



Crown METAL MFG. CO.

5925 SOUTH LOWE AVENUE, CHICAGO, ILLINOIS 60621-2896 • TELEPHONE 312/873-3833

September 22, 1989

Alameda County
Division of Environmental Health
470 27th Street - Room 324
Oakland, CA 94612

Attention: Mr. Ariu Levi

RE: 16525 Worthley Drive
San Lorenzo, CA

Dear Mr. Levi:

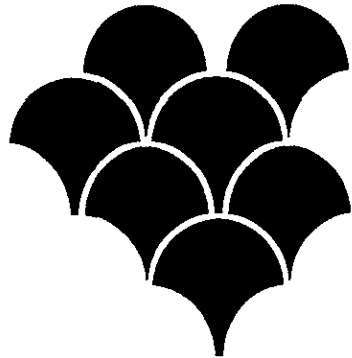
Our environmental consultant, *Ensco Environmental Services, Inc.*, has advised me to forward a copy of the enclosed August Quarterly Groundwater Sampling and Analysis to your attention.

I am hereby enclosing our report for your files. Should you have any questions on the enclosed please feel free to contact *Ensco Environmental Services* at your convenience.

Regards,

Richard C. Ernest
President

RCE/meb
Enc.



**ensco
environmental
services, inc.**

**AUGUST QUARTERLY
GROUNDWATER
SAMPLING AND ANALYSIS**

FOR

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

**Project No. 1587G
September 1989**



September 11, 1989

Crown Metal Manufacturing
5925 S. Lowe Avenue
Chicago, IL 60621-2896

Attention: Mr. Richard C. Ernest

Subject: August Quarterly Groundwater Sampling and Analysis
Pacific International Steel Facility
16525 Worthley Drive, San Lorenzo, California
EES Project No. 1587G

Dear Mr. Ernest:

This comprehensive report presents the results of the August quarterly groundwater sampling and analysis at the site noted above. It includes all current and past analytical data acquired during the course of this ongoing investigation.

If you have any questions, please call.

Sincerely,
EnSCO Environmental Services, Inc.



Kay Pannell
Project Geologist



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

KP/LDP/sw

4 cc: enclosed

1 cc: Mr. James Lewis, Pacific International Steel

C O N T E N T S

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**AUGUST QUARTERLY
GROUNDWATER SAMPLING AND ANALYSIS**

FOR

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

INTRODUCTION

Ensco Environmental Services, Inc. (EES) has completed the August quarterly sampling to ascertain groundwater conditions beneath the Pacific International Steel facility located at 16525 Worthley Drive in the City of San Lorenzo, Alameda County, California (Figure 1). Groundwater samples from five monitoring wells were collected on August 4, 1989. The quarterly sampling program is required by the Regional Water Quality Control Board, San Francisco Bay Region. The purposes of the program are to monitor groundwater conditions and determine groundwater quality beneath the site. The program objectives are the following:

- Plot the groundwater contour surface.
- Investigate for the presence of a petroleum hydrocarbon plume and determine its concentration.
- Compare current and past data.

The existence and degree of hydrocarbon contamination in the groundwater is determined by (1) checking for the presence of free-floating product and (2) performing laboratory analyses on groundwater samples to determine concentrations of total petroleum hydrocarbons as gasoline (TPHG) as well as benzene, toluene, ethyl benzene, and total xylenes (BTEX).

SITE BACKGROUND

The site was formerly occupied by an aircraft engine maintenance facility. Its operations included the use of underground fuel storage tanks which were removed because of suspected leakage.

In July 1987, EES installed six groundwater monitoring wells at the site to quantify contamination and evaluate its presence across the site. Laboratory results revealed petroleum hydrocarbon contamination in the groundwater from two of the wells and in the soil adjacent to all of the wells. A quarterly groundwater monitoring program was then initiated.

In April 1988, EES conducted a soil gas survey (SGS) to further delineate the extent of the soil contamination. The SGS revealed two contamination "hot spot" areas. EES conducted soil sampling in August 1988 to confirm the results of the SGS. Laboratory analyses of the samples generally supported the SGS study.

EES excavated the "hot spot" areas adjacent to well MW-3 in November 1988 and aerated the soils on the site. The excavation was approximately 40 x 40 x 10 feet and was backfilled in August 1989 after the last sampling. Well MW-3 was damaged during the soil removal operation due to its proximity to the resulting excavation. The entire well casing and sand pack was then removed.

GROUNDWATER SAMPLING

Five groundwater monitoring wells were sampled for this quarterly report. Well MW-4 was not accessible at the time of the field investigation because it was covered by a debris pile.

Before sampling, EES measured the depth to groundwater in all of the wells. In addition, each well was checked for the presence of free-floating product using a clear acrylic bailer: none was detected. Groundwater samples were then collected from each well following the procedures outlined in our groundwater sampling protocol

(Appendix A). The samples were stored in a cooled ice chest and transported to Sequoia Analytical Laboratories, Inc. of Redwood City, California, a state-certified laboratory for analyses of total petroleum hydrocarbons as gasoline (TPHG) and benzene, toluene, ethyl benzene and total xylenes (BTEX).

HYDROGEOLOGY

In addition to groundwater sampling, the depth to water was also measured and the groundwater surface elevation was determined. A contour map was then drawn to represent the groundwater gradient. The groundwater surface elevation map presented in Figure 2 shows that the surface of the shallow aquifer is nearly flat and flows toward the east. In the last quarterly report, the groundwater elevation showed both easterly and southerly flow components.

SUMMARY OF ANALYTICAL RESULTS

The results of the laboratory analyses of the groundwater samples collected for this report revealed that two of the five wells sampled contain hydrocarbon contamination. TPHG and BTEX were not detected (ND) in wells MW-2, MW-5, and MW-6. TPHG was detected at concentrations of 2,900 parts per billion (ppb) in MW-3 and 360 ppb in MW-2. Benzene, toluene, and ethyl benzene were detected at concentrations of 800 ppb, 7.5 ppb, and 96 ppb, respectively in MW-3. Xylenes were detected in MW-2 at a concentration of 0.48 ppb. EES's laboratory procedure protocol is attached as Appendix B. The complete report from Sequoia Analytical Laboratory is in Appendix C, and the cumulative data for all sampling conducted at the site is presented in Table 1.

DISCUSSION

The analytical results revealed that contaminant concentrations have decreased to nondetected (ND) in monitoring wells MW-1 and MW-5 since the last quarterly report was issued. Because MW-4 was covered by debris, it was not sampled for this quarterly report.

The benzene concentrations detected in the water sample from well MW-3 (800 ppb) exceed the current State of California Department of Health Services (DHS) maximum contaminant level of 1.0 ppb. Trace concentrations of xylenes were detected in MW-2, but the concentrations of these compounds were below the DHS maximum contaminant levels for drinking water. Current and past data from wells which contain hydrocarbon contaminants are graphically represented in Figures 5 through 9.

