REPORT

Project # 2010-001

QUARTERLY GROUNDWATER

MONITORING

5800 Christie Avenue
Emeryville, California

Submitted to:

Mr. Dennis Byrne
Alameda County Health Care Services
Hazardous Materials Division

80 Swan Way, Room 200
Oakland, CA 94621

Prepared For:

Croley & Herring Investment Company

1311 63rd Street
Emeryville, CA 94608

May 25, 1991

49 Stevenson Street, Suite 600,
San Francisco, CA 94105
Telephone: (415) 227-0822 FAX: (415) 227-0842
AWD Technologies, Inc.

AWD
TECHNOLOGIES

A Subsidiary of
The Dow Chemical Company

May 25, 1991

Mr. Dick Herring
Croley and Herring Investment Company
1311 63rd Street
Emeryville, CA 94608

Dear Mr. Herring,

Subject: **Quarterly Report for Groundwater Monitoring**
5800 Christie Avenue, Emeryville, California

Enclosed please find a copy of the quarterly status report regarding the results of groundwater sampling performed in April, 1990 at the subject facility.

Should you have any questions regarding the subject report, please contact me.

Sincerely yours,

Walter Loo

Walter Loo
Director of Remediation

WWL/isw

Enclosure

AWD Technologies, Inc.
49 Stevenson Street Suite 600 San Francisco California 94105 Telephone 415 227 0822 Fax 415 227 0842

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1.0 INTRODUCTION

AWD Technologies, Inc. (AWD) was retained by Croley and Herring Investment Company (CHIC) to perform the fifth quarterly groundwater monitoring for a facility located at 5800 Christie Street in Emeryville, California. The subject facility is currently leased to an electronic merchandise retailer. Prior to leasing, soil contamination was identified at the subject facility. The contaminated soil was removed with the exception of those underlying a building because of safety concern. The removed soil was remediated onsite and properly disposed of with the approval of the regulatory agencies.

