Woodward-Clyde Consultants



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 tetrachioroethylene/1,1,2,2-tetrachioroethane (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 TCE 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.

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

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ELYSE R. BARDNER, CSR



Herman Engbers Harsch Investment Corporation June 8, 1990 Page 2

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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 μ g/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

Mr. Herman Engbers Harsch Investment Corporation June 8, 1990 Page 3

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.

Harsch Investment Corporation June 8, 1990 Page 4

Woodward-Clyde Consultants

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

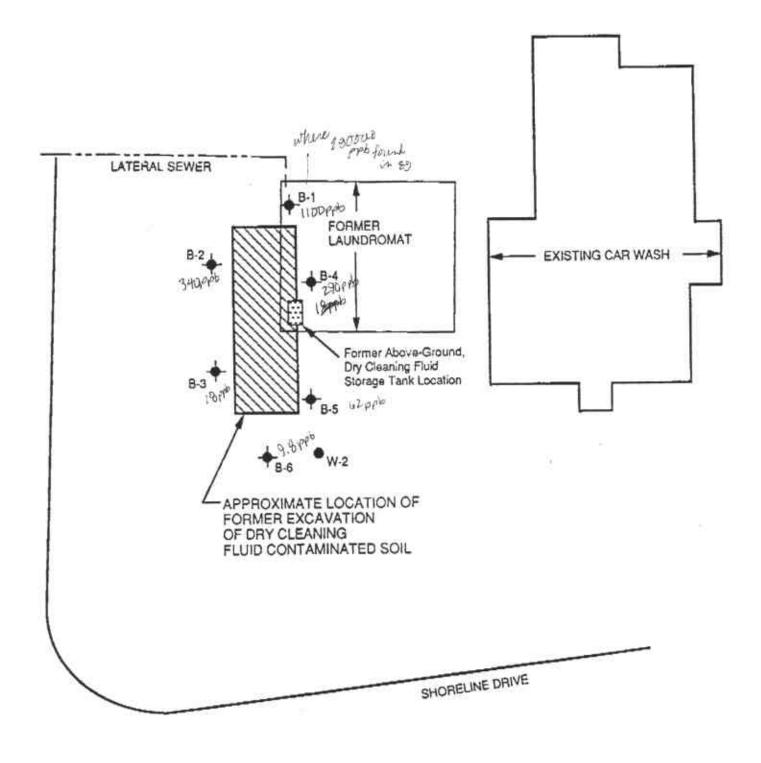
Table 1. SOIL SAMPLES - LABORATORY ANALYTICAL RESULTS

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

910116A - Harsh Invesments, Former Dry Cleaners Excavalin			Sa	ample Eve	nt			Detection
PARAMETER	UNITS	A	pril 19, 19	990				Limits
13, 23, 23, 21, 21, 21, 21, 21, 21, 21, 21, 21, 21		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.

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LEGEND

B-1 - Approximate Boring Locations

W-2 Approximate Groundwater Monitoring Well Location



			June 1990
Project No. 8910116A	Harsh Investments, Inc.	FORMER EXCAVATION AND BORING LOCATION PLAN	Figure 1
11/a a abasa	and Clude Concultants) coomon z ::	



KAMUR INDUSTRIES INC.

2351 Shoreline Dr. Alameda, CA 94501 89 JEC 23 7966 PH 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

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-2 CLIENT: Woodward-clyde

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

Consultantas

DATE ANALYZED: 4/25/90

JOB NO.: 8910116A8300

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

Compound	MDL (ug/kg)	RESULTS (ug/kg)
		ND
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	
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
Cis-1,3-01cition optobers	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Dibromochloromethane	10.0	ND
2-Chloroethylvinyl ether	5.0	NÐ
8romoform	4. 6	
Tetrachloroethene /	5.0	1100
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		ND
1,1,2-Trichlorotrifluoroethan	9 5.0	
MDL = Method Detection Limit	6)	
ug/kg = parts per billion (pp	d 200 = (15%	
QA/QC Summary: Daily Standar	: MS/MSD RPD :	:< 3,6%