CONCLUSIONS AND RECOMMENDATIONS

1. Groundwater elevations at the site were measured at approximate elevations of 0.69 to 1.59 feet above mean sea level for the current report. Groundwater contours developed from these data show a nearly flat gradient with an apparent flow direction to the east. (The gradient may have been affected by the excavation of soil in November 1988 in the vicinity of MW-3.)
2. Comparisons with the previous sampling and analysis report indicate that TPHG and BTEX concentrations have remained ND at monitoring well MW-6 and decreased to ND in wells MW-1 and MW-5. In MW-2, the TPHG concentration increased to 360 ppb, but benzene, toluene, and ethyl benzene decreased to ND and xylenes decreased to 0.48 ppb. TPHG and benzene, toluene, and ethyl benzene concentrations increased in MW-3, although xylenes decreased to ND.
3. No free-floating product was noted in any of the five monitoring wells sampled.
4. Benzene concentrations detected at MW-3 (800 ppb) exceed the current DHS maximum contaminant level of 1.0 ppb in drinking water.
5. EES recommends that Crown Metal Manufacturing continue quarterly groundwater monitoring to document the groundwater flow direction and hydrocarbon plume concentrations. The next quarterly sampling is scheduled for November 1989.

6. EES also recommends that the destroyed groundwater monitoring well, MW-3, be replaced before the next quarterly sampling in November since the highest contaminant concentrations have consistently come from this well.

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
1111 Jackson Street
Oakland, California 94607
Attn: Ms. Lisa McCann

Alameda County
Division of Environmental Health
470 27th Street, Room 324
Oakland, California 94612
Attn: Mr. Ariu Levi

REFERENCE

Exceltech, 1987, "Soil and Groundwater Investigation," unpublished report for Crown Metals Manufacturing.

LIMITATIONS

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

1. The exploratory test borings drilled at the site.
2. The observations by field personnel.
3. The results of laboratory analyses performed by a state-certified laboratory.
4. Referenced document.
5. Our understanding of the regulations of the State of California and Alameda County and/or the City of San Lorenzo.

ALAMEDA COUNTY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS
11/28/89

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 EES 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.

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

TABLE 1
GROUNDWATER ANALYSES DATA

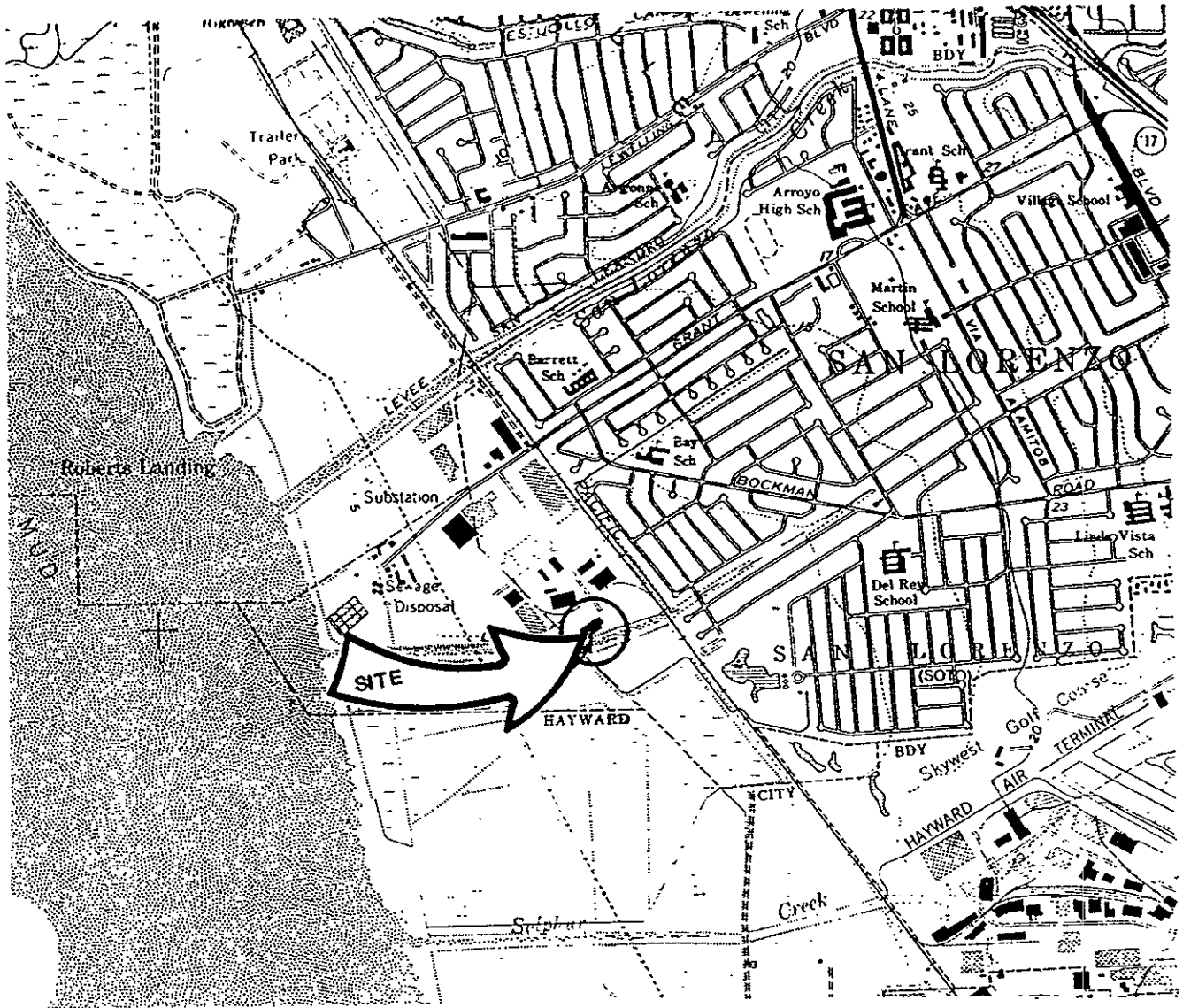
WELL	DATE	TPHG (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL BENZENE (ppb)	XYLENES (ppb)	WELL ELEV. (ft.)	DEPTH TO WATER (ft.)	FLOATING PRODUCT (ft.)
MW-1	7/14/87	BDL	BDL	BDL	---	BDL	8.86	7.56	---
	11/24/87	BDL	BDL	BDL	---	9.0		7.51	---
	2/29/88	BDL	BDL	BDL	---	BDL		7.18	---
	5/25/88	BDL	BDL	BDL	---	BDL		7.40	---
	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	---
MW-2	7/14/87	110	1.2	1.9	---	2	9.17	7.79	---
	11/24/87	3600	82	47	---	13		7.73	---
	2/29/88	800	BDL	BDL	---	BDL		7.26	---
	5/25/88	250	NA	NA	---	NA		7.45	---
	8/10/88	260	ND	ND	ND	ND		7.90	---
	11/29/88	870	9	ND	1	1		8.20	---
	2/7/89	710	16	ND	ND	ND		7.47	---
	5/12/89	260	2.8	0.76	1.3	3		7.27	---
	8/4/89	360	ND	ND	ND	0.48		8.23	---
MW-3	7/14/87	260	BDL	1	---	2	8.54	7.09	---
	11/24/87	8900	1700	3	---	12		7.11	---
	2/29/88	9300	1600	93	---	99		6.57	---
	5/25/88	11000	140	16	---	34		6.80	---
	8/10/88	4600	23	4.8	140	3		7.20	---
	11/29/88	16000	3900	11	600	40		7.41	---
	2/7/89	NA	NA	NA	NA	NA		NA	NA
	5/12/89	2500	ND	5.6	ND	2.7		6.64	---
	8/4/89	2900	800	7.5	96	ND		7.38	---
MW-4	7/14/87	BDL	BDL	BDL	---	BDL	8.84	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	NA	NA	NA	ND	NA		NA	---

