

Iron  
Zn

**SITE INVESTIGATION**  
**Pacific Galvanizing**  
**715 46<sup>th</sup> Avenue**  
**Oakland, California**

**October 15, 1999**

**WORLD ENVIRONMENTAL SERVICES & TECHNOLOGY**  
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**SIGNATURE PAGE**

All engineering information, conclusions, and recommendations contained in this report have been prepared under the supervision of a California Professional Engineer. All hydrogeologic and geologic information, conclusions, and recommendations contained in this report have been prepared under the supervision of a California Registered Geologist.



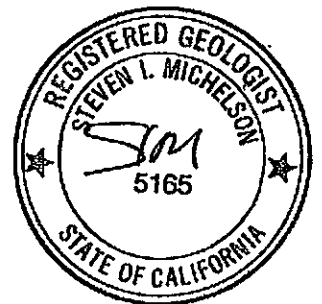
Peter M. Krasnoff  
California Professional Engineer (44031)

10-26-99  
Date



Steven I. Michelson  
California Registered Geologist (5165)

10-26-99  
Date



## 1. INTRODUCTION

This *Site Investigation* report has been prepared by World Environmental Services & Technology (WEST) to present the results of the soil and groundwater investigation in the northern portion of the Pacific Galvanizing facility located at 715 46th Avenue in Oakland, California (the Site). Metals were previously detected in soil samples collected by others in this area. The objective of the investigation was to assess the extent of lead and zinc in soil and the potential impacts to groundwater.

## 2. BACKGROUND

The Site is located in Oakland, California on the northeast corner of Coliseum Way and 46<sup>th</sup> Avenue, see Figure 1. Adjacent properties currently include Bostrom Bergen Metal Products to the south, Coliseum Way and Interstate 880 to the west, Union Pacific railroad corridor to the east, and the Spa Company and Reliance Systems to the north.

The area that was investigated is leased by Pacific Galvanizing from Alameda County. Pacific Galvanizing currently uses the area for storage of equipment. The investigation area is approximately 40-feet wide and is located in the northern portion of the Site, noted as "Alley", see Figure 2. The Alley is open to the Pacific Galvanizing processing building on one side and is fenced on three sides. Beneath the Alley is a buried storm drain consisting of two parallel thirteen-foot by seven-foot box culverts. A portion of the ground surface is covered with a concrete pad. Soil encountered in the upper five feet has been characterized as clay, sand and gravel with occasional peat fill.

Soil samples were collected by The Earth Technology Corporation from the Alley on March 15, 1996 from depths ranging from one to four feet below ground surface (bgs). The soil samples were composited and analyzed. Concentrations of lead were reported up to 1,900 milligrams per kilogram (mg/kg) and zinc up to 45,000 mg/kg. Based on results of previous soil sampling,

additional investigations were undertaken to assess the extent of zinc and lead in soil and groundwater in the Alley.

### **3. RECENT INVESTIGATION**

Thirteen soil samples and one grab groundwater sample were collected on April 2, 1998 from thirteen shallow soil borings advanced at the Site, see Figure 2. The following describes the sample collection methods and sample analytical methods and results.

#### **3.1 SAMPLE COLLECTION METHODS**

Prior to drilling, a subsurface drilling permit was obtained from the Alameda County Zone 7 Water Agency. A copy of the permit is provided in Appendix A. Underground Services Alert (USA) was notified and the boring locations were cleared for underground utilities using a private utility locating contractor.

Thirteen soil borings (SB-1 through SB-13) were advanced using hand augering equipment. The soil sampling equipment was decontaminated prior to reuse at each sampling location. Soil samples were collected at depths between four to five feet bgs by driving a clean 1-3/4-inch diameter sampler lined with clean stainless steel or brass tubes into undisturbed soil. The ends of the soil sample tube selected for chemical analysis were covered with plastic caps.

A grab groundwater sample was collected from soil boring SB-4 using a clean 3/4-inch stainless steel bailer lowered into the borehole. Water in the bailer was decanted into the sample bottle.

The soil and groundwater samples were labeled and were then placed in an ice chest containing ice pending transport to the analytical laboratory. The soil and groundwater samples were submitted to the analytical laboratory under chain-of-custody protocols. Appendix B contains copies of the chain-of-custody forms.

### **3.2 SAMPLE ANALYSES**

The soil samples were analyzed for zinc and lead using EPA Method 6010/7000 series and for corrosivity using EPA Method 150.1. The groundwater sample was filtered by the analytical laboratory and was then analyzed for dissolved zinc and lead using EPA Method 6010/7000 series and for pH using EPA Method 150.1. The chemical analyses were performed by Sequoia Analytical, a State certified laboratory.

## **4. RESULTS OF THE RECENT INVESTIGATION**

### **4.1 SOIL SAMPLE RESULTS**

Concentrations of lead detected in soil samples ranged from 22 mg/kg to 5,300 mg/kg. Concentrations of zinc detected in soil samples ranged from 490 mg/kg to 130,000 mg/kg. The pH of soil samples ranged from 5.5 to 8.5 Standard Units (S.U.). Results of the analysis for total lead, total zinc and pH in soil are summarized on Table 1. Copies of the laboratory certificates are provided in Appendix B.

### **4.2 GROUNDWATER SAMPLE RESULTS**

The groundwater sample contained less than 0.050 milligrams per liter (mg/l) of dissolved lead, and 0.68 mg/l of dissolved zinc. The pH of the groundwater sample was reported at 7.5 S.U. Results of the analysis for dissolved lead, dissolved zinc and pH in groundwater are summarized on Table 2. Copies of the laboratory certificates are provided in Appendix B.

