



Environmental Services, Inc.


2111 Jennings Street, San Francisco, CA 94124-3224, Phone (415) 822-4555 FAX (415) 822-5290


**GROUNDWATER MONITORING
THREE MONTHS ENDING JANUARY 31, 1992
ARROYO SCHOOL
15701 LORENZO AVENUE
SAN LORENZO, CALIFORNIA**

L&W Project 5186D
January 22, 1992

Prepared for
San Lorenzo Unified School District

92 JAN 24 11:12:53


George Wilson
Vice President


John Carver
Civil Engineer



GROUNDWATER MONITORING

Purpose

This report summarizes and presents the results of the quarterly monitoring of three wells at the Arroyo School in San Lorenzo, California. This report, when forwarded to the Alameda County Health Care Services Agency and the Regional Water Quality Control Board (RWQCB), San Francisco Region, will serve as a progress report for the three month period ending January 31, 1992. Those items which have been completed since submission of L&W Environmental Services, Inc.'s last report are highlighted below.

Chronology

The following list summarizes site-related work done to date:

- 01/03/91 6000 gallon fuel tank removed.
- 01/16/91 Borings 1 through 6 drilled.
- 01/25/91 Borings 7 through 11 drilled.
- 01/28/91 Borings 12 through 13 drilled.
- 01/31/91 Monitoring wells MW 1 through MW 3 installed.
- 02/07/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
- 03/15/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
- 04/16/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
- 07/15/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
- 10/15/91 Monitoring wells MW 1 through MW 3 monitored and sampled.
- 01/03/92 Monitoring wells MW 1 through MW 3 monitored and sampled.

Site Description

The area investigated is at the Arroyo School located at 15701 Lorenzo Avenue, San Lorenzo, California. The site investigated is an essentially level paved area with only minimal slope to provide surface drainage. Figure 1 in Appendix A is a site plan showing the location of Arroyo School in relation to the nearby streets. The tank which was removed was located between the maintenance boiler room portion of the building and temporary class rooms. This general location is in the approximate middle of the school complex.

Work Performed

The three monitoring wells installed at the site were measured and sampled on January 3, 1992. The depth to water in each well was measured and a preliminary sample was observed for free product or the presence of a hydrocarbon sheen. Each well was then purged of at least four well volumes or until groundwater temperature, pH, and conductivity were measured and found to be approximately stable on three successive readings. Wells were purged using either an air lift pump or with a teflon bailer. The bailer and all

measuring and sampling equipment were decontaminated before use in each well by cleaning in soapy water, a trisodium phosphate (TSP) rinse, and two clear water rinses. Samples were recovered from each well using a disposable bailer.

The wells were monitored for depth to groundwater and the presence of free product on January 3, 1992. The observations made to date are as follows:

SUMMARY OF GROUNDWATER MEASUREMENTS

| Well No. | Date Measured | Top of Casing Elevation | Thickness of Free Product (feet) | Depth to Groundwater (feet) | Piezometric Surface Elevation |
|----------|---------------|-------------------------|----------------------------------|-----------------------------|-------------------------------|
| MW1 | 2/07/91 | 100.00 | NONE | 11.42 | 88.58 |
| MW2 | 2/07/91 | 100.03 | NONE | 11.27 | 88.76 |
| MW3 | 2/07/91 | 100.17 | NONE | 11.44 | 88.73 |
| MW1 | 3/15/91 | 100.00 | NONE | 10.16 | 89.84 |
| MW2 | 3/15/91 | 100.03 | NONE | 10.16 | 89.87 |
| MW3 | 3/15/91 | 100.17 | NONE | 10.48 | 89.69 |
| MW1 | 4/16/91 | 100.00 | NONE | 10.44 | 89.56 |
| MW2 | 4/16/91 | 100.03 | NONE | 10.50 | 89.53 |
| MW3 | 4/16/91 | 100.17 | NONE | 10.72 | 89.45 |
| MW1 | 7/15/91 | 100.00 | NONE | 12.06 | 87.94 |
| MW2 | 7/15/91 | 100.03 | NONE | 12.04 | 87.99 |
| MW3 | 7/15/91 | 100.17 | NONE | 12.20 | 87.97 |
| MW1 | 10/15/91 | 100.00 | NONE | 12.50 | 87.50 |
| MW2 | 10/15/91 | 100.03 | NONE | 12.48 | 87.55 |
| MW3 | 10/15/91 | 100.17 | NONE | 12.60 | 87.57 |
| MW1 | 01/03/92 | 100.00 | NONE | 11.52 | 88.48 |
| MW2 | 01/03/92 | 100.03 | NONE | 11.53 | 88.50 |
| MW3 | 01/03/92 | 100.17 | NONE | 11.70 | 88.47 |

