

Woodward-Clyde Consultants

1227 Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

June 8, 1990
8910116A

Harsch Investment Corporation
235 West MacArthur Boulevard
Oakland, California 94616

Subject: Soil Sampling at the Former Dry Cleaners,
Park Street and Shoreline Drive
Alameda, California

Attention: Herman Engbers

Dear Mr. Engbers:

The following report presents a description of the soil sampling and laboratory testing services in the vicinity of the former dry cleaners at the South Shore Shopping Center, Park Street and Shoreline Drive, Alameda, California. The purpose of this testing is to characterize the presence of tetrachloroethylene/1,1,2,2-tetrachloroethane (PCE/1,1,2,2-PCA) in the soil at the site. This report also describes two options for remediation of contaminated soil at the former dry cleaners.

Background Information

As described in the report entitled "Emergency Soil Remediation and Recommendations for Disposal of Soil Contaminated with Dry Cleaning Fluid," dated February 1, 1990, WCC was contracted to perform an emergency remediation of a release of 10 to 50 gallons of dry cleaning fluid from the former above ground dry cleaning fluid storage tanks in November, 1989. Soils were excavated from the area and stockpiled on the former Texaco Station site on November 22, 1989. Soil samples were collected at the perimeter side walls of the excavation and tested for halogenated volatile organic compounds (VOCs) (EPA Method 8010). The laboratory analysis indicated that soil samples contained 280,000 parts per billion (ppb) PCE/1,1,2,2-PCA in the south corner of the excavation. In December, 1989 secondary excavation was continued in the south corner of the excavation, until no organic vapors were detectible, using a portable organic vapor analyzer (OVA). The soil removed in the secondary excavation was stockpiled with the original soil at the former Texaco Station. That soil was aerated to reduce the PCE/1,1,2,2-PCA concentrations to levels that will allow the aerated soil to be disposed of at a Class III Landfill.

1985
Guidelines
- 170 ppb
TCE

Soil Borings and Sampling at the Former Soil Excavation

Soil borings were drilled on April 19, 1990 by Kvilhaug, Inc. of Concord, California at six locations around the former soil excavation at the former dry cleaning building, as shown in Figure 1. The borings extended to a

PLTF/QEFT Exhibit 9
WIT: DENNIS BYRNE
DATE 11/22/91 ERB
ELYSE R. GARDNER, CSR

Consulting Engineers, Geologists
and Environmental Scientists

Offices in Other Principal Cities



Mr. Herman Engbers
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maximum depth of 6-1/2 feet below grade. A log of each boring was prepared by a WCC engineer and is attached. The logs contain descriptions of the materials encountered in each boring and field measurements of organic vapors using an organic vapor analyser (OVA). The field procedure involves placing the soil sample in a plastic bag allowing the bag to remain in a warm area for about 15 minutes, and measuring the organic vapors in the air space with the OVA.

The borings were drilled with 8-inch diameter, continuous flight, hollow stem augers, powered by a truck mounted drill rig. Two soil samples, at approximately 3-1/2 feet and 5-1/2 feet below grade, were obtained from each boring. Samples were recovered with a 2-inch diameter modified California drive sampler lined with 4, 2-inch diameter, 3-inch long brass tubes. Sample ends were sealed with Teflon sheets, plastic caps, and tape. The brass tubes were cleaned using an Alconox wash and tap water rinse, and then were air dried before sampling each location.

The samples were transported to Superior Analytical Laboratory, Inc. in an ice chest, using Chain-of-Custody procedures. Selected soil samples were submitted to the analytical laboratory for chemical testing. Samples not selected for chemical analyses were held by the laboratory pending analytical results and proper disposal. Soil cuttings of each boring were placed in 55-gallon drums and stored on site pending laboratory analytical results for proper disposal.

Chemical Laboratory Analysis

The laboratory analytical results are summarized in Table 1 and the reports are attached. Each of the soil samples taken at approximately 4 feet below grade were tested for halogenated VOCs (EPA Method 8010). Soil samples were analyzed for potential contaminants based on field observations, site history, and regulatory requirements, including Alameda County guidelines.