## 5. EVALUATION OF SAMPLE RESULTS

Based on the detection of lead and zinc in soil at the Site, an assessment has been performed to evaluate the potential risk to human health and the environment. Cleanup levels for soil and groundwater are primarily determined based on site-specific evaluation of potential risk to human health and the environment. Risk-based analyses focus on the identification of possible receptors and the potential exposure to the identified chemicals. Based on the investigations, lead and zinc are the chemicals of concern (COCs) at the Site.

Site cleanup goals must be protective of both human health and the environment. Therefore, the determination of site cleanup goals must consider human contact with soils and groundwater and the potential impact to groundwater from contaminated soils. An evaluation of potential risks posed by the COCs at the Site is presented below.

### 5.1 POTENTIAL EXPOSURE PATHWAYS

An evaluation has been performed to identify potential exposure pathways at the Site based on the location and distribution of the affected soils and groundwater, site use, and the concentrations of lead and zinc in soil and groundwater. Evaluation of potential exposure pathways considered indoor and outdoor inhalation of volatile compounds from soil and groundwater; dermal contact, ingestion, and inhalation of soil; and ingestion of groundwater; ingestion of groundwater; and ingestion of groundwater exposed to chemicals leached from soil.

The current land use of the Site is industrial. The presence of the storm drain precludes changes in the use of the parcel. Therefore, a residential exposure scenario has not been considered. The location of the soils with elevated concentrations of lead and zinc are co-incident with the buried storm drains.

Based on this land use, the potential risk posed by the soil and groundwater conditions at the Site have been evaluated using the Preliminary Remediation Goals (PRGs) developed by the United State Environmental Protection Agency (USEPA) Region IX. PRGs combine current EPA



toxicity values with "standard" exposure factors to estimate concentrations "...in environmental media (soil, air, and water) that are protective of humans, including sensitive groups, over a lifetime" (USEPA, 1995). While concentrations above PRGs would not automatically designate a site as "dirty" or trigger a response action, exceeding a PRG suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate. As outlined by the EPA "...PRG concentrations presented in the table can be used to screen pollutants in environmental media, trigger further investigation, and provide an initial cleanup goal if applicable." PRGs are calculated based on an exposure scenario of 50 milligrams per day of soil for 250 days per year for 25 years.

## 5.2 EVALUATION OF SOIL CONDITIONS

Lead and zinc are considered by the USEPA to be non-carcinogens in the residential exposure scenario. Lead is considered by the USEPA to be a non-carcinogen with an industrial PRG of 1,000 mg/kg. The USEPA considers zinc to be a relatively less toxic inorganic compound and has developed a non-risk based ceiling limit industrial PRG concentration of 100,000 mg/kg.

For non-carcinogens, a hazard index is developed by dividing the concentration term by its respective non-cancer PRG. The sum of the ratios represents a non-carcinogenic hazard index (HI) for the Site. Carcinogens and compounds with non-risk based PRGs are excluded from the hazard index calculation. A hazard index of 1 or less is generally considered to pose an acceptable level of risk. A ratio greater than 1 suggests further evaluation (USEPA, 1998).

The statistical evaluation of the lead results revealed a mean concentration of 1,100 mg/kg and 95 percent upper confidence level (UCL) of 1,900 mg/kg. Both the mean and the 95 percent UCL concentration for lead are above the industrial PRG of 1,000 mg/kg. Based on the 95 percent UCL concentration and the industrial PRG for lead in soil, the HI for the site is 1.9.

For zinc, the mean concentration is 24,000 mg/kg and the 95 percent UCL is 43,000 mg/kg. Both the mean and the 95 percent UCL concentration for zinc are below the industrial PRG of 100,000 mg/kg.

to stabilize  
Zn, must have high pH. If pH is at 6.0, Zn will tend to  
solubilize.

Statistical analysis of the results revealed a mean concentration of pH of 6.1 and a 95 percent lower confidence level (LCL) of 5.9 S.U. and a 95 percent UCL of 6.5 S.U. The pH of the soil samples is within the normal range for soil and is interpreted to not pose a risk at the Site.

### 5.3 EVALUATION OF GROUNDWATER CONDITIONS

The California Environmental Protection Agency (Cal-EPA) has developed a primary maximum contaminant level (MCL) for lead in drinking water at 0.015 milligrams per liter (mg/l). Lead was not detected in the grab groundwater sample above the detection limit of 0.050 mg/l.

*too high a detection limit*

Regulatory criteria for groundwater are promulgated by the California Regional Water Quality Control Board (CRWQCB), San Francisco Region, in their Basin Plan (Basin Plan, 1995). The Basin Plan identifies beneficial uses of water in the Site vicinity as municipal supply. Therefore, the applicable water quality objectives are the drinking water standards, MCLs. Cal-EPA has not developed a primary MCL for zinc in drinking water but has developed a secondary MCL for zinc of 5 mg/l. The secondary MCL is based on a taste threshold because zinc<sup>1</sup> can impart an astringent taste to water and it will precipitate as Zn(OH)<sub>2</sub> or ZnCO<sub>3</sub> in alkaline waters to produce a milky turbidity. The concentration of dissolved zinc measured in the grab groundwater sample was 0.68 mg/l, well below the secondary MCL. Based on these results, groundwater does not appear to be affected.

### 5.4 SUMMARY OF SAMPLING RESULTS

The 95 percent UCL concentration of lead in soil is 1,900 mg/kg, which exceeds the industrial PRG of 1,000 mg/kg. The 95 percent UCL concentration of zinc in soil is 43,000 mg/kg, which is below the industrial PRG of 100,000 mg/kg. Lead was not found in a level above the 0.050 mg/l detection limit in the grab groundwater sample. Zinc was reported at 0.68 mg/l in the grab groundwater sample, which is below the secondary drinking water standard of 5 mg/l.

## 6. RECOMMENDATIONS

Based on the site characterization and sampling results for lead and zinc in Site soils, mitigation measures to address the presence of lead in soil appear warranted. Details of the recommended mitigation measures are described below.