**TABLE 1 (CONT.)
GROUNDWATER ANALYSES DATA**

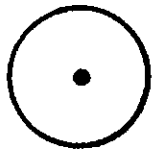
WELL	DATE	TPHG (ppb)	BENZENE (ppb)	TOLUENE (ppb)	ETHYL BENZENE (ppb)	XYLENES (ppb)	WELL ELEV. (ft.)	DEPTH TO WATER (ft.)	FLOATING PRODUCT (ft.)
MW-4 cont.	11/29/88	ND	0.9	NA	ND	NA		6.85	---
	2/7/89	ND	ND	ND	ND	ND		6.26	---
	5/12/89	ND	ND	ND	ND	0.76		6.55	---
	8/4/89	NA	NA	NA	NA	NA		NA	---
MW-5	7/14/87	BDL	BDL	BDL	---	BDL	9.11	7.06	---
	11/24/87	BDL	BDL	BDL	---	7		7.24	---
	2/29/88	BDL	BDL	BDL	---	BDL		6.75	---
	5/25/88	NA	NA	NA	---	NA		---	---
	8/10/88	NA	NA	NA	ND	NA		7.35	---
	11/29/88	NA	NA	NA	NA	NA		NA	---
	2/7/89	ND	ND	ND	ND	ND		7.02	---
	5/12/89	ND	ND	ND	ND	0.84		6.69	---
	8/4/89	ND	ND	ND	ND	ND		7.52	---
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	---	BDL		7.33	---
	8/10/88	ND	ND	ND	ND	ND		NA	---
	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	---

TPHG = Total Petroleum Hydrocarbons as Gasoline
 ppb = parts per billion
 BDL = Below Detection Limit
 NA = Not Analyzed
 ND = Not Detected
 NR = Not Reported
 Note: For detection limits, refer to laboratory reports

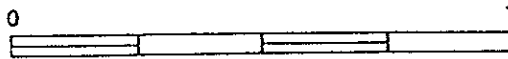
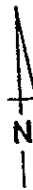
Current Department of Health Services Drinking Water Standards
 Benzene 1.0 ppb (MCL)
 Toluene 100 ppb (AL)
 Ethyl Benzene 680 ppb (MCL)
 Xylenes 1750 ppb (MCL)
 Note: Subject to change as reviewed by Department of Health Services
 MCL = Maximum Contaminant Level
 AL = Action Level



LEGEND



SITE LOCATION



SCALE IN MILES

USGS 7.5 MINUTE SAN LEANDRO QUADRANGLE 1980

<p>ensco environmental services, Inc.</p>	SITE LOCATION MAP		JOB #:	1587
	CROWN METAL MFG-PACIFIC INT'L STEEL		SCALE:	1:24000
	16525 WORTHLEY DRIVE		DATE:	6/6/87
	SAN LORENZO, CALIFORNIA		DRAWN BY:	
			DRAWING #:	FIG. 1

LEGEND

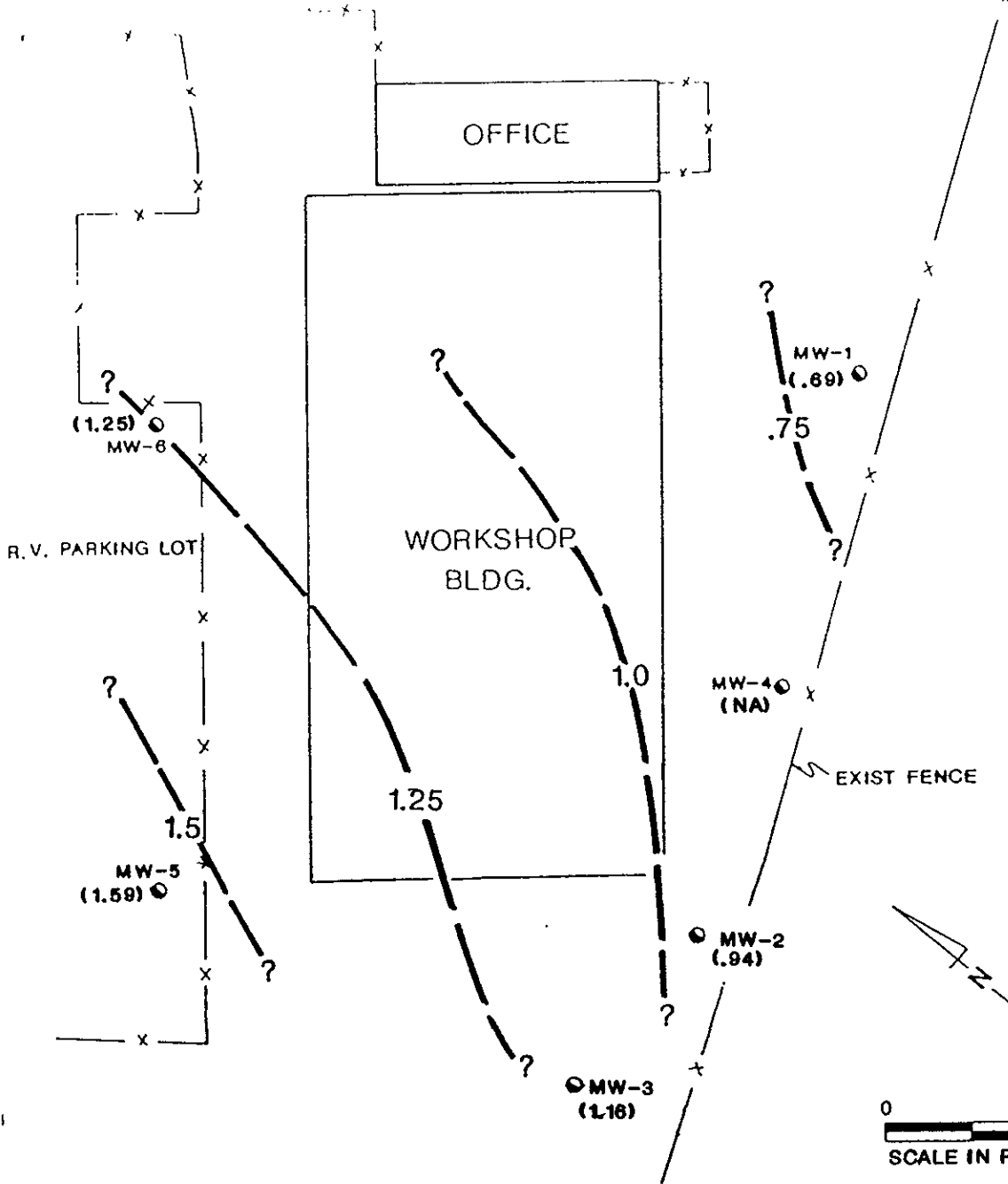
MW-1 GROUNDWATER MONITORING WELL

(1.25) GROUNDWATER ELEVATION IN FEET (DATUM: M.S.L.)

