# Quarterly

# Groundwater Monitoring Report

March 1992

PG&E
ENCON-GAS Transmission and Distribution Construction Yard
4930 Coliseum Way
Oakland, California

Prepared by:

Aqua Resources Inc. (ARI)
a wholly owned subsidiary of The Earth Technology Corp.
2030 Addison Street, Suite 500
Berkeley, CA 94704

Report issued:
May 5, 1992

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## APPENDICES

## 1.0 BACKGROUND

This report presents the results of the quarterly groundwater monitoring performed in March 1992 at the PG&E ENCON-Gas Transmission and Distribution Construction Yard in accordance with the directive issued by Alameda County Health Care Agency. The yard is located at 4930 Coliseum Way in Oakland, California. As part of the groundwater monitoring program, samples were collected from shallow wells and analyses were performed to determine the distribution of waste oil, solvents, and fuel compounds in the uppermost aquifer beneath the northern part of the yard. This area includes the former sites of five underground storage tanks.

The underground tanks were removed in January 1988. Analyses of their contents revealed that of the four tanks formerly located in a cluster near the north corner of the yard, two contained mineral spirits and two tanks contained heavy oil. A concrete sump formerly connected to the tank cluster was located approximately 50 feet northeast of the tank cluster. The fifth tank formerly located near the west corner of the yard contained diesel fuel.

An area of approximately 6,600 square feet was excavated in November and December of 1991 as a remedial action for the petroleum hydrocarbon soil contamination believed to originate from one or more of the following: the four-tank cluster, the concrete sump, the former shop location, or a possible offsite release. The removed contaminated soil, which generally extended from the ground surface to the groundwater free surface at about 8 to 8 1/2 feet below grade, was replaced with clean compacted backfill.

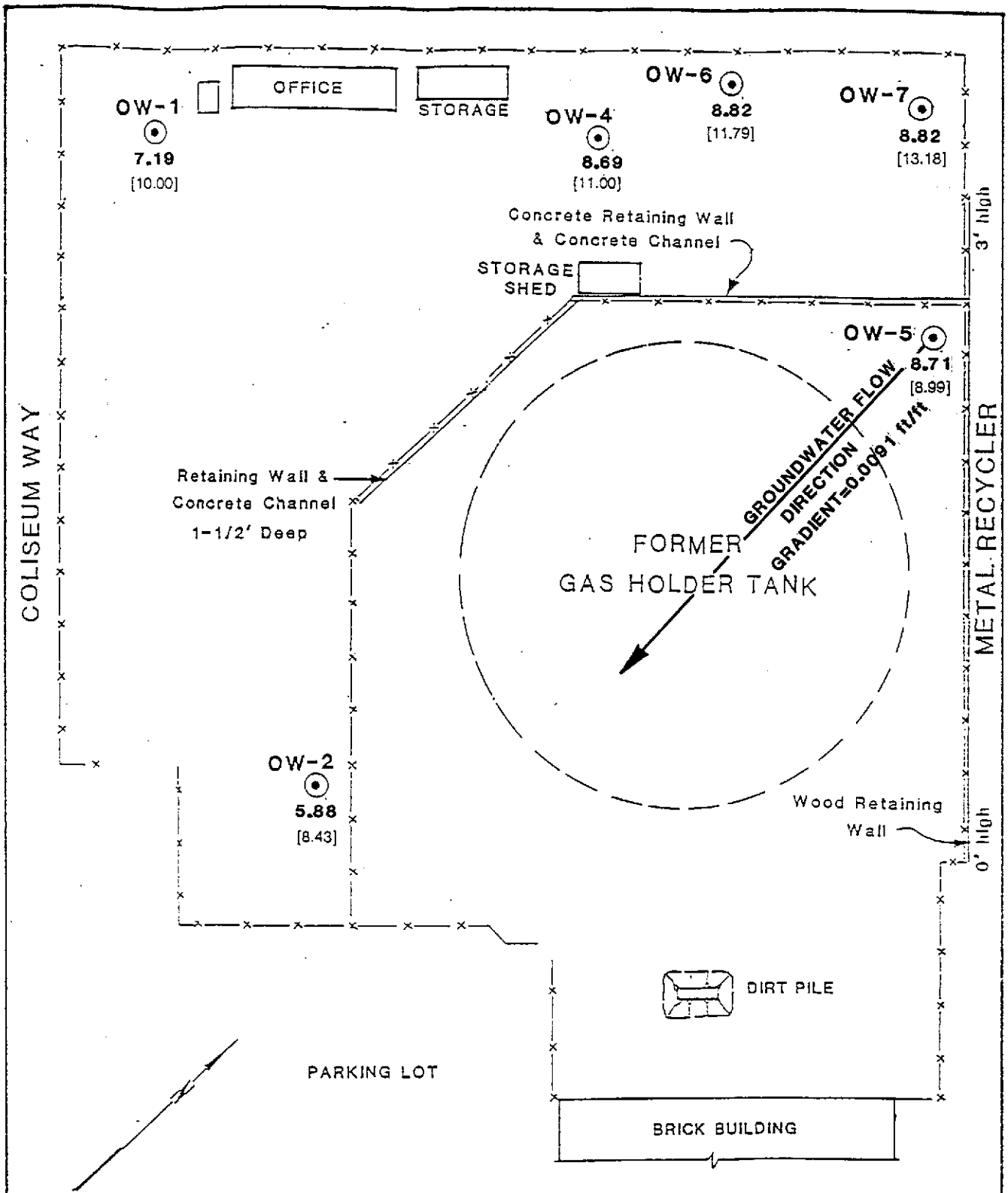
The surface area south of the former location of underground tanks is contaminated with lead. The lead probably originates from the sandblasting operations performed on a large gas storage tank which had been removed in May 1990. Soil at this area has been found contaminated with total and soluble lead above California Code of Regulations (CCR) levels for hazardous wastes. CCR Total Threshold Limit Concentration for lead is 1,000 mg/kg and 5 µg/l for soluble lead.