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

Director

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

CERTIFICATE OF ANALYSIS

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

340

ND

ND

ND

ND

ND

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

RESULTS (ug/kg) MDL (ug/kg) Compound ND 5.0 Chloromethane ND 5.0 Bromomethane ND 10.0 Vinyl chloride ND 5.0 Dichloredifluoromethane ND 5.0 Chloroethane NĎ 10.0 Methylene chloride NĎ 5.0 Trichlorofluoromethane ND 2.0 1,1-Dichloroethene ND 5.0 1,1-Dichloroethane ND 5.0 trans-1,2-Dichloroethene ND 5.0 Chloroform ND 5.0 1.2-Dichloroethane ND 5.0 1,1,1-Trichloroethane ND 5.0 Carbon tetrachloride ND 5.0 Bromodichloromethane ND 5.0 1,2-Dichloropropane ND 5.0 cis-1,3-Dichloropropene ND 5.0 Trichlorcethylene ND 5.0 1,1,2-Trichloroethane ND 5.0 trans-1,3-Dichloropropene ND 5.0 Dibromochloromethane ND 10.0 2-Chloroethylvinyl ether ND 5.0 Bromoform

Chlorobenzene
1,3-Dichlorobenzene
1,2-Dichlorobenzene
1,4-Dichlorobenzene

Tetrachloroetheme /

1,1,2,2-Tetrachloroethane

1,1,2-Trichlorotrifluoroethane 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. BM.D. Laboratory Director

5.0

5.0

5.0

5.0

5.0

5.0

1565 BURKE UNITI - SAN FRANCISCO CA 94124 - PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-6 CLIENT: Woodward-clyde DATE SAMPLED: 4/19/90 DATE RECEIVED: 4/18/90 DATE ANALYZED: 4/25/90

Consultantas

JOB NO.: 8910116A8300

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

Compound	MDL (ug/kg)	RESULTS (ug/kg)
	5.0	ND
Chloromethane	5.0	ND
Bromomethane	10.0	ND
Vinyl chloride	5.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	10.0	ND
Methylene chloride	5.0	ND .
Trichlorofluoromethane	2.0	ND
1,1-Dichloroethene	5.0	ND
1,1-Dichloroethane	5.0	D
trans-1,2-Dichloroethene		ND
Chioroform '	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND ND
Bromodichloromethane	5.0	ND
1,2-Bichloropropane	5.0 5.0	ND
cis-1,3-Dichloropropene		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	110
Tetrachloroethene /	5.0	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		ND
1.1.2-Trichlorotrifluoroethane	5.0	
MDL = Method Detection Limit	S.V	
ug/kg = parts per billion (ppt	(RPD = <15%	
QA/QC Summary: Daily Standard	+ MS/MSD RPD	= < 3.6%

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

Laboratory Director

DITUENDA (LLICUTIER /810 ; 6-13-90 10:460M M-13-90 WED 10:42

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.: 891011648300

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)
	5.0	ND
Chioromethane	5.0	ND
Bromomethane	10.0	ND
Vinyl chloride	5.0	ИD
Dichlorodifluoromethane	5.0	ND
Chloroethane	10.0	ND
Methylene chloride	5.0	ND
Trichlorofluoromethane	2.0	ND -
1.1-Dichloroethene	5.0	ND
1,1-Dichloroethane		ND
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0 5.0	ND
1,2-Dichloroethane		ND
1,1,1-Trichlorcethane	5.0	CN
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	NO
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichloropropene	\$.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichioropropene	5.0	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	(10
Tetrachloroethene /	F 0	290
1,1,2,2-Tetrachlorcethane	5.0	ND
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0 5.0	ND
1,1,2-Trichlorotrifluoroethane	3.4	,,,,
MDL = Method Detection Limit	3	
ug/kg = parts per billion (ppt) ppn - /15%	
QA/QC Summary: Daily Standard	· MS/MSD RPD =	< 3.6% /

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

Laboratory Director

and a reserve

1555 BURKE UNITION FRANCISCO CA 94124 · PHONE (415) 647-2081

CEPTIFICATE 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-546 METHOD 9010 HALOGENATED VOLATILE ORGANICS SAMPLE:8-5-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
(MENTANAN	5.0	ND
Chloromethane	5.0	ND
Bromomethane	5.0	ND
Vinyl chloride	10.0	СИ
Dichlorod:fluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichlorofluoromethane	5.0	ND a
1,1-Dichloroethene	2.0	
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-Chlorcethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachlorcethane	5.0	62
Chlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ФИ
1.4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethane	5.0	Qи
MOL = Method Detection Limit		
ug/kg = parts per billion (ppt	o)	
OA/OC Summary: Daily Standard	i RPD = <15%	
MS/MSD average recovery = 87%	: MS/MSD RPD =< 3.	6%