- - .75 GROUNDWATER ELEVATION CONTOUR LINE IN FEET (DATUM: M.S.L.)

WORTHLEY DRIVE

EXIST ABANDONED CAR LOT



GROUNDWATER ELEVATION CONTOUR MAP (8/4/89)



CROWN METAL MFG - PACIFIC INTL' STEEL

16525 WORTHLEY DRIVE

SAN LORENZO, CALIFORNIA

REVIEWED BY:

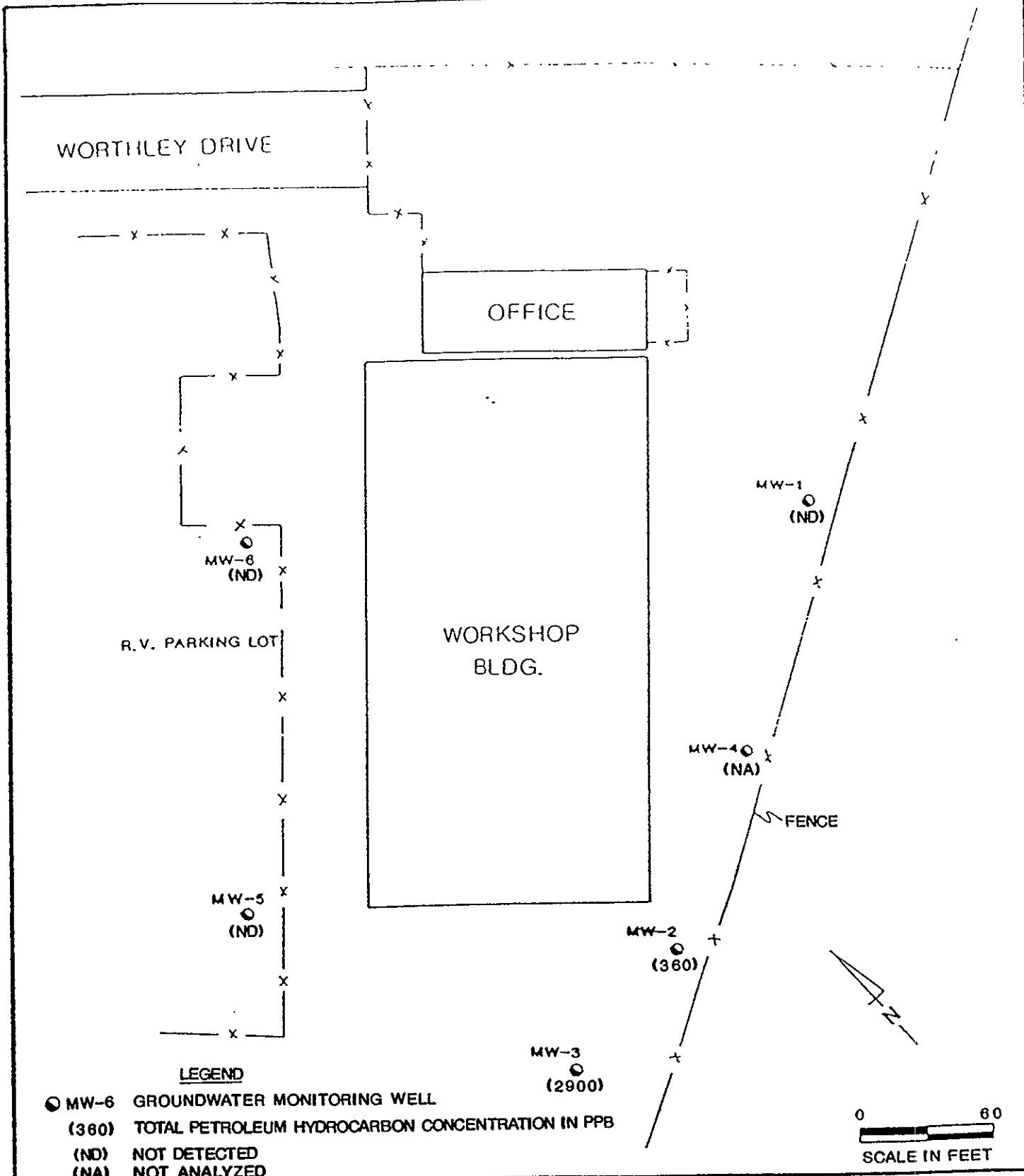
K.P.
JOB #
1587G

DATE:
8-11-89

APPROVED BY:

DRAWN BY
J.C.