The water samples were stored in appropriate containers, labeled and transported in ice chests under Chain-Of-Custody protocol to a California State Certified Laboratory for analysis. Chain-Of-Custody forms are included in Appendix B. Each sample was tested for Total Petroleum Hydrocarbons as Diesel (TPH-D); Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX); and

Total Oil and Grease (TOG). The following table summarizes the laboratory analyses results to date.

RESULTS OF GROUNDWATER ANALYSES

| Well Sample | Date | TPH-D (ppm) | BTEX (ppb) | TOG (ppm) |
|----------------|----------|----------------|---------------|--------------|
| MW1 | 2/07/91 | 0.3 | ND/ND/ND/ND | ND |
| MW2 | 2/07/91 | ND | ND/ND/ND/ND | ND |
| MW3 | 2/07/91 | 0.3 | ND/ND/ND/ND | ND |
| MW1 | 3/15/91 | ND | ND/ND/ND/ND | ND |
| MW2 | 3/15/91 | ND | ND/ND/ND/ND | ND |
| MW3 | 3/15/91 | 0.055 | ND/ND/ND/ND | ND |
| MW1 | 4/16/91 | 0.20 | ND/ND/ND/ND | ND |
| MW2 | 4/16/91 | ND | ND/ND/ND/ND | ND |
| MW3 | 4/16/91 | ND | ND/ND/ND/ND | ND |
| MW1 | 7/15/91 | ND | ND/0.3/ND/ND | ND |
| MW2 | 7/15/91 | ND | ND/ND/ND/ND | ND |
| MW3 | 7/15/91 | ND | ND/ND/ND/ND | ND |
| MW1 | 10/15/91 | 0.080 | ND/ND/ND/ND | ND |
| MW2 | 10/15/91 | ND | ND/ND/ND/ND | ND |
| MW3 | 10/15/91 | ND | ND/ND/ND/ND | ND |
| MW1 | 1/3/92 | 0.14 | ND/ND/ND/ND | ND |
| MW2 | 1/3/92 | ND | ND/ND/ND/ND | ND |
| MW3 | 1/3/92 | 0.065 | ND/ND/ND/ND | ND |

Notes: (ppm) parts per million.
(ppb) parts per billion.
ND Not detected at or above limit of detection.

Analytical Certificates

Original certificates from a California State Certified Laboratory for the most recent groundwater analyses are attached in Appendix B. Copies of the Chain-of-Custody are also included in Appendix B.

Discussion

The groundwater flow direction as indicated by measurements taken on February 7, 1991 was to the southeast. Measurements taken on March 15, 1991

indicated that the groundwater flow direction had moved to the northeast. Measurements taken during April, 1991 indicate that the groundwater flow direction had moved to the north-northeast. Measurements taken during July and October, 1991 indicate that the groundwater flow direction had shifted and remained to the northwest. The January, 1992 elevation readings indicate that the gradient remains to the northwest. Refer to Figure 2 of Appendix A, which shows the well locations and the calculated groundwater gradient. The water surface elevation in each of the three wells rose approximately one foot. The significant change in the water surface elevations may be explained by the locally heavy rains which occurred during November and December, 1991.