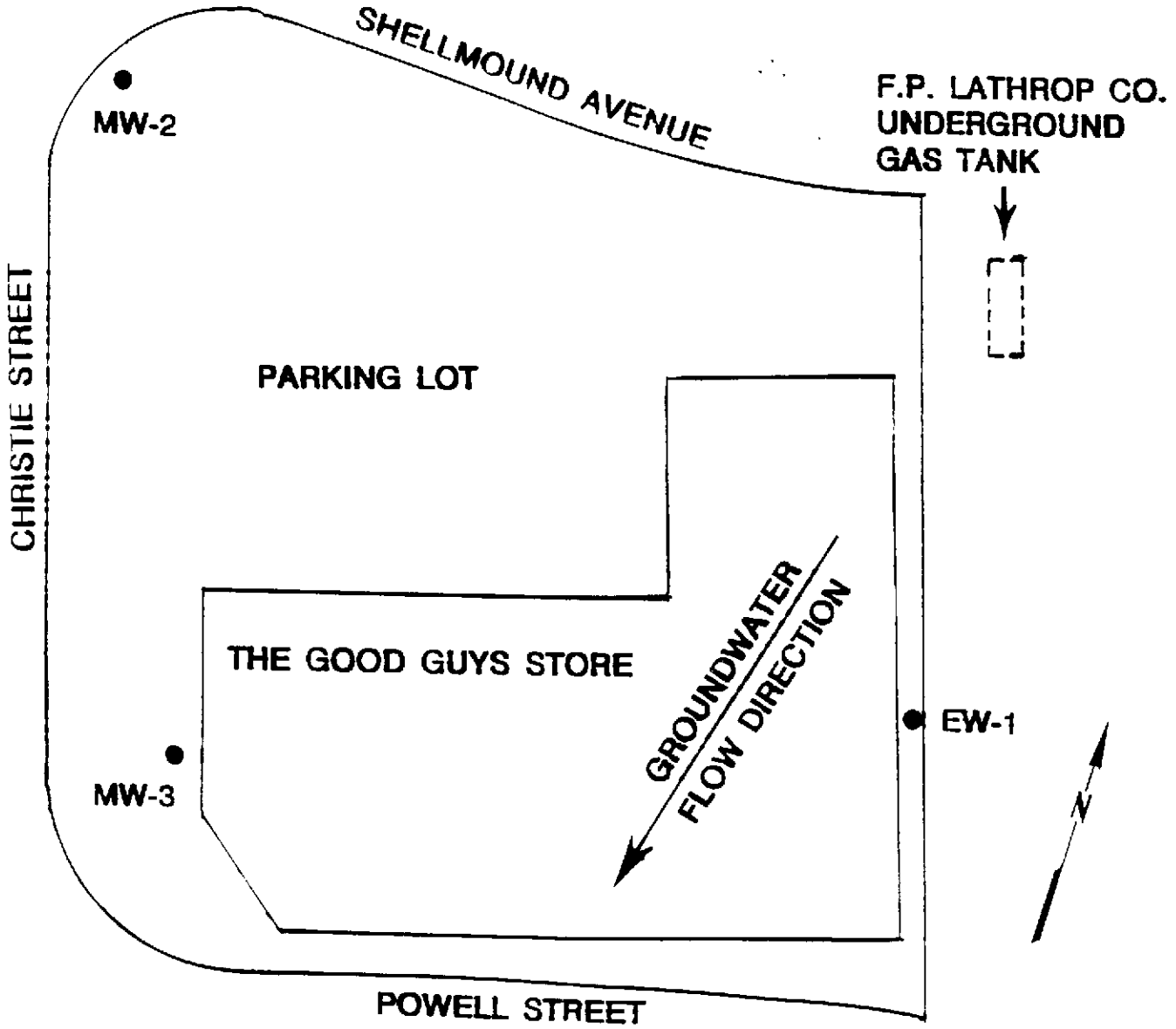
There is a vapor extraction system installed immediately adjacent to the northeastern side of the building to mitigate the residual volatile hydrocarbons contained in the soil. As part of the site closure plan, a quarterly groundwater monitoring program is currently implemented. Three previous quarterly monitoring events were performed on November 6, 1989, February 20, 1990, May 31, 1990, September 7, 1990, and December 24, 1990, respectively. The sixth quarterly monitoring activities was conducted on April 16, 1991. Water samples were taken from the monitoring wells and sent to a State-certified laboratory for analysis under proper chain-of-custody procedures.

This report presents the results of the sixth quarterly groundwater monitoring activities including groundwater movement analysis, laboratory analytical results, summary of findings, and conclusions and discussions.

2.0 GROUNDWATER MOVEMENT ANALYSIS

Prior to sample collection of this quarterly sampling, depth to water table in each of the three existing monitoring wells at the facility was measured for the analysis of groundwater movement. Table 1 presents a summary of the water levels in the three wells (EW-1, MW-2, and MW-3) from the groundwater monitoring events that have been performed by AWD.

From the result of the water level measurements on April 16, 1991, elevation of water levels were slightly increased in the three wells, as compared to the data collected in December 1990. Increased in water levels of the three wells was caused by the rain in March and early April of 1991. Nevertheless, the groundwater flow direction remained in the same direction, flowing toward south (Figure 1). The hydraulic gradient was 0.014 feet per horizontal foot.



LEGEND

● MONITORING WELL LOCATION

0 40 80
scale feet

GROUNDWATER MOVEMENT DIRECTION (4/16/91)

