	330	3.3	51	17		---	
	04/22/93	<50	13	<0.50	1.5	<0.50		---	
	05/28/93	<50	0.76	<0.50	<0.50	<0.50		---	
	08/20/93	57	16	<0.50	0.70	1.9		9.80	1.22
12/16/93*	<50	0.73	2.6	1.1	<0.50	10.18	0.84		
BB-1	01/09/90	ND	ND	ND	ND	ND			
	05/17/90	ND	ND	ND	ND	ND			
	11/06/90	ND	ND	ND	ND	ND			
	02/01/91	ND	ND	ND	ND	ND			
	05/01/90	ND	ND	ND	ND	ND			
	08/08/91	ND	ND	ND	ND	ND			

TABLE 1
 CUMULATIVE RESULTS OF GROUNDWATER SAMPLING AND ANALYSES

Well	Date Sampled	TPHg (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)	Well Elevation (ft above MSL)	Depth to Water (feet)	Groundwater Elevation (ft above MSL)
BB-1 (cont.)	11/15/91	ND	ND	ND	ND	ND			
	02/12/92	---	---	---	---	---			
	05/21/92	---	---	---	---	---			
	11/13/92	---	---	---	---	---			
	02/24/93	ND	ND	ND	ND	ND			
	05/28/93	---	---	---	---	---			
	08/20/93	<50	<0.50	<0.50	<0.50	<0.50			
	11/30/93	<50	<0.50	1.3	<0.50	1.9			

Notes:

TPHg Total petroleum hydrocarbons as gasoline
 ND Not detected at or above the method detection limit
 (see laboratory reports for detection limits)
 < Not detected above listed method detection limit
 --- No data obtained

ppb Parts per billion ($\mu\text{g/l}$)
 BB-1 Bailer Bank
 ft feet
 MSL Mean sea level
 * RW-1 water level obtained on November 30, 1993, water sample collected on December 16, 1993. Groundwater sample collected from groundwater treatment system influent sample port.

APPENDIX A
FIELD PROTOCOL

FIELD PROTOCOL

The following presents RESNA Industries' (RESNA's) protocol for a typical quarterly groundwater monitoring program at a site involving gasoline hydrocarbon-impacted soil and/or groundwater.

Site Safety Plan

The Site Safety Plan describes the safety requirements for the evaluation of gasoline hydrocarbons in soil and groundwater at the site. The site Safety Plan is applicable to personnel of RESNA and its subcontractors. RESNA personnel and subcontractors of RESNA scheduled to perform the work at the site are to be briefed on the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is available for reference by appropriate parties during the work. A site Safety Officer is assigned to the project.

Groundwater Sampling

The static water level in each well is measured to the nearest 0.01-foot using a Solinst® electric water-level sounder or oil/water interface probe (if the wells contain floating product) cleaned with Alconox® and water before use in each well. The liquid in the onsite wells is examined for visual evidence of hydrocarbons by gently lowering approximately half the length of a Teflon® bailer (cleaned with Alconox® and water) past the air/water interface. The sample is then retrieved and inspected for floating product, sheen, emulsion, color, and clarity. The thickness of floating product detected is recorded to the nearest 1/8-inch.

Wells which do not contain floating product are purged using a submersible pump. The pump, cables, and hoses are cleaned with Alconox® and water prior to use in each well. The wells are purged until withdrawal is of sufficient duration to result in stabilized pH, temperature, and electrical conductivity of the water, as measured using portable meters calibrated to a standard buffer and conductivity standard. If the well becomes dewatered, the water level is allowed to recover to at least 80 percent of the initial water level. Prior to the collection of each ground water sample, the Teflon® bailer is cleaned with Alconox® and rinsed with tap water and deionized water, and the latex gloves worn by the sampler changed. Hydrochloric acid is added by the laboratory to the sample vials as a preservative (when applicable). A sample method blank is collected by pouring distilled water into the bailer and then into sample vials. A sample of the formation water is then collected from the surface of the water in each of the wells using the Teflon® bailer. The water samples are then gently poured into laboratory-cleaned, 40-milliliter (ml) glass vials, 500 ml plastic bottles or 1-liter glass bottles (as required for specific laboratory analysis) and sealed with Teflon®-lined caps, and inspected for air bubbles to check for headspace, which would allow

volatilization to occur. The samples are then labeled and promptly placed in iced storage. A field log of well evacuation procedures and parameter monitoring is maintained. Water generated by the purging of wells is stored in 17E DOT 55-gallon drums onsite and remains the responsibility of the client.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, sample location and depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record is initiated by the field geologist and updated throughout handling of the samples, and accompanies the samples to a laboratory certified by the State of California for the analyses requested. Samples are transported to the laboratory promptly to help ensure that recommended sample holding times are not exceeded. Samples are properly disposed of by the laboratory after their useful life has expired.