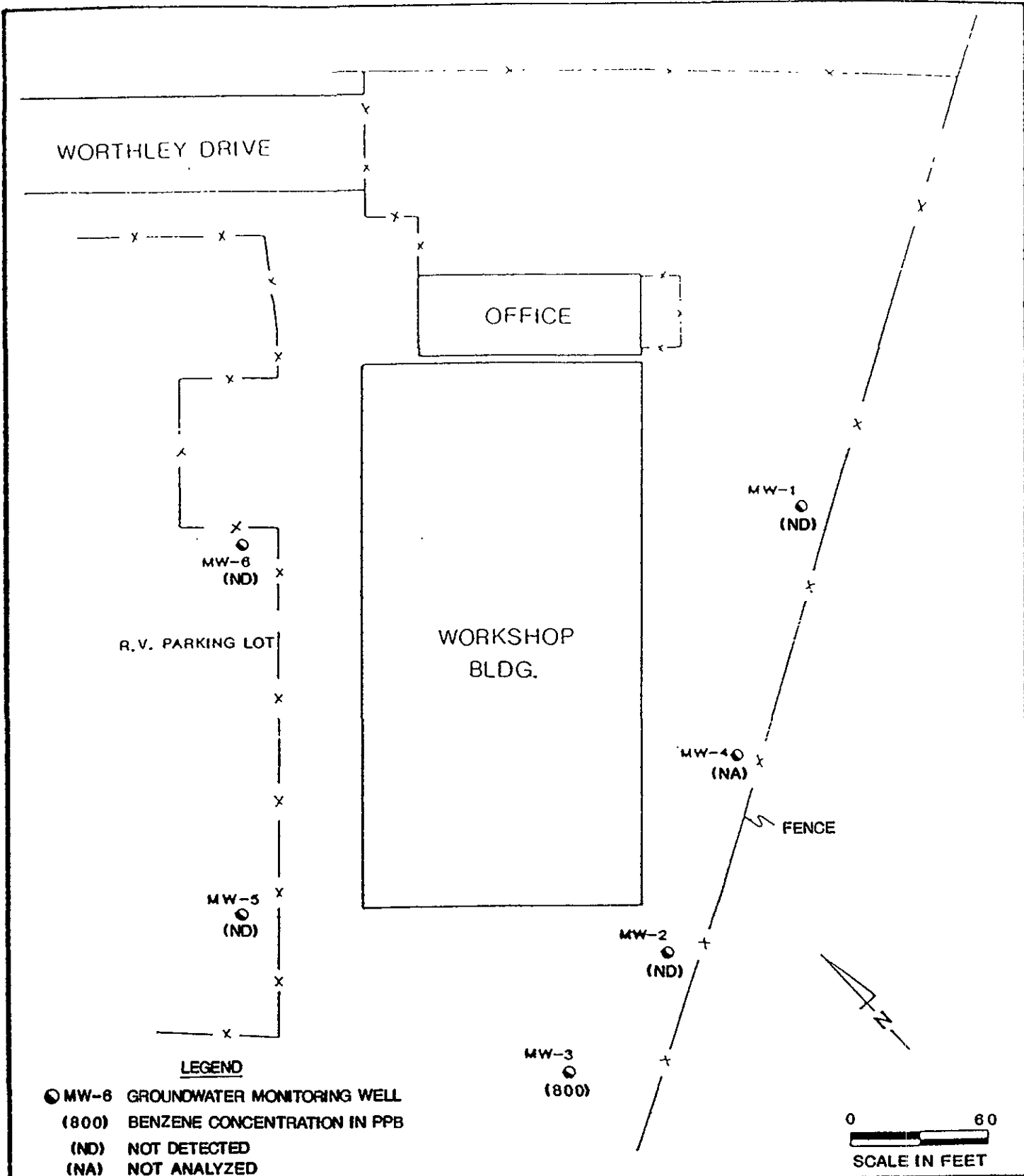
DRAWING #
FIG. 2



TPHG CONCENTRATION MAP (8/4/89)

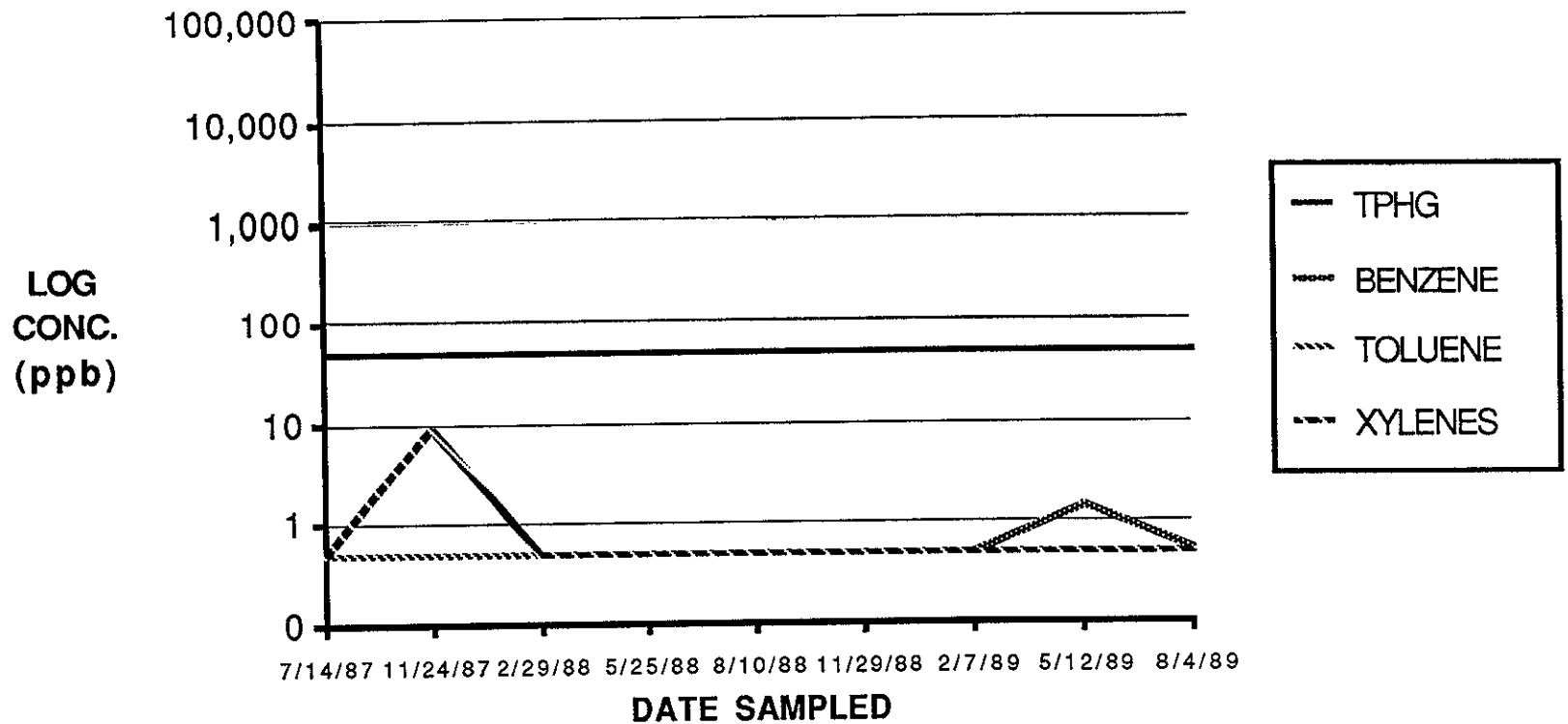


CROWN METAL MFG - PACIFIC INTL' STEEL		REVIEWED BY: <i>R.P.</i>	APPROVED BY
16525 WORTHLEY DRIVE		JOB #: 1587G	DRAWN BY: S.S.
SAN LORENZO, CALIFORNIA		DATE: 6/15/89	DRAWING #: FIG. 3



BENZENE CONCENTRATION MAP (8/4/89)			
CROWN METAL MFG - PACIFIC INTL' STEEL		REVIEWED BY. <i>R.P.</i>	APPROVED BY.
16525 WORTHLEY DRIVE		JOB # 1587G	DRAWN BY S.S.
SAN LORENZO, CALIFORNIA		DATE 6/15/89	DRAWING # FIG. 4

