Crown Metal
MANUFACTURING COMPANY INC.
765 SOUTH STATE ROUTE 83 • ELMHURST, ILLINOIS 60126-4700 • PHONE 708/279-9800 • FAX 708/279-9807

April 6, 1992

Alameda County
Health Care Services Agency
Department of Environmental Health
80 Swan Way Room 200
Oakland, CA 94621-1439

Attention: Ms. Pamela Evans

RE: 16525 Worthley Drive, San Lorenzo, CA

Dear Ms. Evans:

Our environmental consultant, Resna, has requested that the enclosed report covering our latest quarterly groundwater sampling for the above referenced site be forwarded to your attention. This copy is for your reference and use.

Should you have any questions on this report please feel free to contact Resna directly.

Regards,

Richard C. Ernest
President

RCE/meb
Enc.

cc: Mr. Britt Von Thaden

FEBRUARY 1992 QUARTERLY GROUNDWATER MONITORING REPORT

FOR

CROWN METAL MANUFACTURING AT PACIFIC INTERNATIONAL STEEL FACILITY 16525 WORTHLEY DRIVE SAN LORENZO, CALIFORNIA

Project No. 1587-2G
March 1992

RESNA
42501 Albrae Street
Fremont, California 94538
(510) 440-3300

RESNA
Working to Restore Nature

42501 Albrae Street
Fremont, California 94538
Phone: (510) 651-1906
FAX: (510) 651-8647

March 27, 1992
Project No. 1587-2G

Crown Metal Manufacturing
765 South State Route 83
Elmhurst, IL 60126-4700

Attention: Mr. Richard C. Ernest

Subject: February 1992 Quarterly Groundwater Monitoring Report
Pacific International Steel Facility
16525 Worthley Drive, San Lorenzo, California

Dear Mr. Ernest:

RESNA Industries, Inc. has completed the February quarterly groundwater monitoring at the subject site in the City of San Lorenzo, Alameda County, California (Figure 1). Quarterly groundwater sampling of wells MW-2 and MW-8 was conducted on February 12, 1992, as part of the ongoing quarterly monitoring program. During quarterly monitoring, water level measurements were collected from all on-site wells except RW-1. A water level was not obtained nor was a sample collected directly from the recovery well because the pump for the remediation system was in place and limits access to the well. However, a sample was collected from the remediation system influent from well RW-1. Sample collection from wells MW-1, MW-4, MW-5, MW-6, and MW-7 was suspended as previously approved by the Alameda County Health Services Agency.

Groundwater Sampling

Before sampling, RESNA measured the depth to groundwater in the two wells with an electric sounding tape and checked for the presence of free-phase hydrocarbons using a clear acrylic bailer. No free-phase hydrocarbons were detected. Groundwater samples were collected in accordance with RESNA's groundwater sampling protocol (Appendix A) and an equipment rinse water sample (bailer blank) was collected for quality control. Equipment rinse water and groundwater removed from the wells were placed in drums approved by the Department of Transportation and left at the site pending receipt of the analytical results.

Hydrogeology

The groundwater surface contour map, developed from the depth to groundwater measurements at the site, (Figure 2) reveals a shallow groundwater gradient in the area of investigation for February 12, 1992. The contours indicate that the piezometric surface is apparently mounded in the general vicinity of well MW-5 and the apparent gradient ranged from 0.004 to 0.007.

Laboratory Analyses and Results

The groundwater and bailer blank samples were analyzed by Sequoia Analytical, a state-certified laboratory located in Redwood City, California. Sequoia analyzed the samples for the presence of total petroleum hydrocarbons as gasoline (TPHG), as well as benzene, toluene, ethyl benzene, and total xylenes (BTEX) using Environmental Protection Agency Methods 5030/8015/8020.

Sequoia reported that petroleum hydrocarbons were detected in well MW-2, and the remediation system influent. The concentrations reported by Sequoia were as follows:

Compound	MW-2 (11/15/91)	RW-1 Influent (11/15/91)
TPHG	580	260
Benzene	5.9	78
Toluene	1.2	0.73
Ethyl Benzene	0.52	6.6
Total Xylenes	<0.3	8.2

<0.30 Not detected at or above laboratory detection limit. Results in micrograms per liter (parts per billion).

The laboratory analyses did not detect any of the petroleum hydrocarbons tested for in either well MW-8 or the bailer blank samples.

Discussion/Recommendation

Well MW-8 was installed downgradient from the contaminant source area in April 1991. Groundwater samples have been collected from the well for 4 quarters and in each instance no petroleum hydrocarbons were detected. RESNA believes that continuing quarterly monitoring on this well is not necessary. The frequency of sample collection should be reduced to annually however, the collection of water level data from the well should still be conducted quarterly.