### 6.1 SITE DEVELOPMENT

The facility is currently planned to remain developed for industrial use. The location of the soils with elevated concentrations of lead is co-incident with the buried storm drains. Based on this current and likely future land use, a plan has been developed to reduce the potential for exposure to lead in the soil at the Site. The plan includes the proper procedures and notifications to be provided when Site work requires excavation into soil containing elevated concentrations of lead at the Site. Notification of these requirements should be provided in a manner that is consistent with California Health and Safety Code.

what is it zoned for?

### 6.2 ENGINEERING CONTROLS

The 95 percent UCL concentration of lead in soil at the Site exceeds the industrial PRG, which is based on risk posed by ingestion. Based on the continued industrial use of the Site, engineering control measures appear appropriate to reduce the potential for exposure to soil with elevated concentrations of lead. The engineering control measure recommended for the Site includes maintaining a paved surface to minimize the potential for exposure to chemicals in soil at the Site.

#### 6.2.1 Site Maintenance

Site personnel should incorporate into their routine maintenance program an evaluation of the integrity of the paved surfaces at the Site. A record of the extent of surface cracking or

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<sup>1</sup> Camp, T.R., and Meserve, R. L., *Water and Its Impurities*, Dowden, Hutchinson, & Ross, Inc., 1974. p. 106.

differential settlement should be made. Measures to address the integrity of the Site covering should be implemented on an as-needed basis.

### **6.2.2 Site Excavation**

Since the Site contains two large buried storm drains, excavation is likely to be performed only by Alameda County, the owner/operator of the storm drains. Excavation in this area could result in exposure to zinc and lead. However, the exposure duration is likely to be significantly less than the 250 days per year used to calculate the industrial PRG.

When excavation is planned, a work plan including a site specific health and safety plan and a soil management plan should be prepared for the planned activities. However, it is anticipated that some activities, such as emergency repairs, may not allow for development of specific health and safety plans. In these cases, the workers should be thoroughly familiar with the site health and safety plan. The site workers should be trained in accordance with California and Federal regulations, i.e., Title 8 and 29 CFR 1910.120.

### **6.2.3 Soil Sampling**

Prior to conducting future construction activities at the Site, representative soil samples should be collected to assess the concentrations of chemicals of concern in areas where soil excavation is required for building foundation, maintenance or other related construction activities. The objective of the recommended soil sampling program is to identify the possible presence and concentrations of chemicals of concern in soil that are expected to be disturbed during future construction activities at the property. The sampling is recommended at random areas within excavations that are planned at the Site. Soil sampling results should be used to develop the construction worker health and safety plan and to assess appropriate replacement of excavated soil at the Site and/or proper disposal of soil removed from the Site.

#### **6.2.4 Disposal of Soils**

Soils from excavations can be profiled and disposed at an appropriate landfill. Historical site investigation activities in the vicinity of the project have identified the presence of elevated levels of lead and zinc. Therefore, the excavation of soils from the Site requires planning, both with respect to health and safety, but also the disposition of material generated from maintenance activities.

If possible, the soils should be sampled prior to excavation to characterize the level of personal protection to be used during the conduct of the work. The soils could also be profiled for disposal prior to initiation of work, thereby avoiding the need to stockpile, sample and wait for the results of laboratory analyses. The disposal of soils, however, will be landfill-dependent and will require testing in accordance with the specific landfills profiling requirements.

The implementation of emergency repair jobs may not allow adequate time to stockpile, sample, test and wait for laboratory analyses. Therefore, it may be necessary to plan on sending all excavated materials to a Class 1 Landfill.

#### **6.3 NOTIFICATION TO FUTURE PROPERTY OWNERS/DEVELOPERS**

Disclosure of this plan and all Site investigation and monitoring reports to a future buyer and/or developer is recommended to provide appropriate information of the conditions and potential risks at the Site. Disclosure of the Site investigation reports and mitigation plan is required to satisfy real estate disclosure requirements and would be expected to provide a comprehensive assessment that would be used as guidance by a future property owner. Therefore, it is recommendation to provide the Site reports and mitigation plan to a future property owner in lieu of providing a deed notification.

#### 6.4 SUMMARY

The Site consists of a 40-foot wide strip of land with two 13 foot by seven foot underground box storm drain culverts owned and operated by Alameda County. Industrial activities consist of metal galvanizing. Concentrations of lead and zinc in soil have been measured up to 5,300 mg/kg and 130,000 mg/kg in soil samples collected from five feet bgs, respectively. The maximum concentrations exceed the USEPA Region IX industrial PRGs of 1,000 mg/kg for lead and 100,000 mg/kg for zinc. The USEPA has developed a non-carcinogen PRG for lead and a non-risk-based PRG for zinc. The 95 percent UCL lead concentration of 1,900 mg/kg exceeds industrial PRG while the 95 percent UCL concentration for zinc of 43,000 is below its respective industrial PRG.

Current and anticipated future land use of the Site is limited to industrial activities and maintenance activities associated with the storm drain. Based on the current use of the property as a storage yard and as a right-of-way for the storm drain box culvert, worker exposure to zinc and lead in the soil are likely to be limited to dust. Exposure of the utility worker to dust and soil may occur during excavation and maintenance activities associated with the storm drain. The industrial PRG is based on an exposure duration of 250 days per year, which is likely to be much greater than the exposure duration of a utility worker performing maintenance on the storm drain.

A plan to reduce worker exposure has been developed that includes installing pavement over the portions of the lot, which are currently covered by gravel. Construction worker exposure should be mitigated at the time of construction through dust control and dust monitoring and adherence to a site-specific health and safety plan.

## 7. BIBLIOGRAPHY

ASTM. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, E 1739-95*. November, 1995.

California Regional Water Quality Control Board – Central Valley. *A Compilation of Water Quality Goals*. March 1995.