AWD TECHNOLOGIES, INC

AWD TECHNOLOGIES

SITE LOCATION MAP
5800 CHRISTIE STREET
EMERYVILLE, CALIFORNIA

CUSTOMER: CHIC
JOB NUMBER: 930-1000
DATE:
DRAWING NUMBER: FIGURE 1
REV: 0

TABLE 1

SUMMARY OF WATER LEVEL DATA

WELL ID	Elev. of TOC (Ft-MSL)	11/6/89 DTW Ft	11/6/89 SWL Ft	2/20/90 DTW Ft	2/20/90 SWL Ft	5/31/90 DTW Ft	5/31/90 SWL Ft	9/7/90 DTW Ft	9/7/90 SWL Ft	12/4/90 DTW Ft	12/4/90 SWL Ft	4/16/91 DTW Ft	4/16/91 SWL Ft
EW-1	8.62	6.15	2.47	5.93	2.69	5.86	2.76	6.30	2.32	7.39	2.23	6.02	2.60
MW-2	7.42	4.37	3.05	4.26	3.16	4.26	3.16	4.60	2.82	4.67	2.75	4.31	3.11
MW-3	6.42	5.10	1.32	5.42	1.00	4.93	1.49	5.15	1.17	5.96	1.35	5.25	1.17

Note:

TOC is top of casing
DTW is depth to water table
SWL is static water level above MSL
MSL is mean sea level

3.0 GROUNDWATER QUALITY

On April 16, 1991, AWD field personnel visited the facility and collected water samples from each of the three monitoring wells for analysis. These groundwater samples were sent to a State-certified laboratory for analyses of halocarbons using EPA method 601, total petroleum hydrocarbons (TPH) as gasoline and gasoline constituents benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA method 602. During water sampling, field parameters as water temperature, electric conductivity, and pH were measured and recorded.

From the results of the laboratory analysis (Appendix A), none of the water samples collected from Wells MW-2 and MW-3 contain detectable concentration of the above analytes on this sampling event. However, water sample taken from Well EW-1 contained some volatile organic compounds having concentration lower than those which were detected in the fourth quarterly monitoring event. The compounds detected in Well EW-1 from the April 16, 1991 sampling episode are listed as following:

TPH	51,000 ppb
Benzene	3,000 ppb
Toluene	12,000 ppb
Ethylbenzene	<900 ppb
Xylenes	<200 ppb
1,1 DCE	<20 ppb
1,2 DCE	3,700 ppb
1,1 DCA	1,800 ppb
1,2 DCA	<20 ppb
1,1,1 TCA	2,900 ppb
1,1,2 TCA	<20 ppb
TCE	1,300 ppb
Chloroethane	<20
Methylene Chloride	<20
Vinyl Chloride	990 ppb
Temperature	68.2°F
EC	13.85 millimhos/cm
pH	6.8

4.0 SUMMARY OF FINDINGS

Groundwater movement across the facility remains in a similar pattern, as compared to the result from the previous sampling event. Data of flow direction and hydraulic gradient are summarized as following:

Date of Sampling	4/25/89	11/6/89	2/20/90	5/31/90	9/7/90	12/4/90	4/16/91
Flow Direction	Southwest	South	South	South	South	South	South
Hydraulic gradient	0.0014	0.012	0.016	0.0125	0.0115	0.045	0.014

None of the water samples collected from Wells MW-2 and MW-3 contained hydrocarbons at concentration above detection limits. However, analytical results of groundwater in Well EW-1 indicated that TPH concentration increased from 7,400 ppb to 51,000 ppb while benzene concentration increased from 180 ppb to 3,000 ppb. 1,2-DCE concentration increased from 1,500 to 3,700 while vinyl chloride concentration increased from 230 ppb to 900 ppb. Table 2 presents a summary of analytical results of Well EW-1 in time series.

In general, the concentration of analytes detected in this quarterly sampling effort has elevated as composed to the result of the previous quarterly sampling. There are several major factors that affect the changes in the hydrocarbons concentration. These factors are soil desorption due to increase in water table, chemical breakdown due to natural degradation, and unidentified sources. It is AWD's opinion that changes of halocarbons concentrations are caused by the combination of soil desorption and the natural degradation process. The presence of gasoline constituents is likely caused by a suspect upgradient source. AWD will recommend to Alameda County Health Services that potential responsible party/parties (PRP) for the gasoline contamination at this facility be identified. Once the PRP is identified, AWD will then recommend that a groundwater extraction system be implemented in the source area to reverse the groundwater movement and remediate the gasoline plume.