Results and Discussion

The type of fill material encountered in each of the six borings consists of mostly fine grained sands with some silt and occasionally some shell fragments to approximately 6-1/2 feet below grade. Groundwater was encountered at approximately six feet below grade.

The laboratory results indicate that PCE/1,1,2,2-PCA was detected in all of the soil samples analyzed. Samples B-1-5, B-2-4.5, B-3-4, B-4-4, B-5-4, and B-6-4 contain 1100, 340, 18, 290, 62, 9.8 $\mu\text{g}/\text{kg}$ (or ppb, parts per billion), respectively. Although the California Regional Water Quality Control Board (CRWQCB) has guidelines for soils contaminated with petroleum products, at this time there is no guideline for PCE/1,1,2,2-PCA in soils. Cases are considered on an individual basis. However, criteria exists for allowable concentrations of PCE/1,1,2,2-PCA in drinking water and marine waters. The California Department of Health Services (DHS) Maximum Contaminant Level (MCL) in drinking water is 4.0 ppb PCE. The San

Francisco Bay Area Plan, EPA acute toxicity concentration of 1,1,2,2-PCA in marine waters is 10.2 ppm and EPA acute and chronic toxicity concentrations of PCE in marine waters are 9.02 ppm and 450 ppb, respectively.

Given the shallow depth to groundwater and the sand fill, the remaining soil in the area of the former excavation contaminated with PCE/1,1,2,2-PCA is a potential source for leaching into the groundwater. It is our opinion that the potential for this environmental impact on the groundwater at the former dry cleaners site is significant.

As explained in a WCC letter entitled "Options for Use of Aerated Soil From Cleaners Site, Southshore Shopping Center, Alameda, California," Lester Feldman, of the Toxics Division of the CRWQCB, has indicated that a soil and groundwater characterization investigation is required to evaluate the potential past and future impacts of this contaminated soil on the groundwater. The following recommendations are discussed for the remediation of the soil contamination near the former dry cleaning building at the subject site.

Recommendations

We recommend the following options be considered for remediation of the soil in and around the former dry cleaning excavation:

- OPTION A - Soil is excavated within about 15 feet laterally of the former excavation and aerated on site to reduce concentrations of PCE to allowable levels for disposal. Imported engineered fill would replace the soil removed in the excavation. Laboratory analytical testing is performed to verify the remaining concentration of PCE in the excavated soil. Soil is transported to a Class III Landfill by truck. We estimate that the soil could be aerated within a month of excavation and subsequently transported to the landfill. We estimate the cost to be approximately \$26,000.
- OPTION B - Subsurface piping for a vapor extraction system (VES) is installed in the area of the former excavation. A permanent VES is installed, operated and samples are taken. The samples collected during operations are analyzed for halogenated VOCs. We estimate the cost of Option B to be approximately \$30,000. This cost does not include the construction permitting or operations costs beyond one month, but does include the acquisition of Air Quality Control Board permits.

Factors which should be considered in selection of options for remediation include; time for completion, disruption of planned construction, and costs. Option A would be completed in about one month while Option B might require several months to reach completion. Option A would have a potentially greater impact on planned construction, while Option B would have less impact. The estimated costs for both options are approximately the same, however, there may be some uncertainty about the end-date for vapor extraction and operations costs might increase.

Paving
ASPHALT

JUN

8:34

P. 05

Mr. Herman Engbers
Harsch Investment Corporation
June 8, 1990
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Futhermore, WCC recommends continued groundwater characterization at the former dry cleaning site per CRWQCB Toxic Division requirements.