The next quarterly sampling is scheduled for May 1992. RESNA would like the reduction in sampling frequency for well MW-8 to be in effect prior to the May quarterly sampling. If either RESNA or Crown Metals has not received written authorization for the sampling frequency change by April 15, 1992, RESNA will contact the appropriate agencies to expedite this change prior to the May quarterly sampling.

Reporting Requirements

A copy of this report should be forwarded by Crown Metal Manufacturing to the following agencies in a timely manner:

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

Alameda County
Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621-1439
Attention: Ms. Pamela Evans

RESNA

Limitations

The discussion and recommendations presented in this report are based on the following:

1. The observations by field personnel.
2. The results of laboratory analyses performed by a state-certified laboratory.
3. Our understanding of the regulations of the State of California and Alameda County and/or the City of San Lorenzo.

It is possible that variations in the soil or groundwater conditions could exist beyond the points explored in this investigation. Also, changes in the groundwater conditions could occur at some time in the future due to variations in rainfall, temperature, regional water usage, or other factors.

The service performed by RESNA has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the San Lorenzo area. Please note that contamination of soil and groundwater must be reported to the appropriate agencies in a timely manner. No other warranty, expressed or implied, is made.

RESNA includes in this report chemical analytical data from a state-certified laboratory. The analytical tests are performed according to procedures suggested by the U.S. EPA and State of California. RESNA is not responsible for laboratory errors in procedure or result reporting.

Sincerely,
RESNA Industries, Inc.

Britt Von Thaden
Project Geologist

Lawrence D. Pavlak, C.E.G. 1187
Senior Program Geologist

BVT/LDP/sw

cc: Mr. James Lewis, Pacific International Steel

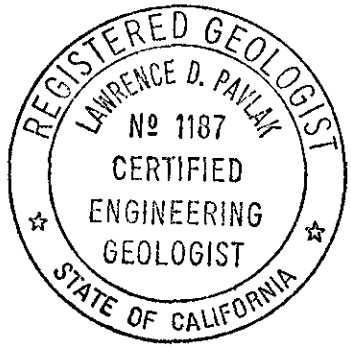


TABLE 1

SUMMARY OF GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	Total Xylenes (µg/l)	Well Elevation (ft above MSL)	Depth to Water (ft)
MW-1	7/14/87	BDL	BDL	BDL	—	BDL	8.86	7.56
	11/24/87	BDL	BDL	BDL	—	9.0		7.51
	2/29/88	BDL	BDL	BDL	—	BDL		7.18
	5/25/88	BDL	BDL	BDL	—	BDL		7.40
	8/10/88	ND	ND	ND	ND	ND		7.85
	11/29/88	ND	ND	ND	ND	ND		7.86
	2/7/89	ND	ND	ND	ND	ND		7.43
	5/12/89	ND	1.4	ND	ND	ND		7.23
	8/4/89	ND	ND	ND	ND	ND		8.17
	11/14/89	ND	ND	ND	—	—		7.93
	1/3/90	—	—	—	—	—		7.77
	2/22/90	ND	ND	ND	ND	ND		7.28
	5/17/90	—	—	—	—	—		7.62
	8/17/90	—	—	—	—	—		7.91
	11/6/90	—	—	—	—	—		8.01
	2/1/91	ND	ND	ND	ND	ND		8.00
	5/1/91	—	—	—	—	—		7.36
	8/8/91	—	—	—	—	—		8.17
	11/15/91	—	—	—	—	—		8.17
	2/12/92	—	—	—	—	—		6.75
MW-2	7/14/87	110	1.2	1.9	—	2.0	9.17	7.79
	11/24/87	3,600	82	47	—	13		7.73
	2/29/88	800	BDL	BDL	—	BDL		7.26
	5/25/88	250	ND	ND	—	ND		7.45

TABLE 1

SUMMARY OF GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	Total Xylenes (µg/l)	Well Elevation (ft above MSL)	Depth to Water (ft)
MW-2	8/10/88	260	ND	ND	ND	ND		7.90
Con't	11/29/88	870	9.0	ND	1.0	1.0		8.20
	2/7/89	710	16	ND	ND	ND		7.47
	5/12/89	260	2.8	0.76	1.3	3.0		7.27
	8/4/89	360	ND	ND	ND	0.48		8.23
	11/14/89	85	ND	3.5	0.36	2.5		8.08
	1/3/90	—	—	—	—	—		7.95
	2/22/90	120	ND	ND	1.5	0.55		7.47
	5/17/90	240	ND	ND	ND	ND		7.70
	8/17/90	130	ND	2.9	1.2	0.68		8.00
	11/6/90	170	0.37	1.2	2.0	1.5		8.30
	2/1/91	57	ND	ND	ND	0.73		8.15
	5/1/91	220	1.5	0.42	0.53	0.54		7.56
	8/8/91	710	4.1	0.84	ND	0.71		8.95
	11/15/91	630	2.3	ND	3.1	0.86		8.26
	2/12/92	580	5.9	1.2	0.52	ND		7.02
MW-3	7/14/87	260	BDL	1.0	—	2.0	8.54	7.09
	11/24/87	8,900	1,700	3.0	—	12		7.11
	2/29/88	9,300	1,600	93	—	99		6.57
	5/25/88	11,000	140	16	—	34		6.80
	8/10/88	4,600	23	4.8	140	3.0		7.20
	11/29/88	16,000	3,900	11	600	40		7.41
	2/7/89	—	—	—	—	—		N A
	5/12/89	2,500	ND	5.6	ND	2.7		6.64
	8/4/89	2,900	800	7.5	96	ND		7.38
	11/14/89	Destroyed in August 1989						