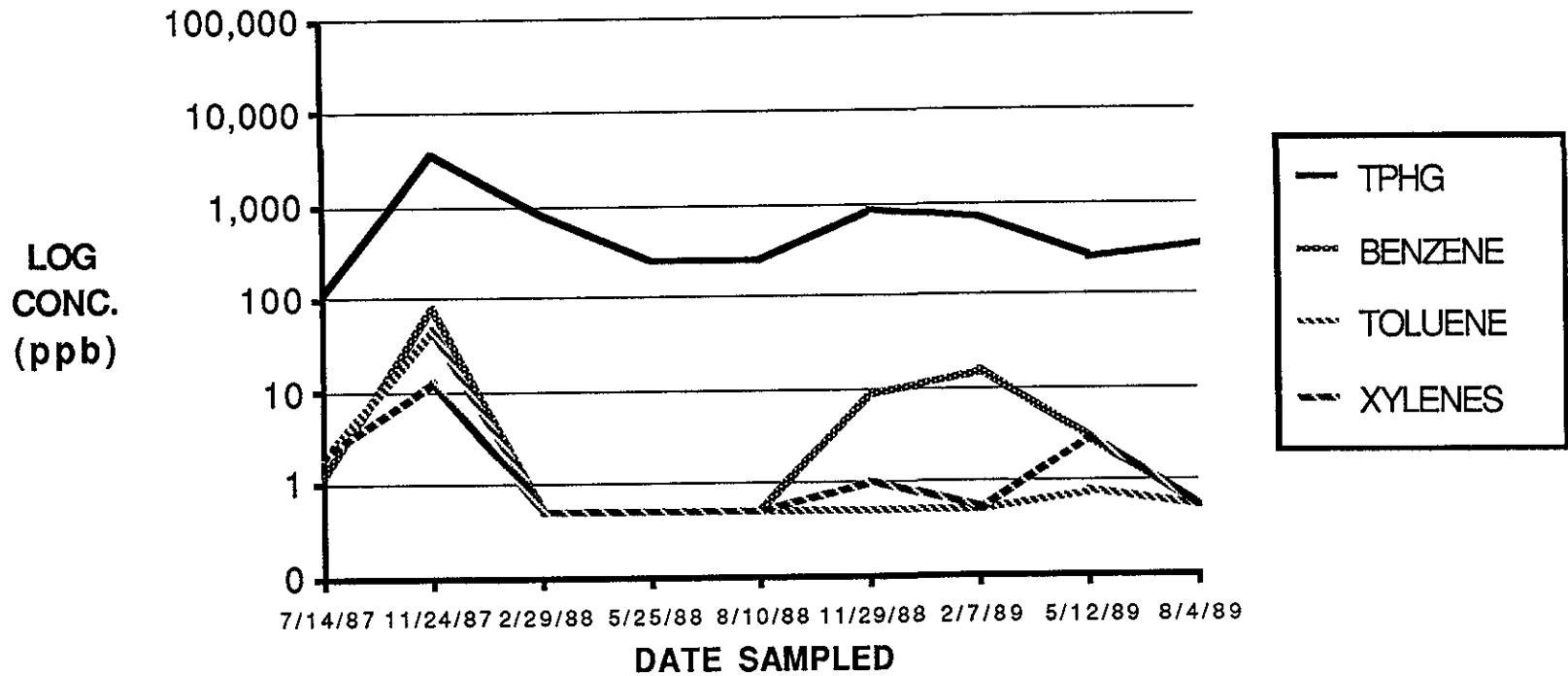
MW-1 GROUNDWATER ANALYSES DATA



NOTE: Graphed results may display higher laboratory equipment detection or reporting limits. For exact analytical results, refer to appended laboratory reports.

Figure # 5

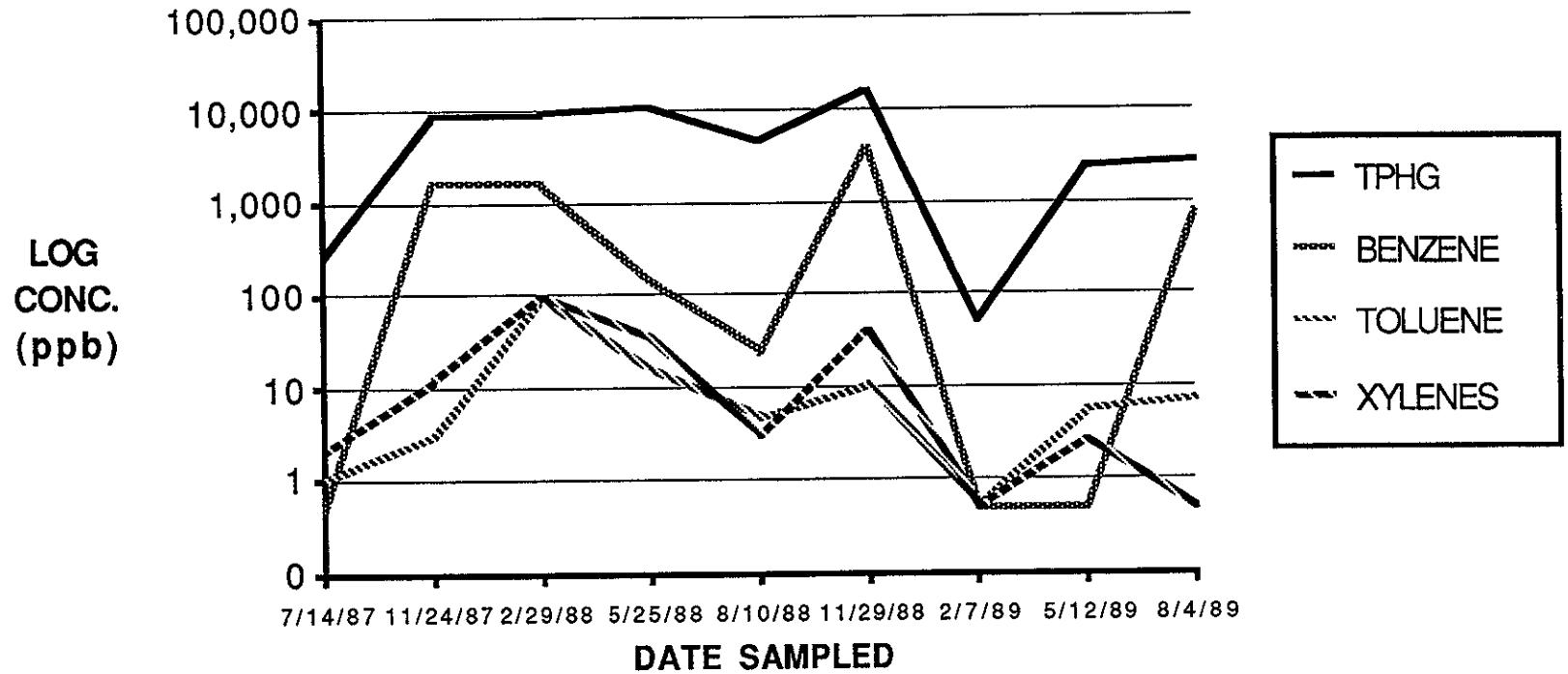
MW-2 GROUNDWATER ANALYSES DATA



NOTE: Graphed results may display higher laboratory equipment detection or reporting limits. For exact analytical results, refer to appended laboratory reports.