Limitations

The scope of this project is limited by time constraints, expense and practicality. A limited number of soil samples and no groundwater samples were taken at locations at the site and a limited number of laboratory analyses were performed on those soil samples. Professional opinions concerning the presence of hazardous substances in the soils in the areas of concern were developed based on the resulting data. It would be prohibitively expensive and time consuming to sample all locations at the site and analyze all the samples for all substances which are now, or in the future might be, considered hazardous. Therefore, WCC cannot be held responsible should the investigation fail to detect the presence or quantity of all hazardous substances at all locations of the site.

We appreciate this opportunity to provide continuing professional environmental engineering services to Harsch Investments, Inc. If you would like to further discuss the options described above or if you have any questions please feel free to call the undersigned.

Sincerely,

WOODWARD-CLYDE CONSULTANTS



Lois Gruenberg
Staff Engineer



Albert P. Ridley, C.E.G.
Senior Associate

LG/APR:tt
8910116A/COT

Attachments:

- Table 1 Soil Samples - Laboratory Analytical Results
- Figure 1
- Appendix A - Soil Boring Logs
- Appendix B - Chemical Analytical Laboratory Reports

Table 1. SOIL SAMPLES - LABORATORY ANALYTICAL RESULTS

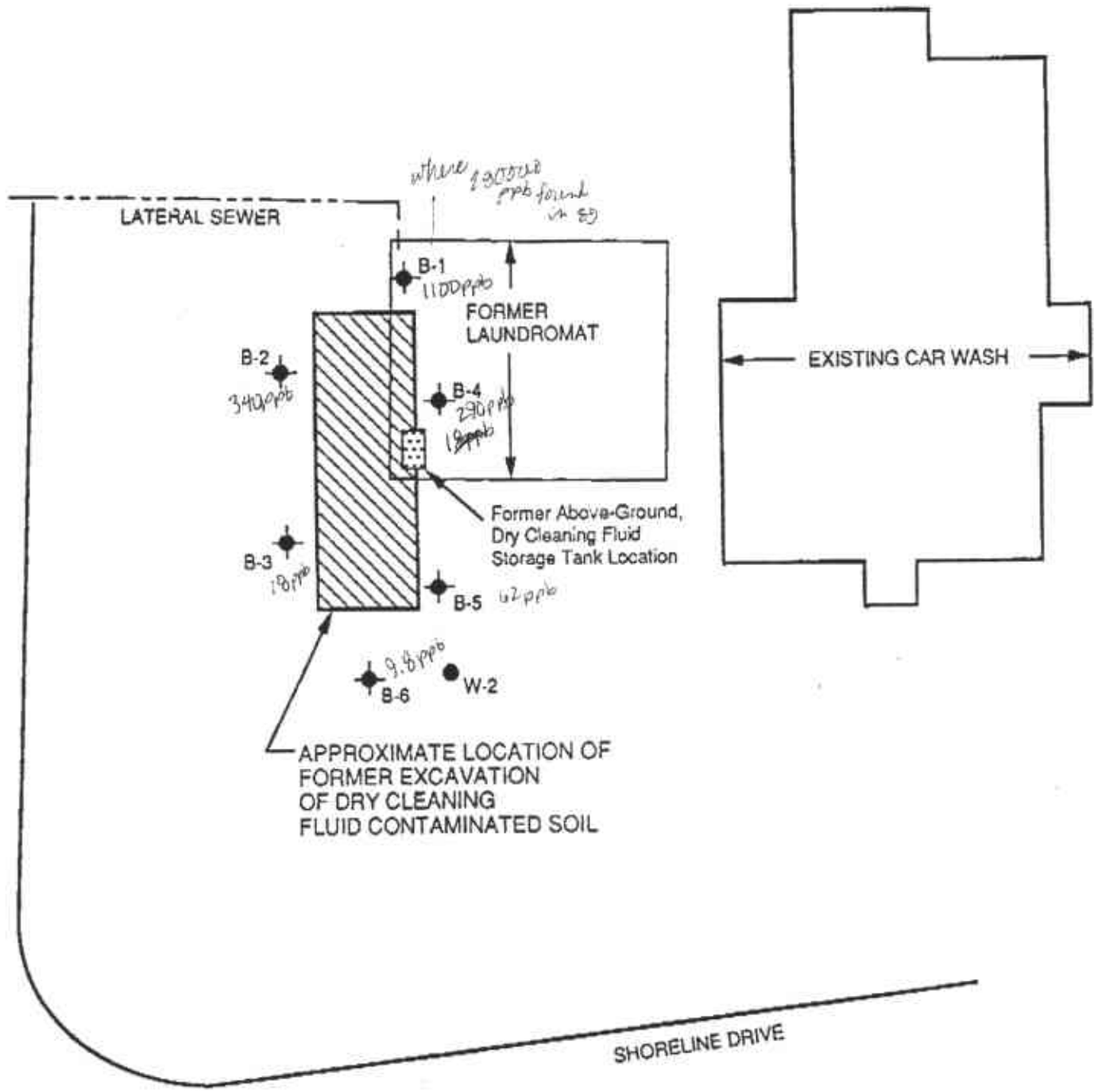
8910116A - Harsh Investments, Former Dry Cleaners Excavation, Southshore Shopping Center, Alameda, California