California Regional Water Quality Control Board - San Francisco Bay Region, *San Francisco Basin – Water Quality Control Plan*, June 21, 1995.

U.S. EPA. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW 846)*, 2nd Edition, November 1986.



TABLE 1  
 LABORATORY INORGANIC ANALYSES - SOIL  
 Pacific Galvanizing - 715 46th Street  
 Oakland, CA

Sample Location	Date Sampled	pH (SU)	Lead Total mg/kg	Zinc Total mg/kg
SB-1-4'	4/2/98	5.5	22	2,700
SB-2-5'	4/2/98	6.2	92	2,200
SB-3-5'	4/2/98	6.4	570	5,800
SB-4-5'	4/2/98	6.3	360	2,800
SB-5-5'	4/2/98	6.4	140	1,800
SB-6-4'	4/2/98	6.1	360	9,800
SB-7-5'	4/2/98	8.5	150	5,200
SB-8-5'	4/2/98	6.9	110	6,300
SB-9-5'	4/2/98	6.8	24	490
SB-10-5'	4/2/98	6.0	1,100	11,000
SB-11-5'	4/2/98	6.2	3,500	72,000
SB-12-5'	4/2/98	6.5	2,500	58,000
SB-13-5'	4/2/98	5.6	5,300	130,000
	Sample Mean	6.1	1,100	24,000
	95% upper confidence interval	6.5	1,900	43,000
	PRG - Industrial Setting		1,000	100,000

Notes:

SU = Standard Unit

mg/kg = milligrams per kilogram

PRG = Preliminary Remediation Goals, USEPA, 1998.

TABLE 2  
LABORATORY INORGANIC ANALYSES - GROUNDWATER GRAB SAMPLE  
Pacific Galvanizing - 715 46th Street  
Oakland, CA

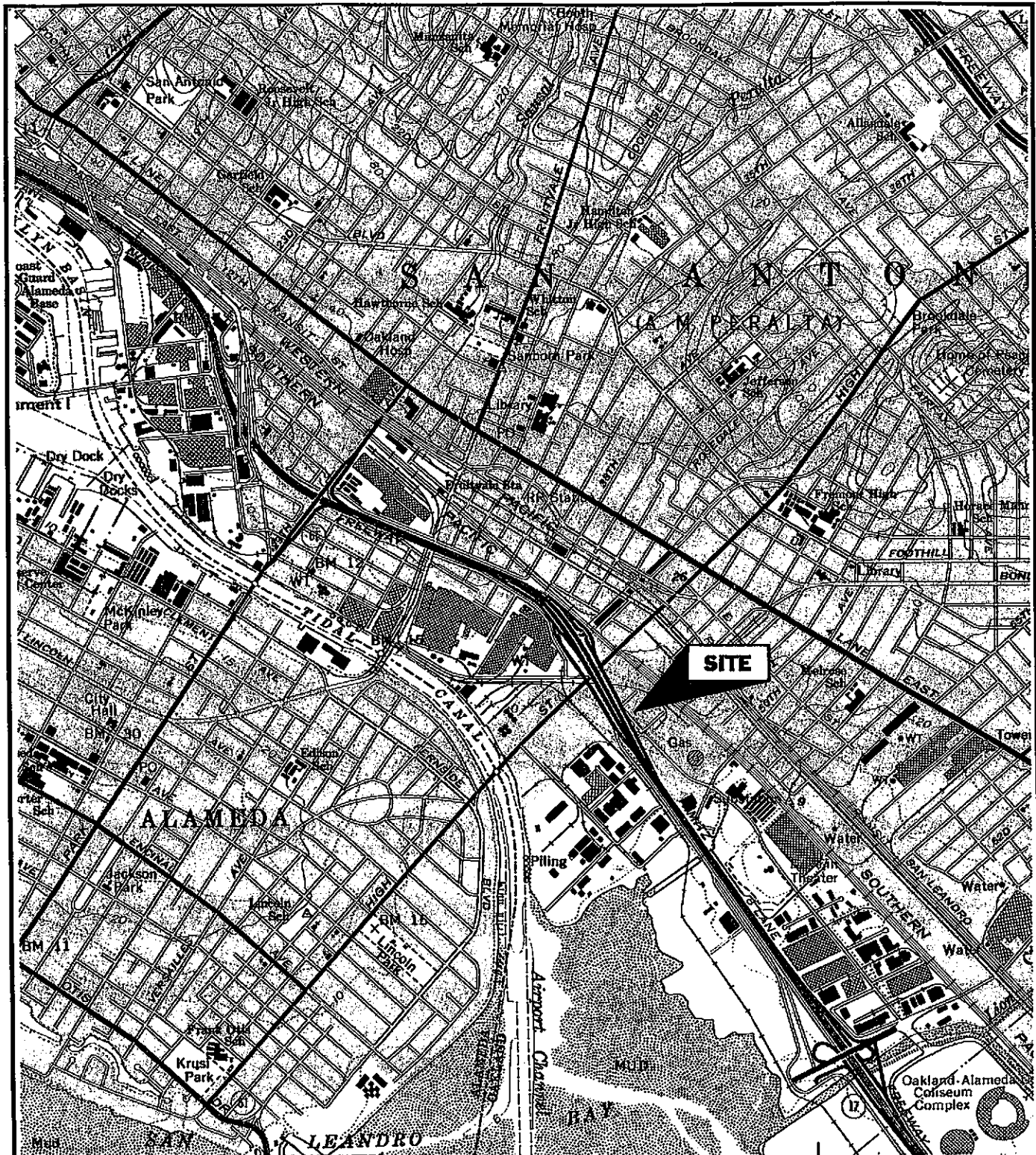
Sample Location	Date Sampled	pH (SU)	Lead Total mg/l	Zinc Total mg/l
SB-4-W	4/2/98	7.5	<0.050	0.68