APPENDIX B

**FIELD REPORT/DATA SHEET,
WELL PURGE DATA SHEET,
LABORATORY REPORTS
AND
CHAIN-OF-CUSTODY RECORDS**

FIELD REPORT/DATA SHEET

Project: Crown Metal Facility
 Date: November 30, 1993
 Number: F1587.33

Field Technician: Jeff Sala
 Day: M Tu W Th F Weather: Sunny
 Station Address: 16525 Worthley Drive

DTW Order	Well ID	Diam.	Lock	Exp. Cap	Total Depth	DTW Initial	DTW Final	Depth to Product	Product Thickness	Time Sampled	Comments
1	MW-8	2	Good	Good	16.40	7.60					
2	MW-7	2	no lock	slip cap	15.95	6.85					
3	MW-6	2	no lock	slip cap	24.70	7.81					
4	MW-5	2	no lock	slip cap	23.95	7.48					
5	MW-4	2	no lock	slip cap	24.80	6.97					
6	MW-1	2		slip cap	25.50	7.92					
7	RW-1	2				10.18					
8	MW-2	2	no lock	slip cap	25.55	8.20	8.38			11.35	

Notes:

Number of Drums Onsite			Soil Pile/Drums Onsite	
Full	Empty	Total	Estimated Volume:	
2	12	14	Numbers of Drums:	0
Estimated Volume: 110			Soil pile covered/condition?	N/A

ALL DRUMS MUST BE LABELLED WITH THE LABELS FACING OUT

WELL PURGE DATA SHEET

Project Name: Pacific International Steel

Job No. F1587.33

Date: 11/30/93

Page 1 of 1

Well No. MW-2

Time Started 10:34

TIME (hr)	GALLONS (cum.)	TEMP. (F)	pH	CONDUCT. (micromho)	TURBIDITY (NTU)
10:34	Start purging MW-1				
10:40	3	65.3	6.54	OR	8.8
10:46	4	68.8	6.89	OR	47.2
10:52	9	70.7	7.00	OR	44.5
10:58	12	69.6	6.95	OR	48.9
10:58	Stop purging MW-1				
Notes:					
	Well Diameter (inches) : 2				
	Depth to Bottom (feet) : 25.55				
	Depth to Water - initial (feet) : 8.20				
	Depth to Water - final (feet) : 8.38				
	% recovery : 99				
	Time Sampled : 11:35				
	Gallons per Well Casing Volume : 2.95				
	Gallons Purged : 12				
	Well Casing Volume Purged : 4.1				
	Approximate Pumping Rate (gpm) : .50				
	OR : Over Range of Instrument				



SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Rich Garlow

Client Project ID: F1587.33 Crown Metals
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 3L11901

Sampled: Nov 30, 1993
Received: Dec 1, 1993
Reported: Dec 16, 1993

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample	Sample
		I.D. 3L11901 MW-2	I.D. 3L11902 BB-1
Purgeable Hydrocarbons	50	590	N.D.
Benzene	0.50	N.D.	N.D.
Toluene	0.50	N.D.	1.3
Ethyl Benzene	0.50	3.8	N.D.
Total Xylenes	0.50	2.3	1.9
Chromatogram Pattern:		Gas	Discrete Peaks

Quality Control Data

Report Limit Multiplication Factor:	2.0	1.0
Date Analyzed:	12/11/93	12/11/93
Instrument Identification:	GCHP-5	GCHP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	82	92

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Vickie Tague
Vickie Tague
Project Manager



SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Rich Gartow

Client Project ID: F1587.33 Crown Metals
Matrix: Water

QC Sample Group: 3L11901-02

Reported: Dec 16, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	A. Tuzon	A. Tuzon	A. Tuzon	A. Tuzon

MS/MSD				
Batch#:	3120290	3120290	3120290	3120290
Date Prepared:	12/11/93	12/11/93	12/11/93	12/11/93
Date Analyzed:	12/11/93	12/11/93	12/11/93	12/11/93
Instrument I.D.#:	GCHP-5	GCHP-5	GCHP-5	GCHP-5
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L

Matrix Spike % Recovery:	90	103	107	98
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Matrix Spike Duplicate % Recovery:	100	115	110	112
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Relative % Difference:	11	11	2.8	4.0
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LCS Batch#:	LCS121193	LCS121193	LCS121193	LCS121193
Date Prepared:	12/11/93	12/11/93	12/11/93	12/11/93
Date Analyzed:	12/11/93	12/11/93	12/11/93	12/11/93
Instrument I.D.#:	GCHP-5	GCHP-5	GCHP-5	GCHP-5
LCS % Recovery:	108	113	108	108

% Recovery Control Limits:	71-133	72-128	72-130	71-120
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Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