Richard Srna, Ph.D. Laboratory Director

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THE OFFICE ASSESSMENT

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-12 CLIENT: Woodward-clyde DATE SAMPLED: 4/19/90 DATE RECEIVED: 4/18/90 DATE ANALYZED: 4/26/90

Consultantas

JOB NO.: 8910116A8300

EPA SW-846 METHOD 8010 HALOGENATED VOLATILE ORGANICS

SAMPLE: B-6-4

Compound	MÕL (ug/kg)	RESULTS (Ug/kg)
	5.0	ND
Chloromethane	5.0	ND
Bromomethane	10.0	ND
Vinyl chloride	5.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	10.0	ND
Methylene chloride		ND
Trichiorofluoromethane	5,0	ND G
1,1-Dichloroetheme	2.0	NO
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	
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	19.0	ND
Bromoform	5.0	ND
Tetrachloroethene /		
1,1,2,2-Tetrachloroethane	5.0	9.8
Chlorobenzene	5.0	סא
1.3-Dichlorobenzene	5.0	ND
1,3-Dichipropenzeno	5.0	ND
1,2-Dichlorobenzene	5.0	СИ
1,4-Dichlorobenzene		ND
1.1.2-Trichlorotrifluoroethan		
MDL = Method Detection Limit	sh)	
ug/kg = parts per billion (pr		
QA/QC Summary: Daily Standar	· MS/MSD RPD =	< 3.6%
MS/MSD average recovery = 879	. Hoyelee in a	//

bilhard

Ph.D.

Laboratory Director

JUN-13-90 MED 10:37

Woodward-Civde Consultants 8910116A Hersch - Alameda

LOG OF BORING B-1

P.12

Woody	vard-Clyde Consultan	ts 🕶	Harsch - Ala	meda					·- !
LOCATION	South Share Center, Shoreline De	ive and Park St	reet	ELEVATIO	ON AND D	ATUM			
	(vilhaug Drilling and Pump		(e/Joei	DATE ST	ARTED	4/1	8/90		
		<u>, l , , , , , , , , , , , , , , , , , ,</u>		DATE CO	MPLETED	4/	18/9	90	
	Mobil Drill B-53 -diam Hollow Stem Auger	DRILL BIT		COMPLE	TION DEP	тн			
CASING	-Dialij (tokov Olom Nogo)	\		SAMPLE	as Mo	difled	Сa	lifornia 2-inc	llam.
PERFORATIO		FROM	то	NO. OF SAMPLES	DIST.		1	UNDIST. 2	
PACK		FROM	TO	MATER	ATD	5'	7	COMPL	24 HR
		FROM	TO	LOGGED	ВҮ		7	CHECKED BY	•
TYPE OF SEAL8	Cement grout	FROM O'	TO 6-1/2'	Lois C	aruenbe	rg	-	Al Ridley	
DEРТН (F1)	DESCRIPTION		PIEZOMETER INSTALLTION	DЕРТН (FT)	SAMPLES	Blow Counts	Recovery	(Strength	ARKS s, moisture nt, etc.)
Ur	ND (SP) - brown - fine grained - some sitt - medium dense - moist to saturated			10		7 9 13 12 14 16		B-1-2 0 ppm OV/ B-1-5 0 ppm OV Boring term approx. 6-1/ ground suffi	A inated at '2' below the

JUN-13-90 WEB. 10:37

Woodward-Clyde Consultants 4910116A Harsch - Alameda



LOG OF BORING **B-2**

ì		ard-Clyde Consulta		Harson - Ala					<u>.</u>	
LOCATI	ION	South Shore Center, Shoreline I	Drive and Park S	reet	ELEVATIO	N AND (ATU	A		
AGENC		vilhaug Drilling and Pump	DRILLER M		DATE STA	RTED	4/	18/9	0	
EQUIPN		Mobil Orlll B-53			DATE COL	APLETE	4	/18/	90	
METHO		diam Hollow Stem Auger	DRILL BIT		COMPLET	ION DE	ਮ ₹			
CASING					SAMPLER	is Mo	difie	d Ca	alifornia 2-inc	ilam.
PERFO		vs	FROM	то	NO. OF SAMPLES	DIST.			UNDIST. 2	
PACK			FROM	то	WATER	ATD	5'		COMPL	24 HR
		<u> </u>	FROM	TO	LOGGED	BY			CHECKED BY	***************************************
TYPE SEA		Cement grout	FROM 0'	TO 6'	Lois G	edneuri	erg		Al Ridley	
<u> </u>		Camerit grout	<u> </u>			(y)	ñ	<u></u>	REM	ARKS
DEPTH (FT)		DESCRIPTION	4	PIEZOMÉTER INSTALLTION	DEPTH (FT)	SAMPLES	Blaw Counts	Recovery	(Strength conte	n, moisture nt, etc.)
5	1	paved surface, silty sand. ND (SP) - brown - fine grained - some silt - medium dense to dense - moist to saturated			5 10 15	¥ X	11 16 20 12 12 14		1 ppm OV B-2-4.5 1.5 ppm O	VA
20 _					20					