Notes:

pH analyzed using EPA Method 9045

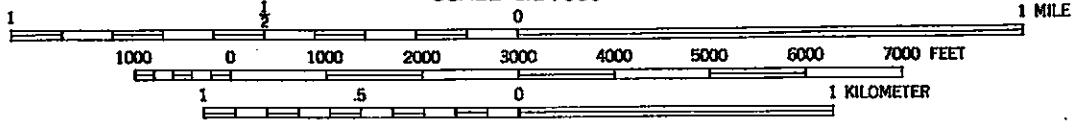
SU = Standard Unit

mg/l = milligrams per liter

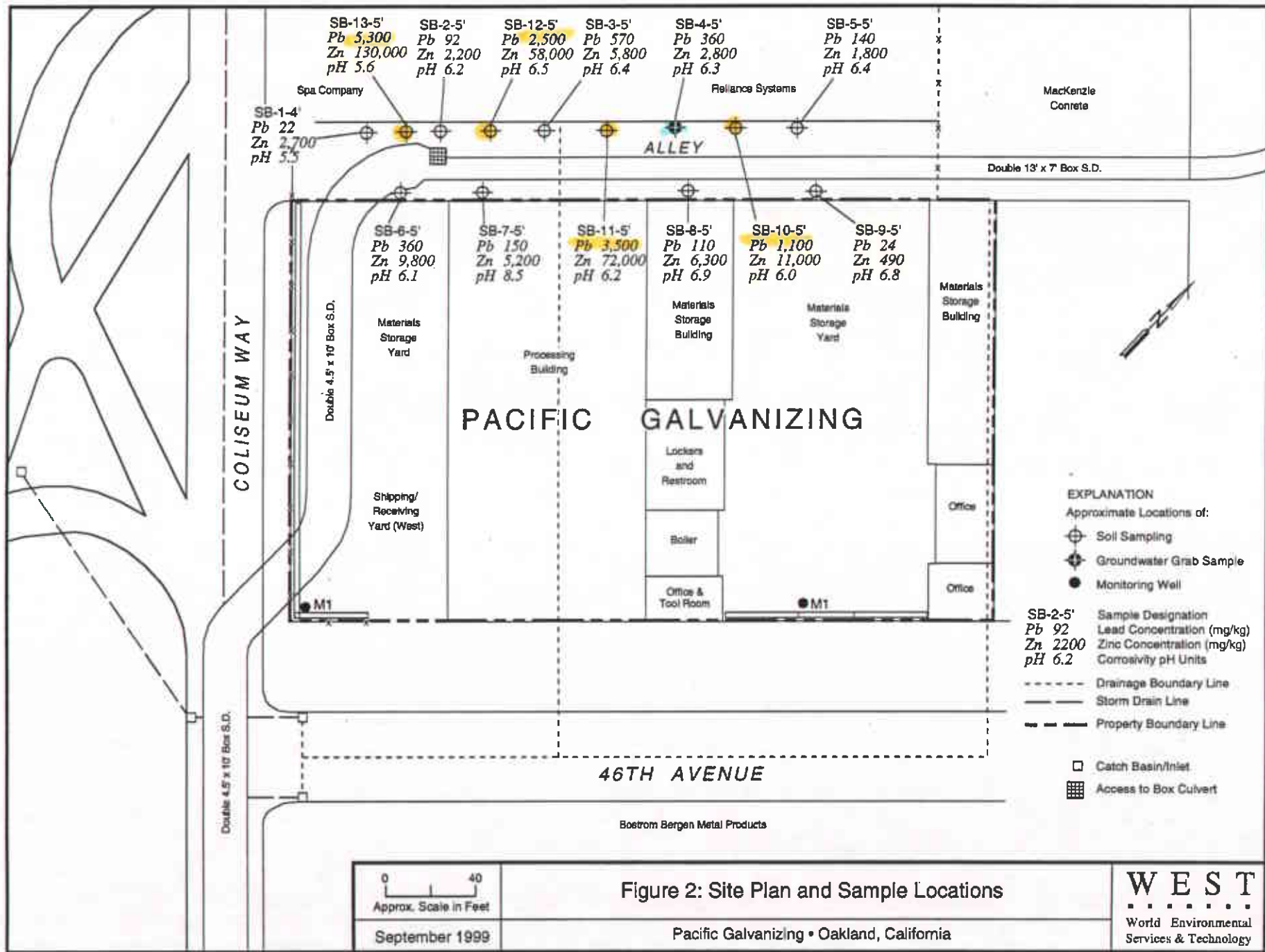


Source: U.S.G.S. East Oakland Quadrangle

SCALE 1:24 000



<p>September 1999</p>	<p>Figure 1: Site Location Map Pacific Galvanizing, Oakland, CA</p>	<p><b>WEST</b> World Environmental Services &amp; Technology</p>
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**APPENDIX A**

***SUBSURFACE DRILLING PERMIT***

03/02/98 SUN 10:14 FAX



# ALAMEDA COUNTY PUBLIC WORKS AGENCY

## WATER RESOURCES SECTION

991 TURNER COURT, SUITE 204, HAYWARD, CA 94545-2651  
PHONE (510) 670-5275 ANDREAS GODFREY FAX (510) 670-5267  
(510) 670-5248 ALVIN KAN

### DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 715 46<sup>th</sup> Ave  
Oakland CA

PERMIT NUMBER 98WR111  
WELL NUMBER \_\_\_\_\_  
APN \_\_\_\_\_

California Coordinates Source \_\_\_\_\_ ft. Accuracy ± \_\_\_\_\_ ft.  
CCN \_\_\_\_\_ ft. GCE \_\_\_\_\_ ft.  
APN 34-2291-4-3

#### PERMIT CONDITIONS

Circled Permit Requirements Apply

CLIENT Name Paete Geologizing  
Address 715 46<sup>th</sup> Ave Phone 510-261-7331  
City Oakland CA Zip \_\_\_\_\_