V. Tague
Vickie Tague
Project Manager



SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Rich Garlow

Client Project ID: F1587.01, Crown Metal
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 3L95701

Sampled: Dec 16, 1993
Received: Dec 17, 1993
Reported: Jan 4, 1994

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3L95701 W-Influent	Sample I.D. 3L95702 W-Int.	Sample I.D. 3L95703 W-Effluent
Purgeable Hydrocarbons	50	N.D.	N.D.	N.D.
Benzene	0.50	0.73	N.D.	N.D.
Toluene	0.50	2.6	N.D.	N.D.
Ethyl Benzene	0.50	1.1	N.D.	N.D.
Total Xylenes	0.50	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Analyzed:	12/30/93	12/30/93	12/30/93
Instrument Identification:	GCHP4	GCHP4	GCHP4
Surrogate Recovery, %: (QC Limits = 70-130%)	93	94	96

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL


Vickie Tague
Project Manager



SEQUOIA ANALYTICAL

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RESNA
3315 Almaden Expwy., Suite 34
San Jose, CA 95118
Attention: Rich Garlow

Client Project ID: F1587.01, Crown Metal
Matrix: Water

QC Sample Group: 3L95701-3

Reported: Jan 4, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Fontecha	J. Fontecha	J. Fontecha	J. Fontecha

MS/MSD Batch#:	3121488	3121488	3121488	3121488
Date Prepared:	12/30/93	12/30/93	12/30/93	12/30/93
Date Analyzed:	12/30/93	12/30/93	12/30/93	12/30/93
Instrument I.D.#:	GCHP4	GCHP4	GCHP4	GCHP4
Conc. Spiked:	20 ug/L	20 ug/L	20 ug/L	60 ug/L

Matrix Spike % Recovery:	85	95	100	98
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Matrix Spike Duplicate % Recovery:	85	95	100	98
------------------------------------	----	----	-----	----

Relative % Difference:	0.0	0.0	0.0	0.0
------------------------	-----	-----	-----	-----

LCS Batch#:	LCS123093	LCS123093	LCS123093	LCS123093
Date Prepared:	12/30/93	12/30/93	12/30/93	12/30/93
Date Analyzed:	12/30/93	12/30/93	12/30/93	12/30/93
Instrument I.D.#:	GCHP4	GCHP4	GCHP4	GCHP4
LCS % Recovery:	85	90	90	92

% Recovery Control Limits:	71-133	72-128	72-130	71-120
----------------------------	--------	--------	--------	--------

Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

JTP 6/21/17

PROJECT NO.		PROJECT NAME/SITE						ANALYSIS REQUESTED										P.O. #:				
F1587-01		Crown Metal						<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p>COLLECTORS (SIGN) <i>[Signature]</i></p> <p>(PRINT) E. Cardon</p> </div> <div style="width: 50%; text-align: right;"> <p>NO. CONTAINERS</p> <p>SAMPLE TYPE</p> <p>BTEX (602/8020)</p> <p>TPHg (8015)</p> <p>TPHg (8015)</p> <p>TOG 418-1/5520</p> <p>601/8010</p> <p>62-4/8240</p> <p>625/8270</p> <p>Arsenic</p> <p>Lead</p> <p>C.O.D.</p> </div> </div>														
SAMPLE IDENTIFICATION		DATE	TIME	COMP	GRAB	PRES. USED	ICED	NO. CONTAINERS	SAMPLE TYPE	BTEX (602/8020)	TPHg (8015)	TPHg (8015)	TOG 418-1/5520	601/8010	62-4/8240	625/8270	Arsenic	Lead	C.O.D.	REMARKS		
W - INFLUENT		12-16-13	14:16			-	-	2	N	X	X										9312957-01	
W - INTERMEDIATE		↓	14:32			-	-	2	N	X	X										-02	
W - EFFLUENT			14:35			-	-	2	N	X	X											-03
W - EFFLUENT			14:36			-	-	1	N								X					
W - EFFLUENT			14:37			-	-	1	N								X					
W - EFFLUENT			14:38			-	-	1	N								X					
RELINQUISHED BY:		DATE	TIME	RECEIVED BY:		LABORATORY:					PLEASE SEND RESULTS TO:											
<i>[Signature]</i>		12/17/13	10:26	<i>[Signature]</i>		SEQUOIA Lab.					USE OFFICE											
RELINQUISHED BY:		DATE	TIME	RECEIVED BY:		REQUESTED TURNAROUND TIME:					PROJECT MANAGER:											
<i>[Signature]</i>		12/17	11:56			R-TURN A.																
RELINQUISHED BY:		DATE	TIME	RECEIVED BY:		RECEIPT CONDITION:					PROJECT MANAGER:											
				<i>[Signature]</i>							Rich Garlow											