PARAMETER	UNITS	Sample Event						Detection Limits
		April 19, 1990						
		B-1-5	B-2-4.5	B-3-4	B-4-4	B-5-4	B-6-4	
Halogenated Volatile Organics (EPA Method 8010) (a) tetrachloroethylene/1,1,2,2-tetrachloroethane	µg/kg	1100	340	18	290	62	9.8	5



(a) Only those parameters that were found above the detection limits are listed. All other parameters tested and their corresponding detection limits are listed in the laboratory reports in the attachment.

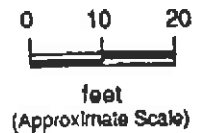
JUN 1990

P. 06 012: # 6



LEGEND

- B-1  Approximate Boring Locations
- W-2  Approximate Groundwater Monitoring Well Location



Project No. 8910116A	Harsh Investments, Inc.	FORMER EXCAVATION AND BORING LOCATION PLAN	June 1990
Woodward Clyde Consultants			Figure 1



KAMUR INDUSTRIES INC.

2351 Shoreline Dr., Alameda, CA 94501 74155-523-7966

89 DEC 19 PM 2:59

December 15, 1989

Mr. Ariu Levi
Alameda County Health Care Services
Department of Environmental Health
Hazardous Materials Program
80 Swan Way; Room 200
Oakland, CA 94621

Re: South Shore Car Wash
2351 Shoreline Drive
Alameda, CA 94501

Dear Mr. Levi:

We are in the process of building a replacement facility for the subject location. Although we are not putting gasoline facilities in the new site, our current operation does offer motor fuels and there are three (3) 10,000 gallon underground tanks being used. Based on the completion date of our new building, we anticipate that the current tanks will be void of product on or before June 15th, with removal by July 31, 1989.

The annual petrotite testing is currently due on these tanks. With the shut down of this facility and the scheduled tank removals, we would like a variance on performing this annual check. Comprehensive daily inventory balances indicate no problems with any of the product systems.

On Wednesday, December 13, I called your Department and was referred to a Mr. Ed Howell. He indicated that the pressure tests could be waived based on the circumstances. At his suggestion, this letter is to confirm my conversation with him. Please contact me if I can supply you with any further information.

Sincerely,

Murray T. Stevens

MTS:khs

x1

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I • SAN FRANCISCO CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

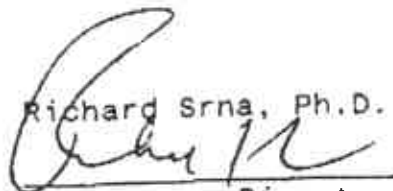
LABORATORY NO.: 51948-2
 CLIENT: Woodward-clyde
 Consultantas
 JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
 DATE RECEIVED: 4/18/90
 DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
 HALOGENATED VOLATILE ORGANICS
 SAMPLE: B-1-5

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	1100
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit
 ug/kg = parts per billion (ppb)
 QA/QC Summary: Daily Standard RPD = <15%
 MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%

Richard Srna, Ph.D.

 Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 51948-4
 CLIENT: Woodward-clyde
 Consultantas
 JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
 DATE RECEIVED: 4/18/90
 DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
 HALOGENATED VOLATILE ORGANICS
 SAMPLE: B-2-4.5

<u>Compound</u>	<u>MDL (ug/kg)</u>	<u>RESULTS (ug/kg)</u>
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	340
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit

ug/kg = parts per billion (ppb)

QA/QC Summary: Daily Standard RPD = <15%

MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%

Richard Srna, Ph.D.
 Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-6
CLIENT: Woodward-clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-3-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	NC
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		18
1,1,2,2-Tetrachloroethane	5.0	ND
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit

ug/kg = parts per billion (ppb)

QA/QC Summary: Daily Standard RPD = <15%

MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%

Richard Srna, Ph.D.

Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I • SAN FRANCISCO CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

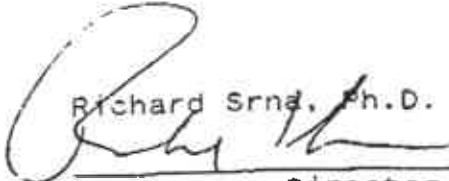
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CLIENT: Woodward-clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/13/90
DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-4-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	290
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%


Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

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C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 51948-10
CLIENT: Woodward-clyde
Consultantes
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/25/90

EPA SW-546 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-5-4

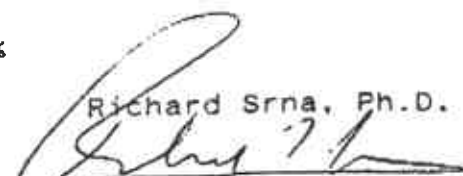
<u>Compound</u>	<u>MDL (ug/kg)</u>	<u>RESULTS (ug/kg)</u>
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	62
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit

ug/kg = parts per billion (ppb)

QA/QC Summary: Daily Standard RPD = <15%

MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%


Richard Srna, Ph.D.
Laboratory Director

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CERTIFICATE OF ANALYSIS

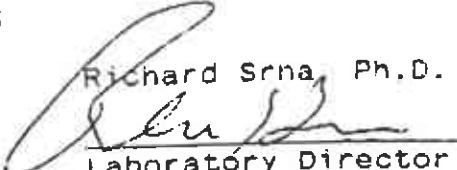
LABORATORY NO.: 51948-12
CLIENT: Woodward-Clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/26/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-6-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	9.8
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%

Richard Srna, Ph.D.

Laboratory Director

Woodward-Clyde Consultants	8910116A Harsch - Alameda	LOG OF BORING B-1
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LOCATION South Shore Center, Shoreline Drive and Park Street		ELEVATION AND DATUM	
AGENCY Kvilhaug Drilling and Pump	DRILLER Mike/Joel	DATE STARTED 4/18/90	
EQUIPMENT Mobil Drill B-53		DATE COMPLETED 4/18/90	
METHOD 8"-diam Hollow Stem Auger	DRILL BIT	COMPLETION DEPTH	
CASING		SAMPLERS Modified California 2-in.-diam.	
PERFORATIONS		NO. OF SAMPLES	DIST.
PACK		WATER LEVEL	ATD 5'
TYPE OF SEALS	FROM TO	LOGGED BY	
Cement grout	FROM 0' TO 6-1/2'	Lois Gruenberg	
		CHECKED BY	
		Al Ridley	

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc)	
	Unpaved surface, silty sand.							
5	SAND (SP) - brown - fine grained - some silt - medium dense - moist to saturated		5	7 9 13	12 14 16		B-1-2 0 ppm OVA B-1-5 0 ppm OVA	
10								Boring terminated at approx. 6-1/2' below the ground surface.
15								
20								
25								