TABLE 2

SUMMARY OF QUARTERLY MONITORING RESULTS OF HAZARDOUS ORGANIC COMPOUNDS

COMPOUNDS	CONCENTRATIONS IN PPB						
	5/8/89	11/6/89	2/20/90	5/31/90	9/7/90	12/4/90	4/6/91
TPH as Gasoline	NT	740	12,000	24,000	25,000	7,400	51,000
Benzene	ND	180	1,300	56	1,100	180	3,000
Toluene	190	39	3,600	6,100	800	3,500	12,000
Xylenes	170	67	47	140	42	<200	<900
Ethylbenzene	ND	0.8	7.1	17	<25	<90	<200
TCE	640	740 700	1,100	830	490	1,500	1,300
1,1 DCE	78	2.3	14	69	36	<30	<20
1,2 DCE	ND	350	2,500	110	2,400	1,500	3,700
1,1,1 TCA	ND	26	550	1,200	510	72	2,900
1,1 DCA	ND	34	460	1,900	1,300	460	1,800
1,2 DCA	ND	4.8	34	33	53	<30	<20
Vinyl Chloride	ND	29	ND	2,600	1,700	230	900
Chloroethane	ND	ND	29	94	150	<30	<20
Methylene Chloride	ND	ND	14	40	22	<400	<20

ND: Not Detected

APPENDIX A

GROUNDWATER ANALYSIS REESULTS

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard. #8 • Hayward, California 94545
Telephone (415) 783-6960
Facsimile (415) 783-1512

TAL

LOG NO.: 9781
DATE SAMPLED: 4/16/91
DATE RECEIVED: 4/16/91
DATE ANALYZED: 4/26/91 and 4/29/91
DATE REPORTED: 4/30/91

CUSTOMER: AWD Technologies

REQUESTER: I-Sen Wang

PROJECT: No. 2010, CHIC/AWD

Sample Type: Water

Method and Constituent	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/l	51,000	400	ND	50	ND	50
Modified EPA Method 8020:							
Benzene	ug/l	3,000	100	ND	0.5	ND	0.5
Toluene	ug/l	12,000	100	ND	0.5	ND	0.5
Xylenes	ug/l	ND	900	ND	2	ND	2
Ethylbenzene	ug/l	ND	200	ND	0.5	ND	0.5

Method and Constituent	Units	Method Blank Concentration	Method Blank Reporting Limit
DHS Method:			
Total Petroleum Hydrocarbons as Gasoline	ug/l	ND	50
Modified EPA Method 8020:			
Benzene	ug/l	ND	0.5
Toluene	ug/l	ND	0.5
Xylenes	ug/l	ND	2
Ethylbenzene	ug/l	ND	0.5

QC Summary:

% Recovery: 98 and 90
% RPD: 4.4 and 4.4

Concentrations reported as ND were not detected at or above the reporting limit.

Trace Analysis Laboratory, Inc.

LOG NO.: 9781
DATE SAMPLED: 4/16/91
DATE RECEIVED: 4/16/91
DATE ANALYZED: 4/24/91
DATE REPORTED: 4/30/91
PAGE: Two

Sample Type: Water

Method and Constituent	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
EPA Method 8010:							
Benzyl Chloride	ug/l	ND	20	ND	0.5	ND	0.5
Bis (2-Chloroethoxy) Methane	ug/l	ND	20	ND	0.5	ND	0.5
Bis (2-Chloroisopropyl) Ether	ug/l	ND	20	ND	0.5	ND	0.5
Bromobenzene	ug/l	ND	20	ND	0.5	ND	0.5
Bromodichloromethane	ug/l	ND	20	ND	0.5	ND	0.5
Bromoform	ug/l	ND	20	ND	0.5	ND	0.5
Bromomethane	ug/l	ND	20	ND	0.5	ND	0.5
Carbon Tetrachloride	ug/l	ND	20	ND	0.5	ND	0.5
Chloracetaldehyde	ug/l	ND	20	ND	0.5	ND	0.5
Chloral	ug/l	ND	20	ND	0.5	ND	0.5
Chlorobenzene	ug/l	ND	20	ND	0.5	ND	0.5
Chloroethane	ug/l	ND	20	ND	0.5	ND	0.5
Chloroform	ug/l	ND	20	ND	0.5	ND	0.5
1-Chlorohexane	ug/l	ND	20	ND	0.5	ND	0.5
2-Chloroethyl Vinyl Ether	ug/l	ND	20	ND	0.5	ND	0.5