TABLE 1

SUMMARY OF GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	Total Xylenes (µg/l)	Well Elevation (ft above MSL)	Depth to Water (ft)
MW-4	7/14/87	BDL	BDL	BDL	—	BDL	8.48	7.25
	11/24/87	60	BDL	0.65	—	7.6		6.97
	2/29/88	BDL	BDL	BDL	—	BDL		6.54
	5/25/88	BDL	BDL	BDL	—	BDL		6.36
	8/10/88	—	—	—	—	—		N A
	11/29/88	ND	0.87	ND	ND	ND		6.85
	2/7/89	ND	ND	ND	ND	ND		6.26
	5/12/89	ND	ND	ND	ND	0.76		6.55
	8/4/89	—	—	—	—	—		N A
	11/14/89	—	—	—	—	—		—
	2/22/90	—	ND	ND	ND	ND		6.67
	5/17/90	ND	—	—	—	—		—
	8/17/90	—	—	—	—	—		7.30
	11/6/90	—	—	—	—	—		7.15
	2/1/91	ND	ND	ND	ND	ND		6.85
	5/1/91	—	—	—	—	—		6.73
	8/8/91	—	—	—	—	—		—
	11/15/91	—	—	—	—	—		7.45
	2/12/92	—	—	—	—	—		6.55
MW-5	7/14/87		BDL	BDL	—	BDL	9.11	7.06
	11/24/87	BDL	BDL	BDL	—	7.2		7.24
	2/29/88	BDL	BDL	BDL	—	BDL		6.75
	5/25/88	BDL	—	—	—	—		—
	8/10/88	—	ND	ND	ND	ND		7.35
	11/29/88	ND	ND	ND	ND	ND		—

TABLE 1

SUMMARY OF GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	Total Xylenes (µg/l)	Well Elevation (ft above MSL)	Depth to Water (ft)
MW-5	2/7/89	ND	ND	ND	ND	ND		7.02
(Con't)	5/12/89	ND	ND	ND	ND	0.84		6.69
	8/4/89	ND	ND	ND	ND	ND		7.52
	11/14/89	ND	ND	ND	ND	ND		7.51
	1/3/90	ND	—	—	—	—		7.42
	2/21/90	—	ND	ND	ND	ND		6.85
	5/17/90	ND	—	—	—	—		7.09
	8/17/90	—	—	—	—	—		7.36
	11/6/90	—	—	—	—	—		7.65
	2/1/91	ND	ND	ND	ND	ND		7.63
	5/1/91	—	—	—	—	—		6.68
	8/8/91	—	—	—	—	—		7.65
	11/15/91	—	—	—	—	—		7.52
	2/12/92	—	—	—	—	—		6.43
MW-6	7/14/87	BDL	BDL	BDL	—	BDL	9.19	—
	11/24/87	—	—	—	—	—		—
	1/5/88	BDL	BDL	BDL	—	BDL		—
	2/29/88	BDL	BDL	BDL	—	BDL		7.19
	5/25/88	BDL	BDL	BDL	ND	BDL		7.33
	8/10/88	BDL	ND	ND	ND	ND		7.50
	11/29/88	ND	ND	ND	ND	ND		7.93
	2/7/89	ND	ND	ND	ND	ND		7.56
	5/12/89	ND	ND	ND	ND	ND		7.16
	8/4/89	ND	ND	ND	ND	ND		7.94
	11/14/89	ND	ND	ND	ND	ND		8.92