Woodward-Clyde Consultants	8910116A Harsch - Alameda	LOG OF BORING B-2
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LOCATION South Shore Center, Shoreline Drive and Park Street		ELEVATION AND DATUM	
AGENCY Kvilhaug Drilling and Pump	DRILLER Mike/Joel	DATE STARTED 4/18/90	
EQUIPMENT Mobil Drill B-53		DATE COMPLETED 4/18/90	
METHOD 8"-diam Hollow Stem Auger	DRILL BIT	COMPLETION DEPTH	
CASING		SAMPLERS Modified California 2-in.-diam.	
PERFORATIONS		FROM	TO
PACK		NO. OF SAMPLES	DIST. 2
TYPE OF SEALS		FROM	TO
Cement grout		WATER LEVEL	ATD 5' COMPL 24 HR
LOGGED BY		CHECKED BY	
Lois Gruenberg		Al Ridley	
FROM 0'		TO 6'	

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS <small>(Strength, moisture content, etc.)</small>
5	Unpaved surface, silty sand. SAND (SP) - brown - fine grained - some silt - medium dense to dense - moist to saturated		5	11 18 20 12 12 14			B-2-2 1 ppm OVA B-2-4.5 1.5 ppm OVA
10			10				Boring terminated at 6' below the ground surface.
15			15				
20			20				
25			25				

Woodward-Clyde Consultants	8910116A Harsch - Alameda	LOG OF BORING B-3
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LOCATION South Shore Center, Shoreline Drive and Park Street			ELEVATION AND DATUM		
AGENCY Kvilhaug Drilling and Pump		DRILLER Mike/Joel	DATE STARTED 4/18/90		
EQUIPMENT Mobil Drill B-53			DATE COMPLETED 4/18/90		
METHOD 8"-diam Hollow Stem Auger		DRILL BIT	COMPLETION DEPTH		
CASING			SAMPLERS Modified California 2-in.-diam.		
PERFORATIONS		FROM TO	NO. OF SAMPLES	DIST.	UNDIST. 2
PACK		FROM TO	WATER LEVEL	ATD 5'	COMPL 24 HR
TYPE OF SEALS		FROM TO	LOGGED BY		CHECKED BY
Cement grout		FROM 0' TO 5-1/2'	Lois Gruenberg		Al Ridley

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
5	Unpaved surface, sand. SAND (SP) - brown - fine grained - some silt, some shells - medium dense - moist to saturated		5		9 13 17 9 11 17		B-3-2 1.5 ppm OVA B-3-4 5.4 ppm OVA
10			10				Boring terminated at 5-1/2' below the ground surface.
15			15				
20			20				
25			25				

Woodward-Clyde Consultants	8910116A Harsch - Alameda	LOG OF BORING B-4
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LOCATION South Shore Center, Shoreline Drive and Park Street		ELEVATION AND DATUM	
AGENCY Kvilhaug Drilling and Pump	DRILLER Mike/Joel	DATE STARTED 4/18/90	
EQUIPMENT Mobil Drill B-53		DATE COMPLETED 4/18/90	
METHOD 8"-diam Hollow Stem Auger	DRILL BIT	COMPLETION DEPTH	
CASING		SAMPLERS Modified California 2-in.-diam.	
PERFORATIONS	FROM TO	NO. OF SAMPLES	DIST. UNDIST. 2
PACK	FROM TO	WATER LEVEL	ATD 5' COMPL 24 HR
TYPE OF SEALS	FROM TO	LOGGED BY CHECKED BY	
Cement grout	FROM 0' TO 5-1/2'	Lois Gruenberg Al Ridley	

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS <small>(Strength, moisture content, etc.)</small>
5	Unpaved surface, silty sand. SAND (SP) - brown - fine grained - some silt, some shells - medium dense to dense - moist to saturated		5	 9 15 18 10 11 17	 9 15 18 10 11 17	 9 15 18 10 11 17	B-4-2 <1 ppm OVA B-4-4 2.5 ppm OVA
10			10				Boring terminated at 5-1/2' below the ground surface.
15			15				
20			20				
25			25				