Woodward-Clyde Consultants #8910116A Harsch - Alameda



B-3

	ard-Orydo Condentant		naisch - Ala						
LOCATION	South Shore Center, Shoreline Driv	e and Park St	reet	ELEVATIO					
AGENCY K	Wilhaug Drilling and Pump	DRILLER MI	ke/Joel	DATE STA			8/9		
EQUIPMENT	Mobil Drill B-53			DATE CO			/18/	90	
	diam Hollow Stem Auger	DRILL BIT		COMPLET					
CASING				SAMPLER	,,,,,	dified	C	alifornia 2-in	diam.
PERFORATION	NS	FROM	то	NO. OF SAMPLES	DIST.			UNDIST. 2	
PACK		FROM	TO	WATER LEVEL	ATD	5'		COMPL	24 HR
TYPE OF		FROM	TO	LOGGED			ı	CHECKED BY	
SEALS	Cement grout	FROM O'	TO 5-1/2'	LOIS G	ruenbe	, <u>, , , , , , , , , , , , , , , , , , </u>		Al Ridle	
рертн (FT)	DESCRIPTION		PIEZOMETER INSTALLTION	оеетн (FT)	SAMPLES	Blow Counts	Весо ину	REM (Strengt	ARKS in, molsture ent, etc.)
1 1	paved surface, sand. ND (SP) - brown - fine grained - some silt, some shells - medium dense - moist to saturated			5 10 15 15 1 20 1 25 1	¥ X	9 13 17 9 11 17		8-3-4 5.4 ppm (Boring term below the g	

*JUH-13-90 WED 10:39

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rd Clyde Consultants 8910116A

LOG OF BORING R-4

Woodw	ard-Clyde Consultant	s 😂	Harsch - A	lameda			B-4
LOCATION	South Shore Center, Shoreline Driv	e and Park S	treet	ELEVATIO	N AND DA	TUM	
	vilhaug Orliling and Pump		ke/Joel	DATE STA		4/18/9	0
	Mobil Drill 8-53	<u> </u>		DATE COL	APLETED	4/18	/90
	diam Hollow Stem Auger	DRILL BIT		COMPLET	HON DEPTH	-	
CASING			_	SAMPLER		fied C	allfornia 2-lndiam.
PERFORATION	NS .	FROM	TO	NO. OF SAMPLES	DIST.		UNDIST. 2
PACK	,,,	FROM	TQ	WATER LEVEL	ATD 5	3'	COMPL 24 HR
TYPE OF		FROM	TO	LOGGED			CHECKED BY
SEALS	Cement grout	FROM O'	TO 5-1/2"	Lois G	iruenberg		Al Ridley
0€РТН (FT)	DESCRIPTION		PIEZOMETER INSTALLTION		SAMPLES	Blow Counts Recovery	REMARKS (Strength, moisture content, etc.)
! -	paved surface, sifty sand. AND (SP) - brown - fine grained - some sift, some shells - medium dense to dense - moist to saturated			10 15 20 25		15 18 10 11 17	B-4-2 <1 ppm OVA B-4-4 2.5 ppm OVA Boring terminated at 5-1/2' below the ground surface.