TABLE 1

SUMMARY OF GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	Total Xylenes (µg/l)	Well Elevation (ft above MSL)	Depth to Water (ft)
MW-6	1/3/90	ND	—	—	—	—		7.89
(Con't)	2/21/90	—	ND	ND	ND	ND		7.28
	5/17/90	ND	—	—	—	—		8.62
	8/17/90	—	—	—	—	—		7.68
	11/6/90	—	—	—	—	—		8.05
	2/1/91	ND	ND	ND	ND	ND		7.87
	5/1/91	—	—	—	—	—		6.95
	8/8/91	—	—	—	—	—		7.97
	11/15/91	—	—	—	—	—		7.92
	2/12/92	—	—	—	—	—		6.92
MW-7	1/3/90	—	—	—	—	—	8.41	8.06
	1/9/90	ND	ND	ND	ND	ND		8.42
	2/21/90	ND	ND	ND	ND	ND		6.63
	5/17/90	ND	ND	ND	ND	ND		6.81
	8/17/90	48	ND	ND	ND	ND		7.13
	11/6/90	ND	ND	0.55	ND	0.32		7.29
	2/1/91	ND	ND	ND	ND	ND		7.20
	5/1/91	—	—	—	—	—		6.80
	8/8/91	—	—	—	—	—		7.15
	11/15/91	—	—	—	—	—		7.20
	2/12/92	—	—	—	—	—		6.73
MW-8	5/1/91	ND	ND	ND	ND	ND	8.52	7.67
	8/8/91	ND	ND	ND	ND	ND		8.15
	11/15/91	ND	ND	ND	ND	ND		7.94
	2/12/92	ND	ND	ND	ND	ND		7.29