Woodward-Clyde Consultants	8910116A Harsch - Alameda	LOG OF BORING B-5
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LOCATION South Shore Center, Shoreline Drive and Park Street		ELEVATION AND DATUM	
AGENCY Kvilhaug Drilling and Pump	DRILLER Mike/Joel	DATE STARTED 4/18/90	
EQUIPMENT Mobil Drill B-53		DATE COMPLETED 4/18/90	
METHOD 8"-diam Hollow Stem Auger	DRILL BIT	COMPLETION DEPTH	
CASING		SAMPLERS Modified California 2-in.-diam.	
PERFORATIONS	FROM TO	NO. OF SAMPLES	DIST. UNDIST. 2
PACK	FROM TO	WATER LEVEL	ATD 5' COMPL 24 HR
TYPE OF SEALS	FROM TO	LOGGED BY	
Cement grout	FROM 0' TO 5-1/2'	Lois Gruenberg	
		CHECKED BY Al Ridley	

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS (Strength, moisture content, etc.)
	Unpaved surface, silty sand.						
5	SAND (SP) - brown - fine grained - some silt, some shells - medium dense to very dense - moist to saturated		5		11 19 27 18 25 29		B-5-2 0 ppm OVA B-5-4 2 ppm OVA
10			10				Boring terminated at 5-1/2' below the ground surface.
15			15				
20			20				
25			25				
25			25				

Woodward-Clyde Consultants	8910116A Harsch - Alameda	LOG OF BORING B-6
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LOCATION South Shore Center, Shoreline Drive and Park Street		ELEVATION AND DATUM	
AGENCY Kvithaug Drilling and Pump	DRILLER Mike/Joel	DATE STARTED 4/18/90	
EQUIPMENT Mobil Drill B-53		DATE COMPLETED 4/18/90	
METHOD 8"-diam Hollow Stem Auger	DRILL BIT	COMPLETION DEPTH	
CASING		SAMPLERS Modified California 2-in.-diam.	
PERFORATIONS	FROM TO	NO. OF SAMPLES	DIST. UNDIST. 2
PACK	FROM TO	WATER LEVEL	ATD 5' COMPL 24 HR
TYPE OF SEALS	FROM TO	LOGGED BY	
Cement grout	FROM 0' TO 5-1/2'	Lois Gruenberg	
		CHECKED BY Al Ridley	

DEPTH (FT)	DESCRIPTION	PIEZOMETER INSTALLTION	DEPTH (FT)	SAMPLES	Blow Counts	Recovery	REMARKS <small>(Strength, moisture content, etc.)</small>
5	Unpaved surface, silty sand. SAND (SP) - brown - fine to medium grained - some silt, some shells - dense - moist to saturated		5	X	13		B-6-2 <0.5 ppm OVA B-6-4 0.5 ppm OVA
				X	21		
				X	21		
				X	16		
				X	21		
X	15						
5							Boring terminated at 5-1/2' below the ground surface.
10							
15							
20							
25							

Woodward-Clyde Consultants

APPENDIX B
CHEMICAL ANALYTICAL LABORATORY REPORTS

x1

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BUREAU UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

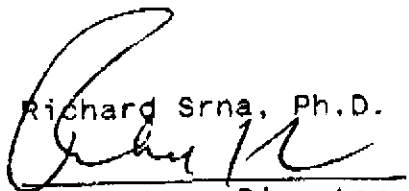
LABORATORY NO.: 51948-2
CLIENT: Woodward-clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-1-5

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	1100
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%


Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

C E R T I F I C A T E O F A N A L Y S I S

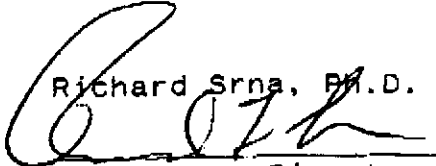
LABORATORY NO.: 51948-4
 CLIENT: Woodward-clyde
 Consultantas
 JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
 DATE RECEIVED: 4/18/90
 DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
 HALOGENATED VOLATILE ORGANICS
 SAMPLE: B-2-4.5