Concentrations of BTEX and TOG were non-detectable in water samples from all wells. BTEX and TOG have been non-detectable since the well installation in February, 1991, with the exception of 0.3 ppb Toluene in the July, 1991 monitoring episode. The TPH-D results from MW2 have remained non-detectable since the well installation. The TPH-D results from MW1 and MW3 rose since the previous monitoring episode and were the highest since the initial reading in February, 1991. These results are probably related to the rains and recharge along with accelerated groundwater movement.

Proposed Future Work

We recommend that the monitoring of the three groundwater wells be continued on a quarterly schedule. Each water sample should be analyzed for TPH-D, BTEX, and TOG. The next scheduled episode should occur in April, 1992.

Report Submittal

Copies of this report have been submitted to:

Hazardous Materials Division
Department of Environmental Health
Alameda County Health Care Services Agency
80 Swan Way Rm 200
Oakland, CA 94621
Attn: Pamela J Evans

California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94162

APPENDIX A

Figures 1 through 2

GROUNDWATER MONITORING

**ARROYO HIGH SCHOOL
15701 LORENZO AVENUE
SAN LORENZO, CALIFORNIA**

L&W Project 5186D
January 22, 1992



L & W Environmental Services, Inc.

2111 Jennings Street
San Francisco, California

Site Plan

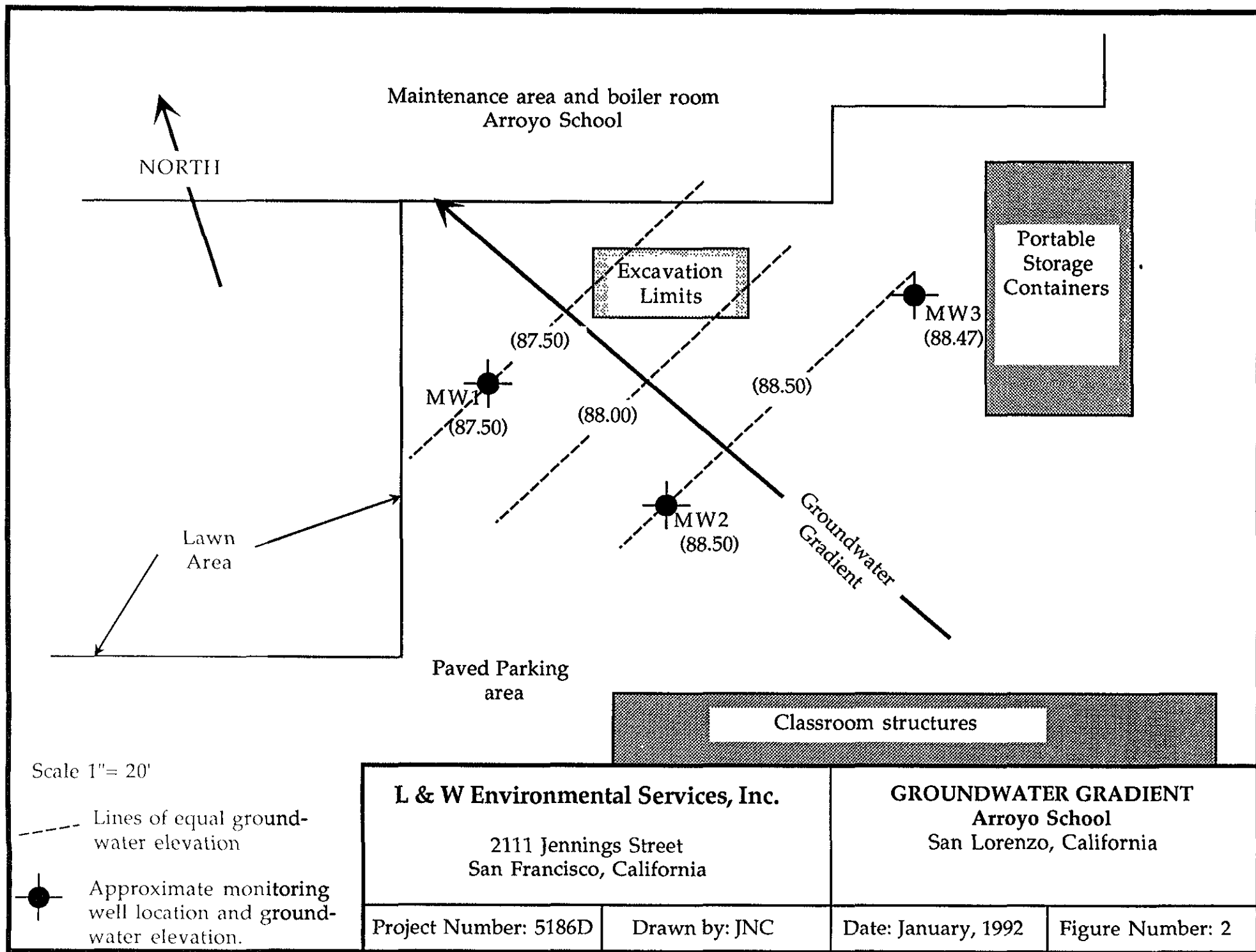
Arroyo High School
San Lorenzo, California