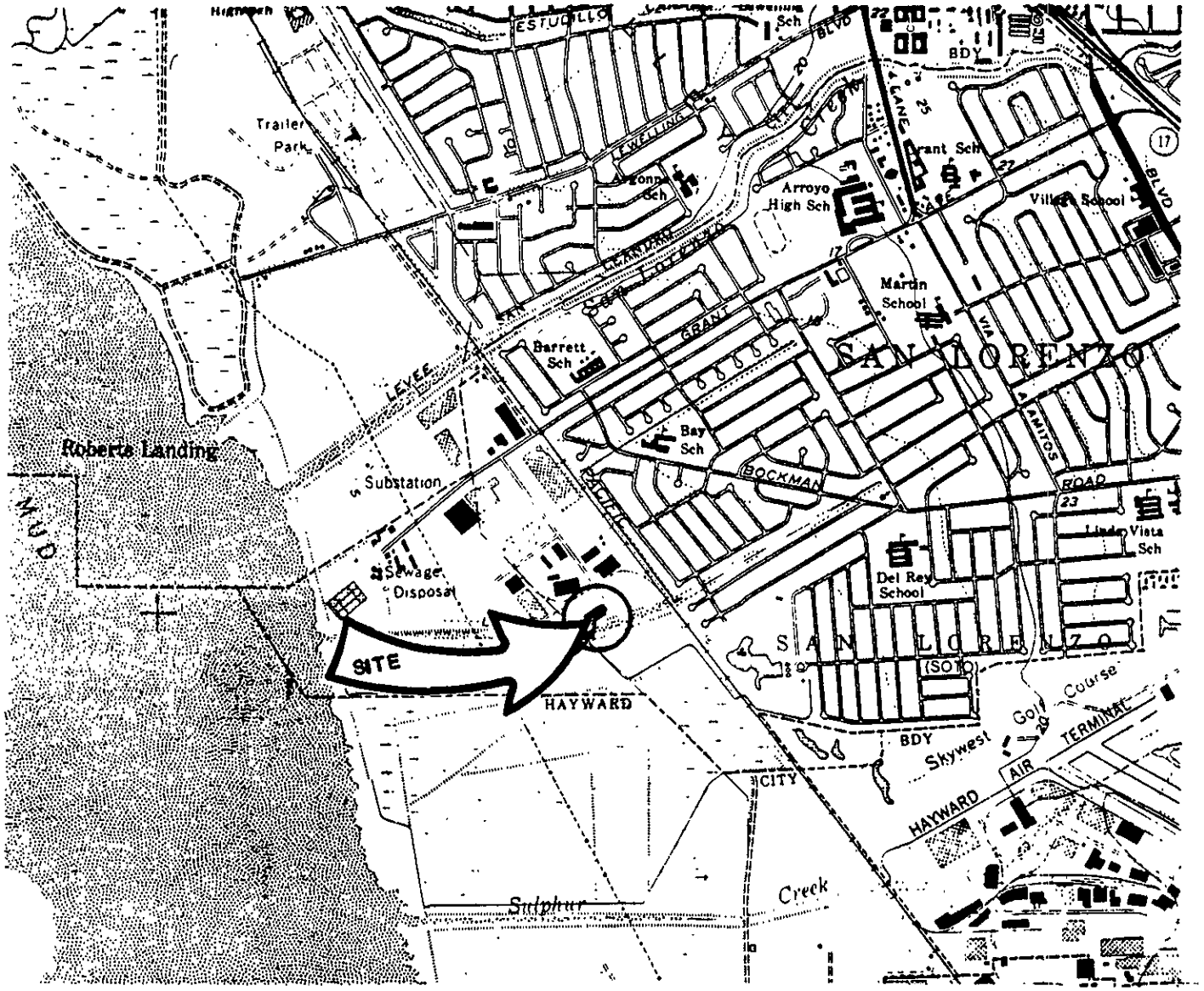
TABLE 1

SUMMARY OF GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl Benzene (µg/l)	Total Xylenes (µg/l)	Well Elevation (ft above MSL)	Depth to Water (ft)
RW-1	1/3/90	—	—	—	—	—	11.02	9.81
	1/9/90	1,300	150	15	100	170		9.75
	3/1/90	440	9.4	1.3	16	25		9.34
	5/17/90	1,400	52	1.0	20	12		9.55
	8/17/90	1,800	410	7.8	160	65		9.84
	11/6/90	—	—	—	—	—		10.15
	10/25/91	420	79	1.8	2.5	14		10.20
RW-1 System Influent	1/16/91	78	17	2.7	7.7	1.3	—	—
	5/1/91	160	40	0.79	14	6.1	—	—
	8/8/91	89	41	0.31	4.6	0.73	—	—
	11/15/91	140	41	ND	1.3	0.44	—	—
	2/12/92	260	78	0.73	6.6	8.2	—	—
BB-1	1/9/90	ND	ND	ND	ND	ND	—	—
	5/17/90	ND	ND	ND	ND	ND	—	—
	11/6/90	ND	ND	ND	ND	ND		
	2/1/91	ND	ND	ND	ND	ND	—	—
	5/1/91	ND	ND	ND	ND	ND	—	—
	8/8/91	ND	ND	ND	ND	ND	—	—
	11/15/91	ND	ND	ND	ND	ND	—	—

TPHG Total petroleum hydrocarbons as gasoline
ND Not detected at or above the method detection limit
— No data obtained

µg/l Micrograms per liter (parts-per-billion)
BB-1 Bailer blank
ft Feet
MSL Mean sea level



LEGEND

SITE LOCATION

N

0 1

SCALE IN MILES

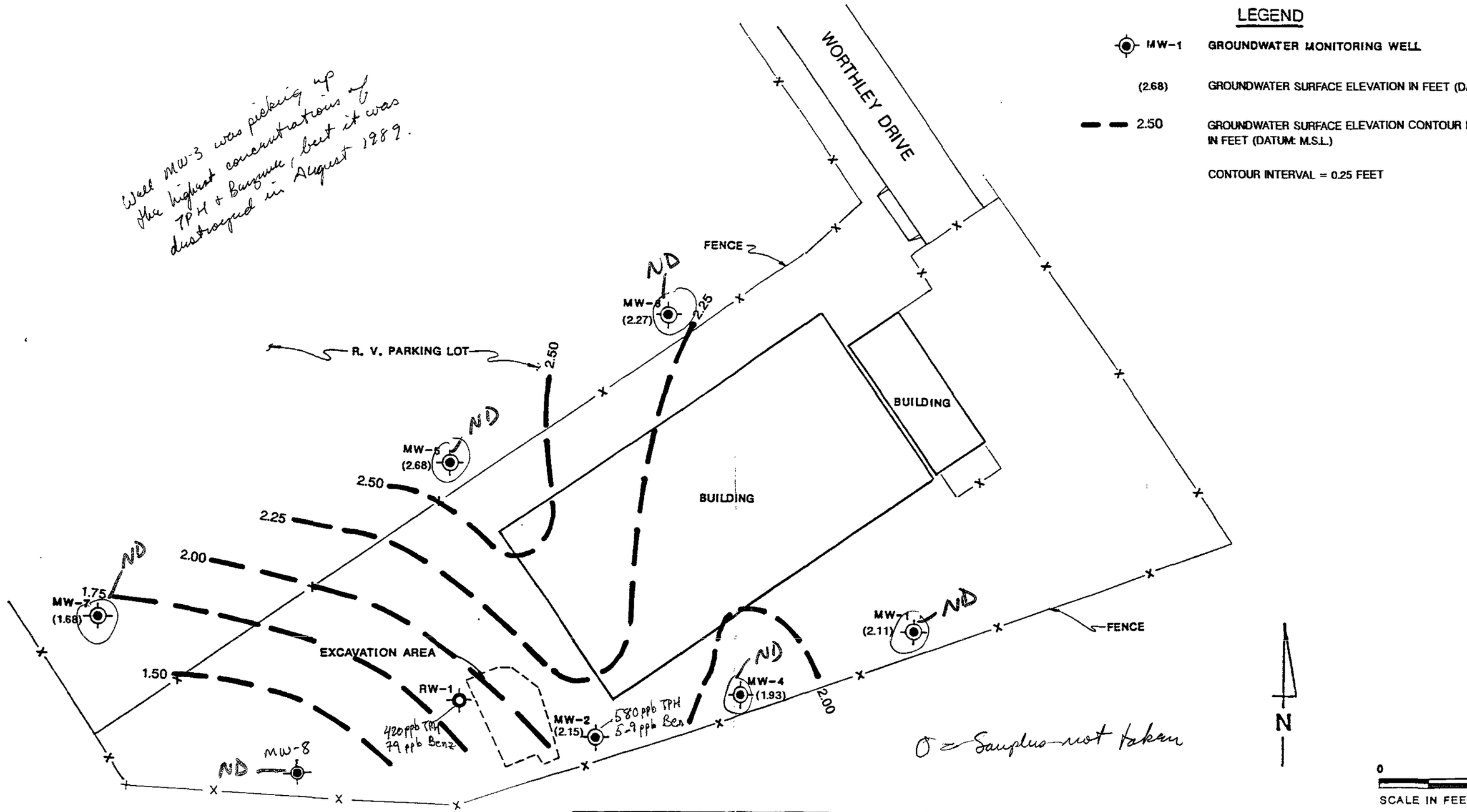
USGS 7.5 MINUTE SAN LEANDRO QUADRANGLE 1980