Figure # 6

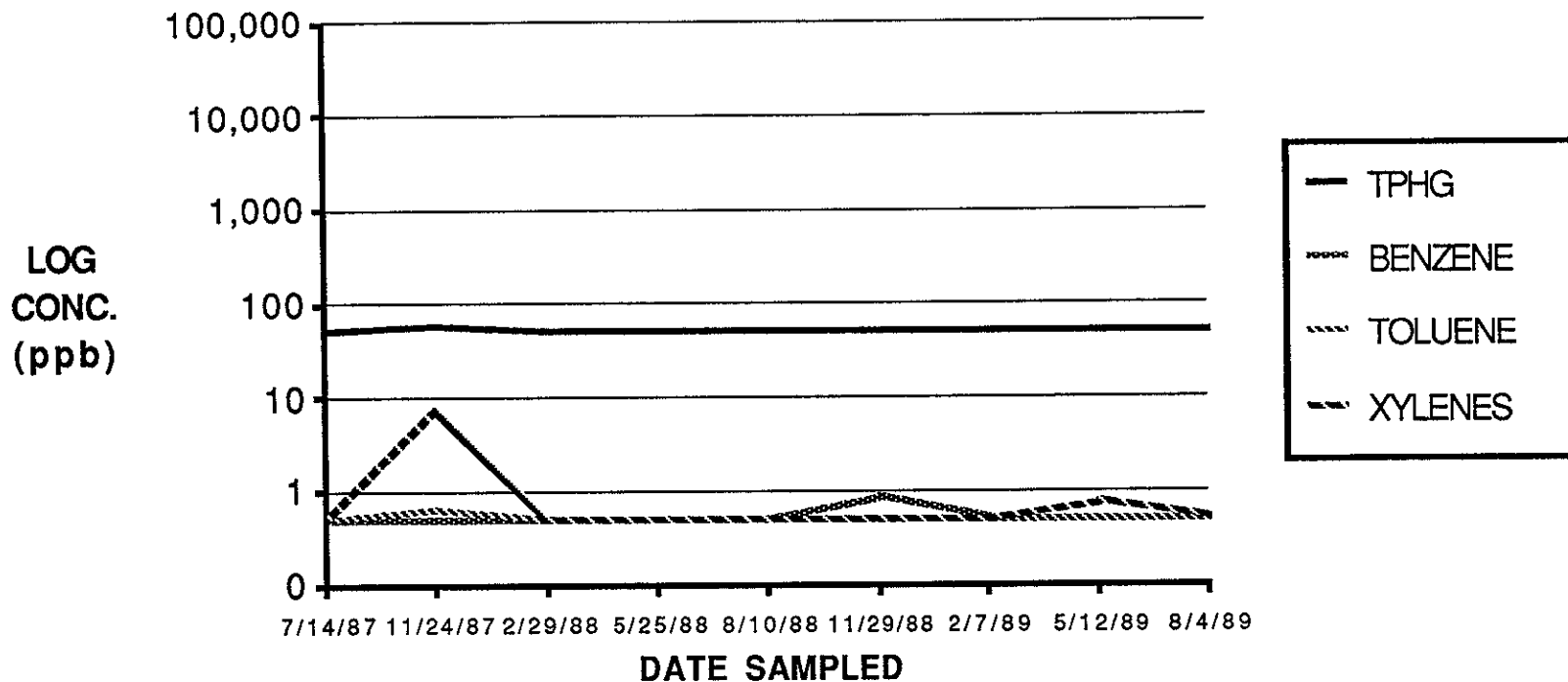
MW-3 GROUNDWATER ANALYSES DATA



NOTE: Graphed results may display higher laboratory equipment detection or reporting limits. For exact analytical results, refer to appended laboratory reports.

Figure # 7

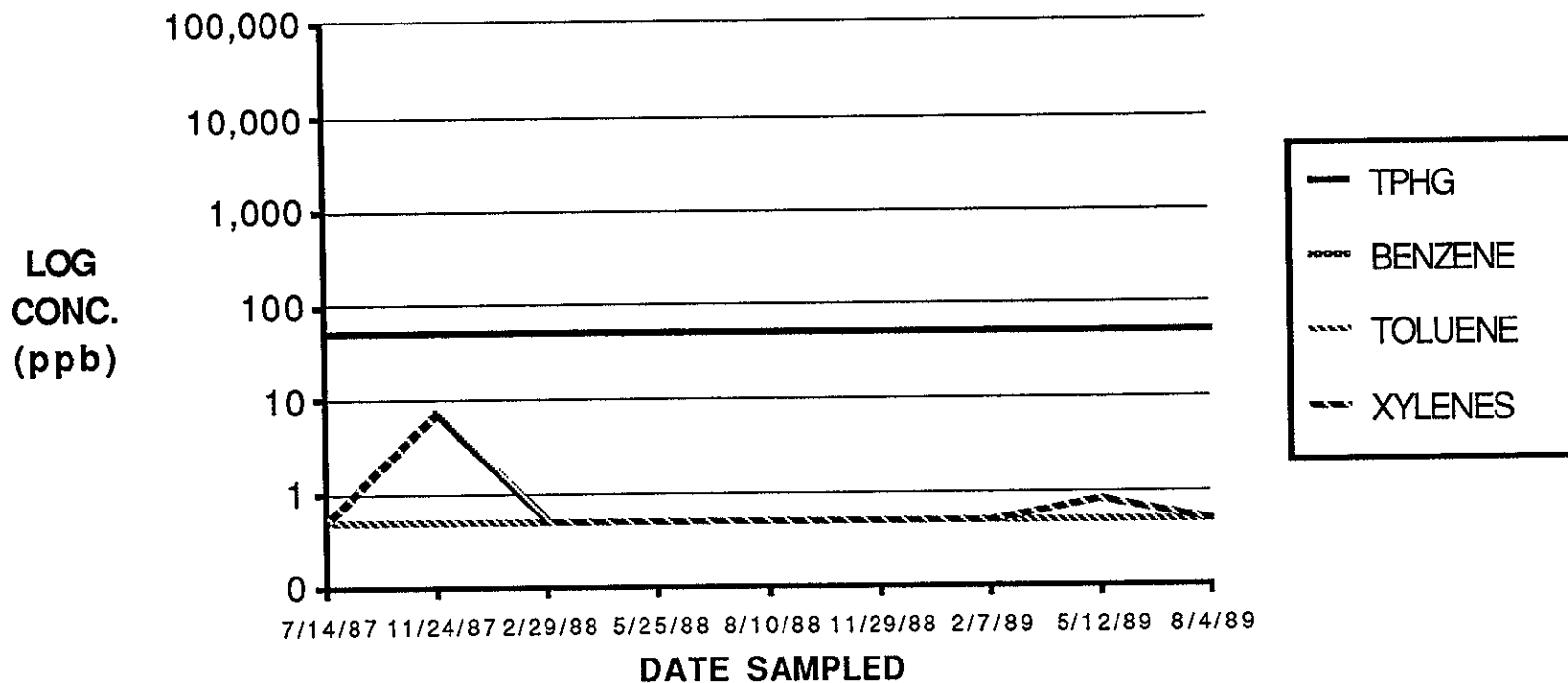
MW-4 GROUNDWATER ANALYSES DATA



NOTE: Graphed results may display higher laboratory equipment detection or reporting limits. For exact analytical results, refer to appended laboratory reports.