Project Number: 5186D

Drawn by: JNC

Date: January, 1992

Figure Number: 1



APPENDIX B

Laboratory Certificates and Chain of Custody Forms

GROUNDWATER MONITORING

**ARROYO HIGH SCHOOL
15701 LORENZO AVENUE
SAN LORENZO, CALIFORNIA**

L&W Project 5186D
January 22, 1992

Y

7340

[illegible]

| | | | |
|-----------------------------------------------------------|------------------|-------------------------------------------------------|------------------|
| RELINQUISHED BY: (Signature) <i>[Signature]</i> | DATE 3 JAN 92 | RECEIVED BY: (Signature) <i>Lorraine Mantovani</i> | DATE 3 JAN 92 |
| RELINQUISHED BY: (Signature) <i>Lorraine Mantovani</i> | TIME 4:00 pm | RECEIVED BY: (Signature) <i>[Signature]</i> | TIME 4:00 pm |
| RELINQUISHED BY: (Signature) <i>[Signature]</i> | DATE 1/6/92 | RECEIVED BY: (Signature) <i>[Signature]</i> | DATE 1/6/92 |
| RELINQUISHED BY: (Signature) <i>[Signature]</i> | TIME 300 | RECEIVED BY: (Signature) <i>[Signature]</i> | TIME 300 |
| RELINQUISHED BY: (Signature) <i>[Signature]</i> | DATE 6 JAN 92 | RECEIVED BY: (Signature) <i>[Signature]</i> | DATE 6 JAN 92 |
| RELINQUISHED BY: (Signature) <i>[Signature]</i> | TIME | RECEIVED BY: (Signature) <i>[Signature]</i> | TIME 4:15 pm |
| RELINQUISHED BY: (Signature) | DATE | RECEIVED BY: (Signature) | DATE |
| RELINQUISHED BY: (Signature) | TIME | RECEIVED BY: (Signature) | TIME |
| RELINQUISHED BY: (Signature) | DATE | RECEIVED BY: (Signature) | DATE |
| RELINQUISHED BY: (Signature) | TIME | RECEIVED BY: (Signature) | TIME |

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806

PHONE (510) 222-3002

FAX (510) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. E 750

Attn: George Wilson
L & W Environmental
2111 Jennings Street
San Francisco, CA 94124

Received: 01/06/92
Reported: 01/21/92
Job #: 73140

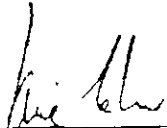
Project: San Lorenzo USD
15701 Lorenzo Avenue
Matrix: Water