RESNA

SITE LOCATION MAP

CROWN METAL MFG-PACIFIC INT'L STEEL	JOB #: 1587-2G	
16525 WORTHLEY DRIVE	SCALE: 1:24000	DRAWN BY:
SAN LORENZO, CALIFORNIA	DATE 3/27/92	DRAWING #: FIG. 1

Well MW-3 was picking up the highest concentrations of TPH & Benzene, but it was destroyed in August 1989.



0 = Samples not taken

REVIEWED BY: BVT	GROUNDWATER SURFACE CONTOUR MAP (2/12/92)		RESNA
	CROWN METAL MFG – PACIFIC INTL' STEEL		
APPROVED BY:	16525 WORTHLEY DRIVE	JOB #: 1587-2G	DRAWN BY: SLS
	SAN LORENZO, CALIFORNIA	DATE: 3/27/92	DRAWING #: FIG. 2

APPENDIX A

GROUNDWATER SAMPLING PROTOCOL

RESNA

Groundwater Sampling Protocol

GROUNDWATER SAMPLING PROTOCOL

Sampling of groundwater is performed by RESNA Industries, Inc. sampling technicians. Summarized field sampling procedures are as follows:

1. Proceed to first well with clean and decontaminated equipment.

2. Measurements of liquid surface(s) in the well, and total depth of monitoring well. Note presence of silt accumulation.

3. Field check for presence of floating product; measure apparent thickness.

4. Purge well prior to collecting samples; purge volume (casing volumes) calculated prior to removal.

5. Monitor groundwater for temperature, pH, and specific conductance during purging. Allow well to recover.

6. Collect samples using Environmental Protection Agency (EPA) approved sample collection devices, i.e., teflon or stainless steel bailers or pumps.

7. Transfer samples into laboratory-supplied EPA-approved containers.

8. Label samples and log onto chain-of-custody form.

9. Store samples in a chilled ice chest for shipment to a state-certified analytical laboratory.

10. Decontaminate equipment prior to sampling next well.

Equipment Cleaning and Decontamination

All water samples are placed in precleaned laboratory-supplied bottles. Sample bottles and caps remain sealed until actual usage at the site. All equipment which comes in contact with the well or groundwater is thoroughly cleaned with a trisodium phosphate (TSP) solution and rinsed with deionized or distilled water before use at the site. This cleaning procedure is followed between each well sampled. Wells are sampled in approximate order of increasing contamination. If a teflon cord is used, the cord is cleaned. If a nylon or cotton cord is used, a new cord is used in each well. All equipment blanks are collected prior to sampling. The blanks are analyzed periodically to ensure proper cleaning procedures are used.

Water Level Measurements

Depth to groundwater is measured in each well using a sealed sampling tape or scaled electric sounder prior to purging or sampling. If the well is known or suspected of containing free-phase petroleum hydrocarbons, an optical interface probe is used to measure the hydrocarbon thickness and groundwater level. Measurements are collected and recorded to the nearest 0.01 foot. Each monitoring well's total depth will be measured; this will allow a relative judgement of well siltation to be made and need for redevelopment.

Bailer Sheen Check

If no measurable free-phase petroleum hydrocarbons are detected, a clear acrylic bailer is used to determine the presence of a sheen. Any observed film as well as odor and color of the water is recorded.

Groundwater Sampling

Prior to groundwater sampling, each well is purged of "standing" groundwater. Either a bailer, hand pump, or submersible pump is used to purge the well. The amount of purging is dependent on the well yield. In a high yield formation, samples will be collected when normal field measurement, including temperature, pH, and specific conductance stabilize, provided a minimum of three well-casing volumes of water have been removed. Field measurements will be taken after purging each well volume. Physical parameter measurements (temperature, pH, and specific conductance) are closely monitored throughout the well purging process and are used as indicators for

assessing sufficient purging. The purging parameters are measured to observe stabilization to a range of values typical for that aquifer and well. Stable field parameters are recognized as indicative of groundwater aquifer chemistry entering the well. Specific conductance (conductivity) meters are read to the nearest ±10 umhos/cm and are calibrated daily. pH meters are read to the nearest ±0.1 pH units and are calibrated daily. Temperature is read to the nearest 0.1 °F. Calibration of physical parameter meters will follow manufacturer's specifications. Collected field data during purging activities will be entered on the Well Sampling Field Data Sheet.