#### A. GENERAL

1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
2. Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources Water Well Driller Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

APPLICANT Name WEST  
Address 528 W. Alameda Phone 415-460-6771  
City San Rafael Zip 94901

#### B. WATER SUPPLY WELLS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

TYPE OF PROJECT

Well Construction	<input type="checkbox"/>	Geotechnical Investigation	<input type="checkbox"/>
Cathodic Protection	<input type="checkbox"/>	General	<input type="checkbox"/>
Water Supply	<input type="checkbox"/>	Contamination	<input checked="" type="checkbox"/>
Monitoring	<input checked="" type="checkbox"/>	Well Destruction	<input type="checkbox"/>

#### C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

PROPOSED WATER SUPPLY WELL USE

New Domestic	<input type="checkbox"/>	Replacement Domestic	<input type="checkbox"/>
Municipal	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	Other _____	<input type="checkbox"/>

#### D. GEOTECHNICAL

Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with uncompacted material. In areas of known or suspected contamination, grouted cement grout shall be used in place of compacted cuttings.

DRILLING METHOD:

Mud Rotary	<input type="checkbox"/>	Air Rotary	<input type="checkbox"/>	<u>Hand</u>
Cable	<input type="checkbox"/>	Other	<input type="checkbox"/>	<u>Auger</u> <input checked="" type="checkbox"/>

#### E. CATHODIC

Fill hole above anode zone with concrete placed by tremie.

DRILLER'S LICENSE NO. N/A

#### F. WELL DESTRUCTION

See attached.

WELL PROJECTS

Drill Hole Diameter _____ in.	Maximum
Casing Diameter _____ in.	Depth _____ ft.
Surface Seal Depth _____ ft.	Number _____

#### G. SPECIAL CONDITIONS

GEOTECHNICAL PROJECTS

Number of Borings <u>9</u>	Maximum
Hole Diameter <u>1</u> in.	Depth <u>10</u> ft.

ESTIMATED STARTING DATE 3/17/98  
ESTIMATED COMPLETION DATE 2/12/98

APPROVED [Signature] DATE 3/13/98

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-03.

APPLICANT'S SIGNATURE [Signature] DATE 2/27/98

**APPENDIX B**

***LABORATORY CERTIFICATES AND CHAIN OF CUSTODIES***

**SAMPLE ANALYSIS/COMPOSITE REQUEST FORM  
CHAIN-OF-CUSTODY**

Project No.:				Field Logbook No.:		Date: 4/2/98							
Project: Pacific Galvanizing				Project Location:			1	2	3	4	5	6	7
Sampler Signature <i>Ben Wells</i>					Turnaround Time								
					<b>Analyses Required</b>								
Sample ID	Date	Sample Description	Time	Lab ID	No. of Containers	Type	TPHmo, TPHd	TPHg, BTEX	pH	VOCs - 8240	Pb, Zn (total)	Pb, Zn, dissolved	HOLD
SB-1 - 4'	2-Apr	Soil	8040306		1	S			x		x		
SB-2 - 5'	2-Apr	Soil	8040307		1	S			x		x		
SB-3 - 5'	2-Apr	Soil	8040308		1	S			x		x		
SB-4 - 5'	2-Apr	Soil	8040309		1	S			x		x		
SB-5 - 5'	2-Apr	Soil	8040310		1	S			x		x		
SB-6 - 4'	2-Apr	Soil	8040311		1	S			x		x		
SB-7 - 5'	2-Apr	Soil	8040312		1	S			x		x		
SB-8 - 5'	2-Apr	Soil	8040313		1	S			x		x		
SB-9 - 5'	2-Apr	Soil	8040314		1	S			x		x		
<del>SB-2-W</del>	<del>2-Apr</del>	<del>Water</del>			<del>1</del>	<del>L</del>			<del>x</del>		<del>x</del>	<del></del>	<del></del>
<del>SB-4-W</del>	<del>2-Apr</del>	<del>Water</del>			<del>1</del>	<del>L</del>			<del>x</del>		<del>x</del>	<del></del>	<del></del>
<del>SB-7-W</del>	<del>2-Apr</del>	<del>Water</del>			<del>1</del>	<del>L</del>			<del>x</del>		<del>x</del>	<del></del>	<del></del>
SB-10-5'	2-Apr	Soil	8040315		1	S			X		X		
SB-11-5'	↓	↓	8040316		1	S			X		X		
SB-12-5'	↓	↓	8040317		1	S			X		X		
SB-13-5'	↓	↓	8040318		1	S			X		X		
NOTES:													
Call to confirm turn-around time													
<b>WATER SAMPLES TO BE FILTERED PRIOR TO PRESERVATION AND ANALYSIS</b>													
Metals by ICAP													
Relinquished by: (Signature) <i>Ben Wells</i>				Date 4/2/98	Time 2:50	Received by: (Signature) <i>Karl Rothaler</i>				Date 4-2-98 1450			
Relinquished by: (Signature) <i>Karl Rothaler</i>				Date 4/2	Time 1540	Received by: (Signature) <i>C. Fulmer</i>				Date 4/2/98 1540			



9804200

**SAMPLE ANALYSIS/COMPOSITE REQUEST FORM  
CHAIN-OF-CUSTODY**

Project No.:				Field Logbook No.:		Date: 4/2/98							
Project: Pacific Galvanizing				Project Location:		1	2	3	4	5	6	7	
Sampler Signature: <i>Ben Wells</i>				Turnaround Time:								x	
<b>Analyses Required</b>													
Sample ID	Date	Sample Description	Time	Lab ID	No. of Containers	Type	TPHmo, TPHd	TPHg, BTEX	pH	VOCs - 8240	Pb, Zn (total)	Pb, Zn, dissolved	HOLD
SB-4-W	2-Apr	Water	4:40	8040814	1	L			x			x	