Figure # 8

MW-5 GROUNDWATER ANALYSES DATA



NOTE: Graphed results may display higher laboratory equipment detection or reporting limits. For exact analytical results, refer to appended laboratory reports.

Figure # 9

APPENDIX A

GROUNDWATER SAMPLING PROTOCOL

ENSCO ENVIRONMENTAL SERVICES, INC.

GROUNDWATER SAMPLING PROTOCOL

GROUNDWATER SAMPLING PROTOCOL

Sampling of groundwater is performed by Ensco Environmental Services, Inc. (EES) sampling technicians. Summarized field sampling procedures are as follows:

1. Measurements of liquid surface in the well and depth of monitoring well.
2. Field check for presence of floating product.
3. Purge well prior to collecting samples.
4. Monitor groundwater for temperature, pH, and specific conductance during purging.
5. Collect samples using Environmental Protection Agency (EPA) approved sample collection devices, i.e., teflon or stainless steel bailers or pumps.
6. Transfer samples into laboratory-supplied EPA-approved containers.
7. Label samples and log onto chain-of-custody form.
8. Store samples in a chilled ice chest for shipment to a state-certified analytical laboratory.

GROUNDWATER SAMPLING PROCEDURES

Equipment Cleaning

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.

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.

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. 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. At no time will the well be purged dry so 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 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 groundwater samples will not be collected.

Groundwater sample containers are labeled with a unique sample number, location, product name and number, 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.

APPENDIX B

LABORATORY PROCEDURES PROTOCOL

ENSCO ENVIRONMENTAL SERVICES, INC.

LABORATORY PROCEDURES

LABORATORY PROCEDURES

Selection of the Laboratory

The laboratories selected to perform the analytical work are certified by the California State Department of Health Services as being qualified to perform the selected analyses. The selected laboratories are reviewed by Ensco Environmental Services, Inc. to ensure that they are certified by the State of California and maintain an adequate quality control program

Chain-of-Custody Control

The following procedures are used during sampling and analytical activities to provide chain-of-custody control during transfer of samples from collection through delivery to the laboratories. Record keeping activities used to achieve chain-of-custody control are:

- Contact made by sampling organization with facility supervisor and laboratory prior to sampling to alert them of dates of sampling and sample delivery.
- Well location map with well identification number(s) prominently displayed.
- Field log book for documenting sampling activities in the field.
- Labels for identifying individual samples.
- Chain-of-custody record for documenting transfer and possession of samples.
- Laboratory analysis request sheet for documenting analyses to be performed.

Field Filtration of Samples

Samplers will refrain from filtering TOC, TOX or other organic compound samples as the increased handling required may result in the loss of chemical constituents of interest. Allowing the samples to settle prior to analysis followed by decanting the sample is preferable to filtration of these substances. If filtration is necessary for the determination of extractable organic compounds, the filtration should be performed in the laboratory. It may be necessary to run parallel sets of filtered and unfiltered samples with standards to establish the recovery of hydrophobic compounds when sample must be filtered. All the materials' precautions used in the construction of the sampling train should be observed for filtration apparatus. Vacuum filtration of groundwater samples is not recommended.

Water samples for dissolved inorganic chemical constituents (e.g., metals, alkalinity and anionic species) will be filtered in the field.

Sample Containers

Sample containers vary with each type of analytical parameter. Selected container types and materials are non-reactive with the sample and the particular analytical parameter being tested. Appropriate containers for volatile organics are glass bottles of at least 40 milliliters in size fitted with teflon-faced silicon septa. Sample containers are properly cleaned and sterilized by the certified laboratory according to the EPA protocol for the individual analysis.

Sample Preservation and Shipment

Various preservatives are used by the certified laboratory to retard changes in samples. Sample shipment from Ensco Environmental Services to laboratories performing the selected analyses routinely occurs within 24 hours of sample collection.

Analytical Procedures

The analysis of groundwater samples is conducted in accordance with accepted quantitative analytical procedures. The following four publications are considered the primary references for groundwater sample analysis, and the contracts with the laboratories analyzing the samples stipulate that the methods set out in these publications be used. Please note that procedures used are periodically updated by federal and state agencies, and the certified laboratories amend analysis as required by the update.

- Standard Methods for the Examination of Water and Wastewater, 16th Ed., American Public Health Association, et al., 1985.
- Methods for Chemical Analysis of Water and Wastes, U.S. EPA, 600/4-79-020, March 1979.
- Test Methods for Evaluation of Solid Waste: Physical/Chemical Methods, U.S. EPA SW-846, 1982.
- Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA, 600/4-82-057, 1982.
- Practical Guide for Groundwater Sampling, EPA, 600/2-85/104, September 1985.
- RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, EPA, September 1986.

Analytical Methods

The analytical methods used by the selected laboratories are those required by the type of analysis (fuels, metals, etc.). These methods are those currently approved by the State Regional Water Quality Control Board.

APPENDIX C

**LABORATORY REPORTS
CHAIN-OF-CUSTODY RECORD**



SEQUOIA ANALYTICAL

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

Ensco Environmental Services
41674 Christy Street
Fremont, CA 94538
Attention: Gary Mulkey

Client Project ID: #1587G, Crown Metal, PO#14350
Matrix Descript: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 908-0805 A-B

Sampled: Aug 4, 1989
Received: Aug 8, 1989
Analyzed: Aug 8, 1989
Reported: Aug 21, 1989

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons	Benzene	Toluene	Ethyl Benzene	Xylenes
		$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)
9080805 A-B	MW-1	N.D.	N.D.	N.D.	N.D.	N.D.
9080806 A-B	MW-2	360	N.D.	N.D.	N.D.	0.48
9080807 A-B	MW3	2,900	800	7.5	96	N.D.
9080808 A-B	MW-5	N.D.	N.D.	N.D.	N.D.	N.D.
9080809 A-B	MW-6	N.D.	N.D.	N.D.	N.D.	N.D.


Detection Limits:	30.0	0.3	0.3	0.3	0.3
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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

Arthur G. Burton
Laboratory Director

CHAIN OF CUSTODY RECORD

PROJECT NO 1587G		PROJECT NAME Crown Metal		TEST REQUESTED				P.O. # 14350																																					
SAMPLERS (Signature) John Monice				<table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;">X</td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				X						X						X						X						X						X						LAB Sequoia	
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REPORT TO: Gary Mulkey																																													