In low yield formations, the well is purged such that the "standing" water is removed and the well is allowed to recharge. (Normal field measurements will be periodically recorded during the purging process.) In situations where recovery to 80% of static water level is estimated, or observed to exceed a two hour duration, a sample will be collected when sufficient volume is available for a sample for each parameter. Attempts will be made so the well is not purged dry such that the recharge rate causes the formation water to cascade into the well.

In wells where free-phase hydrocarbons are detected, the free-phase portion will be bailed from the well and the estimated volume removed recorded. A groundwater sample will be collected if bailing reduces the amount of free-phase hydrocarbons to the point where they are not present in the well. Well sampling will be conducted using one of the aforementioned methods depending on the formation yield. However, if free-phase hydrocarbons persist throughout bailing, then a groundwater sample will not be collected.

Volatile organic groundwater samples are collected so that air passage through the sample does not occur or is minimal (to prevent volatiles from being stripped from the samples): sample bottles are filled by slowly running the sample down the side of the bottle until there is a positive convex meniscus over the neck of the bottle; the teflon side of the septum (in cap) is positioned against the meniscus, and the cap screwed on tightly; the sample is inverted and the bottle lightly tapped. The absence of an air bubble indicates a successful seal; if a bubble is evident, the cap is removed, more sample is added, and the bottle is resealed.

Chain-of-Custody

Groundwater sample containers are labeled with a unique sample number, location, and date of collection. All samples are logged into a chain-of-custody form and placed in a chilled ice chest for shipment to a laboratory certified by the State of California Department of Health Services.

Sample Storage

Groundwater samples collected in the field are stored in an ice chest cooled to 4 °C while in transit to the office or analytical laboratory. Samples are stored in a refrigerator overnight and during weekends and holidays. The refrigerator is set to 4 °C and is locked with access controlled by a designated sample custodian.

Quality Assurance/Quality Control Objectives

The sampling and analysis procedures employed by RESNA for groundwater sampling and monitoring follow quality assurance/quality control (QA/QC) guidelines. Quality assurance objectives have been established to develop and implement procedures for obtaining and evaluating water quality and field data in an accurate, precise, and complete manner. In this way, sampling procedures and field measurements provide information that is comparable and representative of actual field conditions. Quality control (QC) is maintained by site-specific field protocols and requiring the analytical laboratory to perform internal and external QC checks. The goal is to provide data that are accurate, precise, complete, comparable, and representative. The definitions as developed by overseeing federal, state, and local agency guidance documents for accuracy, precision, completeness, comparability, and representativeness are:

- **Accuracy** — the degree of agreement of a measurement with an accepted reference or true value.
- **Precision** — a measure of agreement among individual measurements under similar conditions. Usually expressed in terms of the standard deviation.
- **Completeness** — the amount of valid data obtained from a measurement system compared to the amount that was expected to meet the project data goals.
- **Comparability** — express the confidence with which one data set can be compared to another.
- **Representativeness** — a sample or group of samples that reflect the characteristics of the media at the sampling point. It also includes how well the sampling point represents the actual parameter variations which are under study.

Laboratory and field handling procedures of samples are monitored by including QC samples for analysis with every submitted sample lot from a project site. QC samples may include any combination of the following:

- **Trip Blanks:** Used for purgeable organic compounds only; QC samples are collected in 40 milliliter (ml) sample vials filled in the analytical laboratory with organic-free water. Trip blanks are sent to the project site, and travel with project site samples. Trip blanks are **not** opened, and are returned from a project site with the project site samples for analysis.
- **Field Blank:** Prepared in the field using organic-free water. These QC samples accompany project site samples to the laboratory and are analyzed for specific chemical parameters unique to the project site where they were prepared.

- **Duplicates:** Duplicated samples are collected "second samples" from a selected well and project site. They are collected as either split samples or second-run samples collected from the same well.

- **Equipment Blank:** Periodic QC samples collected from field equipment rinseate to verify decontamination procedures.

The number and types of QC samples are determined and analyzed on a project-specific basis.