912:#16

LOG OF SORING 8910116A **B-5** Woodward-Clyde Consultants Harsch - Alameda ELEVATION AND DATUM South Shore Center, Shoreline Drive and Park Street LOCATION DATE STARTED 4/18/90 DRILLER Mike/Joel Kvilhaug Drilling and Pump AGENCY DATE COMPLETED 4/18/90 EQUIPMENT Mobil Drlll B-53 COMPLETION DEPTH DRILL BIT METHOD 8"-diam Hollow Stem Auger SAMPLERS Modified California 2-In.-diam. CASING VA 04 UNDIST. 2 TO FROM SAMPLES PERFORATIONS WATER 24 HR COMPL ATD 5 FROM TO PACK FEAST CHECKED BY LOGGED BY FROM TO TYPE OF Lois Gruenberg Al Ridley SEALS FROM 5-1/2" Cement grout Counts REMARKS Recovery PIEZOMETER DEPTH (FT) DEPTH (FT) INSTALLTION (Strength, moisture DESCRIPTION content, etc.) Unpaved surface, silty sand. SAND (SP) B-5-2 19 - brown 0 ppm OVA - fine grained some siit, some shells 18 B-5-4 25 - medium dense to very dense 5 _ 5 2 ppm OVA - moist to saturated 29 Boring terminated at 5-1/2' below the ground surface. 10 10 15 15 20 25

- JUN-13-90 WED 10:40

LOG OF BORING **B-6**

wood	lward-Clyde Consultani	S	Harsch - Ala	meda			B-0
LOCATION	South Shore Center, Shoreline Dri	ve and Park Str	reet	ELEVATION	ON AND D	ATUM	
AGENCY	Kvilhaug Drilling and Pump		e/Joel	DATE ST	ARTED	4/18	/90
EQUIPMEN	Mobil Orill 8-53			DATE CO	MPLETED	4/1	8/90
METHOD	8*-diam Hollow Stem Auger	DRILL SIT		COMPLE	TION DEPT	TH	
CASING		·-		SAMPLE	RS Mod	iffled (Dalifornia 2-indiam.
PERFORAT	nons	FROM	TO	HO, OF Samples	DIST.		UNDIST. 2
PACK		FROM	70	FEAET	ATD	5'	COMPL 24 HR
TYPE OF		FROM	TO	LOGGED			CHECKED BY
SEALS	Cement grout	FROM O'	TO 5-1/2'	Lois	Sruenber	'g	Al Ridley
DEРТН (FT)	DESCRIPTION		PIEZOMETER INSTALLTION	DEРТН (FT)	SAMPLES	Blow Counts	REMARKS (Strength, moleture content, etc.)
-	Unpaved surface, silty sand. SAND (SP) - brown - fine to medium grained - some silt, some shells - dense - moist to saturated			5	ΔM	13 21 21 16 21 15	B-6-2 <0.5 ppm OVA B-8-4 0.5 ppm OVA Boring terminated at 5-1/2 below the ground surface.

JUN-13-90 WED 10:40

Woodward-Clyde Consultants

APPENDIX B
CHEMICAL ANALYTICAL LABORATORY REPORTS

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

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-2

DATE SAMPLED: 4/19/90

CLIENT: Woodward-clyde

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

Consultantas

JOB NO.: 8910116A8300

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	NO
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	NĐ
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ΩN
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-Trichlorotrifluoroethan	● 5.0	ND
MDL = Method Detection Limit		
uo/ka = parts per billion (PP	b)	_
- Akian Cummary, Bally Standar	4 XPD = <15%	
MS/MSD average recovery = 87%	: MS/MSD RPD =	⟨ 3.6%

Richard Srna, Ph.D

aboratory Director

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

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.Ô	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 1
trans-1,2-Dichloroethene	5.0	NÐ
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 /		0.40
1,1,2,2-Tetrachloroethane	5.0	340
Chlorobenzene	5.0	DM
1,3-Dichlorobenzene	5.0	ND ND
1,2-Dichlorobenzene	5.0	ND
1.4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethar	e 5.0	ND
MDL = Method Detection Limit		
ug/kg = parts per billion (pr)b)	
QA/QC Summary: Daily Standar	d KbD = <10%	(3.6%
MS/MSD average recovery = 87%	: M2/M2D KPD =	` / /