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NO.: 9781
DATE SAMPLED: 4/16/91
DATE RECEIVED: 4/16/91
DATE ANALYZED: 4/24/91
DATE REPORTED: 5/01/91
PAGE: Three

Sample Type: Water

Method and Constituent	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
EPA Method 8010 (Continued):							
Chloromethane	ug/l	ND	20	ND	0.5	ND	0.5
Chloromethyl Methyl Ether	ug/l	ND	20	ND	0.5	ND	0.5
Chlorotoluene	ug/l	ND	20	ND	0.5	ND	0.5
Dibromochloromethane	ug/l	ND	20	ND	0.5	ND	0.5
Dibromomethane	ug/l	ND	20	ND	0.5	ND	0.5
1,2-Dichlorobenzene	ug/l	ND	20	ND	0.5	ND	0.5
1,3-Dichlorobenzene	ug/l	ND	20	ND	0.5	ND	0.5
1,4-Dichlorobenzene	ug/l	ND	20	ND	0.5	ND	0.5
Dichlorodifluoromethane	ug/l	ND	20	ND	0.5	ND	0.5
1,1-Dichloroethane	ug/l	1,800	7	ND	0.5	ND	0.5
1,2-Dichloroethane	ug/l	ND	20	ND	0.5	ND	0.5
1,1-Dichloroethylene	ug/l	ND	20	ND	0.5	ND	0.5
Trans-1,2-Dichloro-ethylene	ug/l	3,700	8	ND	0.5	ND	0.5
Dichloromethane	ug/l	ND	20	ND	0.5	ND	0.5
1,2-Dichloropropane	ug/l	ND	20	ND	0.5	ND	0.5
1,3-Dichloropropylene	ug/l	ND	20	ND	0.5	ND	0.5
1,1,2,2-Tetrachloro-ethane	ug/l	ND	20	ND	0.5	ND	0.5

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NO.: 9781
DATE SAMPLED: 4/16/91
DATE RECEIVED: 4/16/91
DATE ANALYZED: 4/24/91
DATE REPORTED: 5/01/91
PAGE: Four

Sample Type: Water

Method and Constituent	Units	MW-1 Concentration	MW-1 Reporting Limit	MW-2 Concentration	MW-2 Reporting Limit	MW-3 Concentration	MW-3 Reporting Limit
EPA Method 8010 (Continued):							
1,1,1,2-Tetrachloroethane	ug/l	ND	20	ND	0.5	ND	0.5
Tetrachloroethylene	ug/l	ND	20	ND	0.5	ND	0.5
1,1,1-Trichloroethane	ug/l	2,900	10	ND	0.5	ND	0.5
1,1,2-Trichloroethane	ug/l	ND	20	ND	0.5	ND	0.5
Trichloroethylene	ug/l	1,300	8	ND	0.5	ND	0.5
Trichlorofluoromethane	ug/l	ND	20	ND	0.5	ND	0.5
Trichloropropane	ug/l	ND	20	ND	0.5	ND	0.5
Vinyl Chloride	ug/l	990	20	ND	0.5	ND	0.5

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NO.: 9781
DATE SAMPLED: 4/16/91
DATE RECEIVED: 4/16/91
DATE ANALYZED: 4/24/91
DATE REPORTED: 4/30/91
PAGE: Five