Shallow Groundwater Survey

A shallow groundwater survey employs reconnaissance field sampling and chemical analysis for rapid plume mapping. Occasionally, a state-certified laboratory subcontractor may be used. The subcontractor would sample for analysis at locations marked by the RESNA field geologist. The thin-diameter probes from which groundwater is collected are advanced to the water bearing stratum, sample is withdrawn to the surface, and analyzed immediately thereafter. Probe holes are backfilled with a grout slurry or as the local permitting agency requires. The shallow survey contractor will supply sampling, purging, and field chemical analysis to RESNA in their report. RESNA considers this type of shallow probe mapping (together with shallow groundwater sampling) to be a reconnaissance technique only.

APPENDIX B

LABORATORY REPORT
AND
CHAIN-OF-CUSTODY

SEQUOIA ANALYTICAL

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

RESNA - Exceltech	Client Project ID:	3462-2, Crown Metals	Sampled:	Feb 12, 1992
42501 Albrae Street, Suite 100	Matrix Descript:	Water	Received:	Feb 12, 1992
Fremont, CA 94538	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Feb 19, 1992
Attention: Jim Rubin	First Sample #:	202-1927	Reported:	Feb 27, 1992

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
202-1927	Influent	260	78	0.73	6.6	8.2
202-1928	Int	N.D.	N.D.	N.D.	N.D.	N.D.
202-1929	Effluent	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

2021927.ENS <1>

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
1587-G	Crown Metals

SAMPLERS (Signature): Robert Sutherland

NO.	DATE	TIME	SAMPLE DESCRIPTION	TPH/BTEX
BB-1	2/12/92	11:00	3 pres VOAs	X
MW-8	↓	11:30	↓	X
MW-2	↓	12:30	↓	X

TEST REQUESTED

P.O. # 25765

LAB Sequoia

TURN AROUND TIME Normal

REMARKS

2022285

86

87

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Robert Sutherland	2/12/92	14:00	Mira
Mira Dan	2/13/92	9:45	A. Nagra

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Russell Mack	2/14/92	4:10	Mira Dan

REMARKS:

REPORT TO: Britt Von Thaden

EXCELTECH
41674 Christy Street
Fremont, C.A. 94538-3114
(415) 659-0404
Fax (415) 651-4677
Contr. Lic. No. 550205

FORM DATED 3-27-90

SEQUOIA ANALYTICAL

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

RESNA - Exceltech
42501 Albrae Street, Sulte 100
Fremont, CA 94538
Attention: Britt Von Thaden

Client Project ID: 1587-G, Crown Metals

QC Sample Group: 2022285-7

Reported: Feb 27, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Nipp	M. Nipp	M. Nipp	M. Nipp
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Feb 19, 1992	Feb 19, 1992	Feb 19, 1992	Feb 19, 1992
QC Sample #:	GBLK021992	GBLK021992	GBLK021992	GBLK021992
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10	30
Conc. Matrix Spike:	9.5	9.5	9.7	29
Matrix Spike % Recovery:	95	95	97	97
Conc. Matrix Spike Dup.:	9.9	10	10	30
Matrix Spike Duplicate % Recovery:	99	100	100	100
Relative % Difference:	4.1	5.1	3.0	3.4

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{(\text{Conc. of M.S. + Conc. of M.S.D.}) / 2} \times 100$

SEQUOIA ANALYTICAL

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

RESNA - Exceltech	Client Project ID:	1587-G, Crown Metals	Sampled: Feb 12, 1992
42501 Albrae Street, Suite 100	Matrix Descript:	Water	Received: Feb 12, 1992
Fremont, CA 94538	Analysis Method:	EPA 5030/8015/8020	Analyzed: Feb 19, 1992
Attention: Britt Von Thaden	First Sample #:	202-2285	Reported: Feb 27, 1992

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
202-2285	BB-1	N.D.	N.D.	N.D.	N.D.	N.D.
202-2286	MW-8	N.D.	N.D.	N.D.	N.D.	N.D.
202-2287	Mw-2	580	5.9	1.2	0.52	N.D.
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Maria Lee

Vickie Tague
Project Manager

2022285.ENS <1>

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
3462-2	Crown Metals

SAMPLERS (Signature): Robin Smithwick

NO.	DATE	TIME	SAMPLE DESCRIPTION	TPHG/BTEX	Arsenic	COD	SS
INF	2-12-92	9:30	3 pres VOAs	X			
INT	↓	9:45	↓				
EFF	↓	10:00	✓ 1 Plastic Lit, 1 Amber Liter ✓2 plain VOAs	X	X	X	X

TEST REQUESTED

P.O. # 25765

LAB Sequoia

TURN AROUND TIME Normal

REMARKS

202927
28
29

Ph = 2.08
Totalizer = 196850.5
system = on

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Robin Smithwick	2/12/92	14:00	Quipa
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Alex Dam	2/12/92	4:45	N. Nagpal

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Melissa McLeod	2/12/92	4:10	Alex Dam
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:

REMARKS:

REPORT TO: Jim Rubin

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Fremont, C.A. 94538-3114
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FORM DATED 3-27-90