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
 $\mu\text{g/L}$

| <u>Lab ID</u> | <u>Client ID</u> | <u>Diesel</u> | <u>MDL</u> |
|---------------|------------------|---------------|------------|
| 73140-1 | 5186D-MW1 | 140 | 50 |
| 73140-2 | 5186D-MW2 | ND<50 | 50 |
| 73140-3 | 5186D-MW3 | 65 | 50 |

QA/QC: Spike Recovery: 88%

MDL: Method Detection Limit. Compound below this level would not be detected.


Jaime Chow
Laboratory Director

JC/td

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806

PHONE (510) 222-3002

FAX (510) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. E 750

Received: 01/06/92

Reported: 01/21/92

Job #: 73140

Attn: George Wilson
L & W Environmental
2111 Jennings Street
San Francisco, CA 94124

Project: San Lorenzo USD
15701 Lorenzo Avenue
Matrix: Water

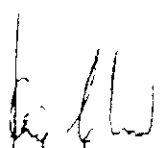
Aromatic Volatile Hydrocarbon Analysis
EPA Method 602
µg/L

| <u>Lab ID</u> | <u>Client ID</u> | <u>Benzene</u> | <u>MDL</u> | <u>Toluene</u> | <u>MDL</u> |
|---------------|------------------|----------------|------------|----------------|------------|
| 73140-1 | 5186D-MW1 | ND<0.3 | 0.3 | ND<0.3 | 0.3 |
| 73140-2 | 5186D-MW2 | ND<0.3 | 0.3 | ND<0.3 | 0.3 |
| 73140-3 | 5186D-MW3 | ND<0.3 | 0.3 | ND<0.3 | 0.3 |

| <u>Lab ID</u> | <u>Client ID</u> | <u>Ethyl- benzene</u> | <u>MDL</u> | <u>Xylenes</u> | <u>MDL</u> |
|---------------|------------------|---------------------------|------------|----------------|------------|
| 73140-1 | 5186D-MW1 | ND<0.3 | 0.3 | ND<0.6 | 0.6 |
| 73140-2 | 5186D-MW2 | ND<0.3 | 0.3 | ND<0.6 | 0.6 |
| 73140-3 | 5186D-MW3 | ND<0.3 | 0.3 | ND<0.6 | 0.6 |

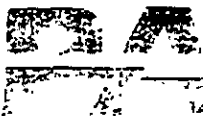
QA/QC: Spike Recovery for Benzene: 95%
Spike Recovery for Toluene: 104%
Spike Recovery for Xylene: 110%

MDL: Method Detection Limit. Compound below this level would not be detected.


Jaime Chow
Laboratory Director

JC/td

OUTSTANDING QUALITY AND SERVICE
CALIFORNIA STATE CERTIFIED LABORATORY



Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806

PHONE (510) 222-3002

FAX (510) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. E 750

Received: 01/06/92
Reported: 01/21/92
Job #: 73140

Attn: George Wilson
L & W Environmental
2111 Jennings Street
San Francisco, CA 94124

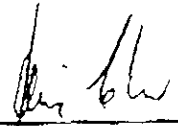
Project: San Lorenzo USD
15701 Lorenzo Avenue
Matrix: Water

Total Oil and Grease
EPA Method 5520B
mg/L

| <u>Lab ID</u> | <u>Client ID</u> | <u>Oil and Grease</u> | <u>MDL</u> |
|---------------|------------------|-----------------------|------------|
| 73140-1 | 5186D-MW1 | ND<5 | 5 |
| 73140-2 | 5186D-MW2 | ND<5 | 5 |
| 73140-3 | 5186D-MW3 | ND<5 | 5 |

QA/QC: Spike Recovery: 94%

MDL: Method Detection Limit. Compound below this level would not be detected.



Jaime Chow
Laboratory Director

JC/td