Sample Type: Water

Method and Constituent	Units	Method Blank Concentration	Method Blank Reporting Limit
EPA Method 8010:			
Benzyl Chloride	ug/l	ND	0.5
Bis (2-Chloroethoxy) Methane	ug/l	ND	0.5
Bis (2-Chloroisopropyl) Ether	ug/l	ND	0.5
Bromobenzene	ug/l	ND	0.5
Bromodichloromethane	ug/l	ND	0.5
Bromoform	ug/l	ND	0.5
Bromomethane	ug/l	ND	0.5
Carbon Tetrachloride	ug/l	ND	0.5
Chloracetaldehyde	ug/l	ND	0.5
Chloral	ug/l	ND	0.5
Chlorobenzene	ug/l	ND	0.5
Chloroethane	ug/l	ND	0.5
Chloroform	ug/l	ND	0.5
1-Chlorohexane	ug/l	ND	0.5
2-Chloroethyl Vinyl Ether	ug/l	ND	0.5

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NO.: 9781
DATE SAMPLED: 4/16/91
DATE RECEIVED: 4/16/91
DATE ANALYZED: 4/24/91
DATE REPORTED: 5/01/91
PAGE: Six

Sample Type: Water

Method and Constituent	Units	Method Blank Concentration	Method Blank Reporting Limit
EPA Method 8010 (Continued):			
Chloromethane	ug/l	ND	0.5
Chloromethyl Methyl Ether	ug/l	ND	0.5
Chlorotoluene	ug/l	ND	0.5
Dibromochloromethane	ug/l	ND	0.5
Dibromomethane	ug/l	ND	0.5
1,2-Dichlorobenzene	ug/l	ND	0.5
1,3-Dichlorobenzene	ug/l	ND	0.5
1,4-Dichlorobenzene	ug/l	ND	0.5
Dichlorodifluoromethane	ug/l	ND	0.5
1,1-Dichloroethane	ug/l	ND	0.5
1,2-Dichloroethane	ug/l	ND	0.5
1,1-Dichloroethylene	ug/l	ND	0.5
Trans-1,2-Dichloro-ethylene	ug/l	ND	0.5
Dichloromethane	ug/l	ND	0.5
1,2-Dichloropropane	ug/l	ND	0.5
1,3-Dichloropropylene	ug/l	ND	0.5
1,1,2,2-Tetrachloro-ethane	ug/l	ND	0.5

Concentrations reported as ND were not detected at or above the reporting limit.

LOG NO.: 9781
DATE SAMPLED: 4/16/91
DATE RECEIVED: 4/16/91
DATE ANALYZED: 4/24/91
DATE REPORTED: 5/01/91
PAGE: Seven

Sample Type: Water

Method and Constituent	Units	Method Blank Concentration	Method Blank Reporting Limit
EPA Method 8010 (Continued):			
1,1,1,2-Tetrachloroethane	ug/l	ND	0.5
Tetrachloroethylene	ug/l	ND	0.5
1,1,1-Trichloroethane	ug/l	ND	0.5
1,1,2-Trichloroethane	ug/l	ND	0.5
Trichloroethylene	ug/l	ND	0.5
Trichlorofluoromethane	ug/l	ND	0.5
Trichloropropane	ug/l	ND	0.5
Vinyl Chloride	ug/l	ND	0.5

Concentrations reported as ND were not detected at or above the reporting limit.

QC Summary:

% Recovery: 76
% RPD: 3.9

Louis W.DuPuis
Quality Assurance/Quality Control Manager

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (415) 783-6960
Facsimile (415) 783-1512

#9781

CHAIN OF CUSTODY RECORD

Proj.No.	Project Name	No. of Containers	TPH(gas) & BTEX	601				REMARKS
2010	CHIC / ACWD							
Samplers: (signature)								
Sample ID	Date / Time / Site Location							
MW-1	4/16 11:35 Extraction well	4 x 40ml	X	X				10 days TAT
MW-2	4/16 11:55 Shellmound	4 x 40ml	X	X				↓
MW-3	4/16 11:45 Powell	4 x 40ml	X	X				↓

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	**Date/Time**	**Received by: (signature)**	**Date/Time**

Received for Laboratory by: (signature) — **Date/Time**

TAL 4/16/91 12:30

REMARKS