**NOTES:**

Call to confirm turn-around time

**WATER SAMPLES TO BE FILTERED PRIOR TO PRESERVATION AND ANALYSIS**

Metals by ICAP

Relinquished by: (Signature) <i>Ben Wells</i>	Date 4/3/98	Time 11:00	Received by: (Signature) <i>Nick Mairano</i>	Date 4/3/98	Time 14:33
Relinquished by: (Signature) <i>Nick Mairano</i>	Date 4/3/98	Time 16:20	Received by: (Signature) <i>Paul Mairano</i>	Date 4/3/98	Time 16:30

**APPENDIX C**

*Analytical Data*



# Sequoia Analytical

680 Chesapeake Drive  
404 N. Wiget Lane  
819 Striker Avenue, Suite 8

Redwood City, CA 94063  
Walnut Creek, CA 94598  
Sacramento, CA 95834

(650) 364-9600  
(510) 988-9600  
(916) 921-9600

FAX (650) 364-9233  
FAX (510) 988-9673  
FAX (916) 921-0100

WEST  
828 Mission Street, 2nd Floor  
San Rafael CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Sample Descript: Solid  
Analysis for: Lead  
First Sample #: 804-0306

Sampled: Apr 2, 1998  
Received: Apr 2, 1998  
Digested: Apr 9, 1998  
Analyzed: Apr 14, 1998  
Reported: Apr 16, 1998

## LABORATORY ANALYSIS FOR: Lead

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg	QC Batch Number	Instrument ID
804-0306	SB-1-4'	10	22	ME0409986010MDA	MV-3
804-0307	SB-2-5'	10	92	ME0409986010MDA	MV-3
804-0308	SB-3-5'	10	570	ME0409986010MDA	MV-3
804-0309	SB-4-5'	10	360	ME0409986010MDA	MV-3
804-0310	SB-5-5'	10	140	ME0409986010MDA	MV-3
804-0311	SB-6-4'	10	360	ME0409986010MDA	MV-3
804-0312	SB-7-5'	10	150	ME0409986010MDA	MV-3
804-0313	SB-8-5'	10	110	ME0409986010MDA	MV-3
804-0314	SB-9-5'	10	24	ME0409986010MDA	MV-3
804-0315	SB-10-5'	10	1,100	ME0409986010MDA	MV-3
804-0316	SB-11-5'	100	3,500	ME0409986010MDA	MV-3

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Please Note:  
\*Revised Report, 4/28/98

  
Alan B. Kemp  
Laboratory Director



# Sequoia Analytical

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WEST  
828 Mission Street, 2nd Floor  
San Rafael CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Sample Descript: Solid  
Analysis for: Lead  
First Sample #: 804-0317

Sampled: Apr 2, 1998  
Received: Apr 2, 1998  
Digested: Apr 9, 1998  
Analyzed: Apr 14, 1998  
Reported: Apr 16, 1998

## LABORATORY ANALYSIS FOR: Lead

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg	QC Batch Number	Instrument ID
804-0317	SB-12-.5'	100	2,500	ME0409986010MDA	MV-3
804-0318	SB-13-.5'	100	5,300	ME0409986010MDA	MV-3

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Please Note:

\*Revised Report, 4/28/98

  
Alan B. Kemp  
Laboratory Director

8040306.WWWW <2>



# Sequoia Analytical

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FAX (916) 921-0100

WEST  
828 Mission Street, 2nd Floor  
San Rafael CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Sample Descript: Solid  
Analysis for: Zinc  
First Sample #: 804-0306

Sampled: Apr 2, 1998  
Received: Apr 2, 1998  
Digested: Apr 9, 1998  
Analyzed: Apr 14, 1998  
Reported: Apr 16, 1998

## LABORATORY ANALYSIS FOR: Zinc

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg	QC Batch Number	Instrument ID
804-0306	SB-1-4'	10	2,700	ME0409986010MDA	MV-3
804-0307	SB-2-5'	10	2,200	ME0409986010MDA	MV-3
804-0308	SB-3-5'	10	5,800	ME0409986010MDA	MV-3
804-0309	SB-4-5'	10	2,800	ME0409986010MDA	MV-3
804-0310	SB-5-5'	10	1,800	ME0409986010MDA	MV-3
804-0311	SB-6-4'	10	9,800	ME0409986010MDA	MV-3
804-0312	SB-7-5'	10	5,200	ME0409986010MDA	MV-3
804-0313	SB-8-5'	10	6,300	ME0409986010MDA	MV-3
804-0314	SB-9-5'	10	490	ME0409986010MDA	MV-3
804-0315	SB-10-5'	10	11,000	ME0409986010MDA	MV-3
804-0316	SB-11-5'	100	72,000	ME0409986010MDA	MV-3

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

  
Alan B. Kemp  
Laboratory Director

Please Note:  
\*Revised Report, 4/28/98



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WEST  
828 Mission Street, 2nd Floor  
San Rafael CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Sample Descript: Solid  
Analysis for: Zinc  
First Sample #: 804-0317


Sampled: Apr 2, 1998  
Received: Apr 2, 1998  
Digested: Apr 9, 1998  
Analyzed: Apr 14, 1998  
Reported: Apr 16, 1998

## LABORATORY ANALYSIS FOR: Zinc

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg	QC Batch Number	Instrument ID
804-0317	SB-12-.5'	100	58,000	ME0409986010MDA	MV-3
804-0318	SB-13-.5'	100	130,000	ME0409986010MDA	MV-3

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

  
Alan B. Kemp  
Laboratory Director

Please Note:  
\*Revised Report, 4/28/98





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FAX (916) 921-0100

WEST  
828 Mission Street, 2nd Floor  
San Rafael CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Sample Descript: Solid  
Analysis for: Corrosivity  
First Sample #: 804-0306