1555 BURKE UNIT I - SAN FRANCISCO C4 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:8-3-4

Compound	MDL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
	5.0	ND
Bromomethane	10.0	ND
Vinyl chloride Dichlorodifluoromethane	5.0	ND
	5.0	ND
Chloroethane	10.0	NÐ
Methylene chloride Trichlorofluoromethane	5.0	ND .
1.1~Dichloroethene	2.0	ΝD
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	ДN
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.C	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		ND
MDL = Method Detection Limit		
MUE 3 MECHOD Decection william (nah	3	

ug/kg = parts per billion (ppb) QA/QC Summary: Daily Standard RPD = <15%

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

Laboratory Director

DIVALIDA REESCUTIER 7010 : 6-13-90 10:46AM ; ÚH+13-90 WED 10:42

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: 4/13/90

DATE ANALYZED: 4/25/90

EPA SW-846 METHOD 8010 HALOGENATED VOLATILE ORGANICS SAMPLE: 8-4-4

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	иD
1.1-Dichloroethane	5.0	В
trans-1,2-Dichloroethene	5.0	ND
Chloroform	5.0	ND
1,2-Dichloroethane	5.0	ND
1,1,1-Trichloreethane	5.0	ND
Carbon tetrachloride	5.0	GN
Bromodichioromethane	5.0	ND
1.2-Dichloropropane	5.0	NO
cis-1,3-Dichloropropene	5.0	ND
Trichloroethylene	5.0	ND
1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.D	ND
Dibromochloromethane	5.0	ND
2-Chloroethylvinyl ether	10.0	ND
Bromoform	5.0	ND
Tetrachioroethene /		_
1,1,2,2-Tetrachloroethane	5.0	290
Chlorobenzene	5,0	ND
1.3-Dichiorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1.4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethan	e 5.0	ND
MDL = Method Detection Limit		
- ug/kg = parts per billion (pg	ob)	
- AN/AC Summary: Daily Standar	d RPD = <15%	
MS/MSD average recovery = 87%	: MS/MSD RPD =	< 3.0%
		, ,

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ALL AND SERVICE

1555 Burke Unit $I\cdot$ San Francisco. Ca 94124 \cdot Phone (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 51948-10 CLIENT: Woodward-clyde

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

Consultantas

DATE ANALYZED: 4/25/90

JOB NO.: 8910116A8300

EPA SW-846 METHOD 3010 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	ФИ
Chloroethane	5.0	ND
Methylene chloride	10.0	МÐ
Trichlorofluoromethane	5.0	ПD
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-Chlorcethylvinyl ether	10.0	ND
Bromoform	5,0	ND
Tetrachloroethene /		
1,1,2,2~Tetrachlorcethane	5.0	62
Chlorobenzene	5,0	ND
1,3-Dichlorobenzene	5.0	DИ
1,2-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
1,1,2-Trichlorotrifluoroethar		ND
MOL = Method Detection Limit	· -	
ug/kg = parts per billion (pp	ob)	
QA/QC Summary: Daily Standar	rd RPD = <15%	
un won - who an encounty = 979	MS/MSD RPD =	(3.6%

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

A CONTRACTOR OF THE STATE OF TH

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: 4/25/90

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

Compound	MOL (ug/kg)	RESULTS (ug/kg)
Chloromethane	5.0	ND
Bromomethane	5.0	МО
Vinyl chloride	10.0	ND
Dichlorodifluoromethane	5.0	ND
Chloroethane	5.0	ND
Methylene chloride	10.0	ND
Trichiorofluoromethane	5,0	ND
1.1-Dichloroethene	2.0	ND
1.1-Dichloroethane	5,0	ND
trans-1,2-Dichloroethene	5.0	ND
	5.0	ND
Chloroform 1,2-Dichloroethane	5.0	ND
1,1.1-Trichloroethane	5.0	ND
Carbon tetrachloride	5.0	ND
Bromodichloromethane	5.0	ND
	5.0	GM
1,2-Dichloropropane	5.0	ND
cis-1,3-Dichlaropropene	5.0	ND
Trichloroethylene 1,1,2-Trichloroethane	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
trans-1,3-Dichtoropropere	5,0	ND
Dibromochloromethane 2-Chloroethylvinyl ether	10.0	ND
	5.0	ND
Bromoform Tetrachloroethene /	717	
1,1,2,2-Tetrachloroethane	5.0	9.8
Chlorobenzene	5.0	GN
1,3-Dichlorobenzene	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1.4-Dichlorobenzene	5.0	МÐ
1,1,2-Trichlorotrifluoroetha		ND
MDL = Method Detection Limit		
ug/kg = parts per billion (p	(da	
- oldo cummarur Daily Standa	rd RPU = <10%	· -
MS/MSD average recovery = 87	% : MS/MSD RPD =	< 3.6%
May Man average recording - e.	•	

Richard Srna, Ph.D.

Laboratóry Director

From

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51948

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

Chain of Custody Record

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