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	340
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit
 ug/kg = parts per billion (ppb)
 QA/QC Summary: Daily Standard RPD = <15%
 MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%


 Richard Srna, Ph.D.
 Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I · SAN FRANCISCO CA 94124 · PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-6
CLIENT: Woodward-clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-3-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	18
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit

ug/kg = parts per billion (ppb)

QA/QC Summary: Daily Standard RPD = <15%

MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%

Richard Srna, Ph.D.

Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I - SAN FRANCISCO CA 94124 - PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

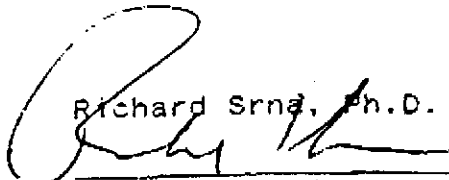
LABORATORY NO.: 51948-8
CLIENT: Woodward-clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-4-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	290
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%


Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-10
CLIENT: Woodward-clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/25/90

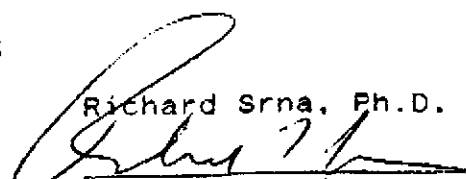
EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-5-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	62
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit
ug/kg = parts per billion (ppb)

QA/QC Summary: Daily Standard RPD = <15%

MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%


Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.

1555 BURKE UNIT I • SAN FRANCISCO CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-12
CLIENT: Woodward-clyde
Consultantas
JOB NO.: 8910116A8300

DATE SAMPLED: 4/19/90
DATE RECEIVED: 4/18/90
DATE ANALYZED: 4/26/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: B-6-4

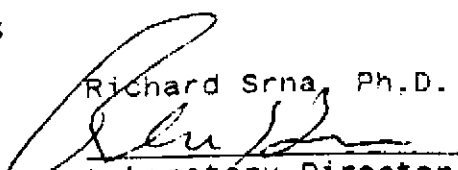
Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND
1,1-Dichloroethene	2.0	ND
1,1-Dichloroethane	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	9.8
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	ND

MDL = Method Detection Limit

ug/kg = parts per billion (ppb)

QA/QC Summary: Daily Standard RPD = <15%

MS/MSD average recovery = 87% : MS/MSD RPD = < 3.6%


Richard Srna, Ph.D.
Laboratory Director

FROM MTZ SA# 51948

Woodward-Clyde Consultants
500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO.
8910116A-8300

SAMPLERS (Signature)
Lois Greenberg

ANALYSES					Number of Containers
General Metals SO11	Priority Pollutant Metals	EPA Method 624	EPA Method 625	EPA Method 606	
				EPA 8010	

REMARKS
(Sample preservation, handling procedures, etc.)

DATE	TIME	SAMPLE NUMBER	General Metals SO11	Priority Pollutant Metals	EPA Method 624	EPA Method 625	EPA Method 606	Number of Containers
4/19		B-1-2	X				HOLD	1
1990		B-1-5					X	1
		B-2-2					HOLD	1
		B-2-4.5					X	1
		B-3-2					HOLD	1
		B-3-4					X	1
		B-4-2					HOLD	1
		B-4-4					X	1
		B-5-2					#	3
		B-5-2					HOLD	1
		B-5-4					X	1
		B-6-2					HOLD	1
		B-6-4	V				X	1

To:
Superior
Analytical

TOTAL NUMBER OF CONTAINERS
12

RELINQUISHED BY: (Signature) <i>Lois Greenberg</i>	DATE/TIME 4/19 3P. 1990	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature) <i>N. Feltz</i>	RECEIVED FOR LAB BY: (Signature) <i>M. Goldenberg</i>	DATE/TIME 4/16 1545	