Sampled: Apr 2, 1998  
Received: Apr 2, 1998  
Analyzed: Apr 6, 1998  
Reported: Apr 16, 1998

## LABORATORY ANALYSIS FOR: Corrosivity

Sample Number	Sample Description	Detection Limit pH units	Sample Result pH units	QC Batch Number	Instrument ID
804-0306	SB-1-4'	N/A	5.5	IN0406989045I4A	INPH-1
804-0307	SB-2-5'	N/A	6.2	IN0406989045I4A	INPH-1
804-0308	SB-3-5'	N/A	6.4	IN0406989045I4A	INPH-1
804-0309	SB-4-5'	N/A	6.3	IN0406989045I4A	INPH-1
804-0310	SB-5-5'	N/A	6.4	IN0406989045I4B	INPH-1
804-0311	SB-6-4'	N/A	6.1	IN0406989045I4A	INPH-1
804-0312	SB-7-5'	N/A	8.5	IN0406989045I4A	INPH-1
804-0313	SB-8-5'	N/A	6.9	IN0406989045I4A	INPH-1
804-0314	SB-9-5'	N/A	6.8	IN0406989045I4C	INPH-1
804-0315	SB-10-.5'	N/A	6.0	IN0406989045I4C	INPH-1
804-0316	SB-11-.5'	N/A	6.2	IN0406989045I4C	INPH-1

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

Please Note:  
\*Revised Report, 4/28/98

  
Alan B. Kemp  
Laboratory Director





# Sequoia Analytical

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WEST  
828 Mission Street, 2nd Floor  
San Rafael CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Sample Description: Solid  
Analysis for: Corrosivity  
First Sample #: 804-0317

Sampled: Apr 2, 1998  
Received: Apr 2, 1998  
Analyzed: Apr 6, 1998  
Reported: Apr 16, 1998

## LABORATORY ANALYSIS FOR: Corrosivity

Sample Number	Sample Description	Detection Limit pH units	Sample Result pH units	QC Batch Number	Instrument ID
804-0317	SB-12-.5'	N/A	6.5	IN040698904514C	INPH-1
804-0318	SB-13-.5'	N/A	5.6	IN040698904514B	INPH-1

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #1271

  
Alan B. Kemp  
Laboratory Director

Please Note:  
\*Revised Report, 4/28/98





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West  
828 Mission St. 2nd Floor  
San Rafael, CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Sample Descript: Water, SB-4-W  
Lab Number: 804-0812

Sampled: Apr 2, 1998  
Received: Apr 3, 1998  
Analyzed: Apr 4 - Apr 10, 1998  
Reported: Apr 14, 1998

## LABORATORY ANALYSIS

Analyte	Detection Limit mg/L	Sample Results mg/L	QC Batch Number	Instrument ID
Dissolved Lead.....	0.050	N.D.	32608	ICP
Dissolved Zinc.....	0.10	0.68	32608	ICP
pH (pH units).....	N/A	7.5	32517	Manual

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL, #2245

*Melissa A Brewer*

Alan B. Kemp  
Laboratory Director





# Sequoia Analytical

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FAX (916) 921-0100

West  
828 Mission St. 2nd Floor  
San Rafael, CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Matrix: Liquid

QC Sample Group: 8040812

Reported: Apr 14, 1998

## QUALITY CONTROL DATA REPORT

<b>Analyte:</b>	Dissolved Lead	Dissolved Zinc
<b>QC Batch#:</b>	32608	32608
<b>Analy. Method:</b>	EPA 6010	EPA 6010
<b>Prep. Method:</b>	EPA 3010	EPA 3010
<b>Analyst:</b>	MDE	MDE
<b>MS/MSD #:</b>	8040812	8040812
<b>Sample Conc.:</b>	N.D.	680 µg/L
<b>Prepared Date:</b>	4/9/98	4/9/98
<b>Analyzed Date:</b>	4/10/98	4/10/98
<b>Instrument I.D.#:</b>	ICP	ICP
<b>Conc. Spiked:</b>	500 µg/L	500 µg/L
<b>Result:</b>	510	1,100
<b>MS % Recovery:</b>	100	88
<b>Dup. Result:</b>	430	940
<b>MSD % Recov.:</b>	86	53
<b>RPD:</b>	16	50
<b>RPD Limit:</b>	0-20	0-20

<b>LCS #:</b>	LCS041098	LCS041098
<b>Prepared Date:</b>	4/9/98	4/9/98
<b>Analyzed Date:</b>	4/10/98	4/10/98
<b>Instrument I.D.#:</b>	ICP	ICP
<b>Conc. Spiked:</b>	500 µg/L	500 µg/L
<b>LCS Result:</b>	520	530
<b>LCS % Recov.:</b>	105	107

<b>MS/MSD</b>		
<b>LCS</b>	80-120	80-120
<b>Control Limits</b>		

**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.

\*\* MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SEQUOIA ANALYTICAL, #2245

*Melissa Brewer*

Alan B. Kemp  
Laboratory Director





West  
828 Mission St. 2nd Floor  
San Rafael, CA 94901  
Attention: Ben Wells

Client Project ID: Pacific Galvanizing  
Matrix: Liquid

QC Sample Group: 8040812

Reported: Apr 14, 1998

### QUALITY CONTROL DATA REPORT

Analyte: pH

QC Batch#: 32517

Analy. Method: EPA 150.1

Prep. Method: EPA 150.1

Analyst: GLG

Duplicate  
Sample #: 70137043

Prepared Date: 4/4/98

Analyzed Date: 4/4/98

Instrument I.D.#: Manual

Sample  
Concentration: 6.9 pH units

Dup. Sample  
Concentration: 6.9 pH units

RPD: 0.0

RPD Limit: 0-30

SEQUOIA ANALYTICAL, #2245

*Melissa A. Brewer*

Alan B. Kemp  
Laboratory Director

\*\* RPD=Relative % Difference