## 2.0 SAMPLING ACTIVITIES

Four of the originally-installed five monitoring wells remain in existence on the site. One monitoring well, OW-3, was destroyed during remedial excavations performed in the northern corner of the yard. Two new monitoring wells were installed on December 19, 1991. A fifth well, OW-6, was installed in the general vicinity of well OW-3 to act as its replacement. A sixth monitoring well, OW-7, was installed at the northeastern end of the remediation area to gauge the likelihood of upgradient contamination in the shallow groundwater underlying the PG&E site. The locations of these new wells were approved by the Alameda County Health Care Services Agency. Figure 1 presents the site plan including all present monitoring well locations. On March 31 and April 1, 1992, groundwater samples were collected by ARI personnel from monitoring wells OW-1, OW-2, OW-4, OW-5 and wells OW-6 and OW-7 installed in December 1991. Prior to sampling, three to six casing volumes of groundwater were purged with a bailer or pump from each well. Conductivity, pH, and temperature were measured after approximately every two gallons of groundwater was removed to ensure the stability of these parameters prior to sampling.

The groundwater samples collected from each well were analyzed by Curtis & Tompkins, Ltd. Analytical Laboratories, Berkeley, California for extractable petroleum hydrocarbons as diesel (TPH-D; LUFT Manual, October 1989); total oil and grease (SMWW 17:5520BF); and volatile organic compounds (EPA methods 8010); total volatile hydrocarbons as gasoline (LUFT Manual October 1989), benzene, toluene, xylenes, and ethylbenzene (BTXE), (EPA 4030/8020); and for lead (EPA 7421). In addition, field blank, travel blank and method blank analyses were performed for the purposes of quality assurance (QA) on the groundwater sample results.

Certified laboratory results are presented in Appendix A. Chain-of-Custody documentation is provided in Appendix B.




AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA

PG & E ENCON-Gas T & D Construction Yard

**Groundwater Elevations 3/31/92**

JOB NO. 90262.

**FIGURE 1**

DATE **April 1992**

March 1992 report

## 3.0 ANALYTICAL RESULTS

Table 3.1 summarizes the analytical results for petroleum hydrocarbons detected in the groundwater and QA samples collected on March 31 and April 1, 1992. TPH-Diesel was detected in each of the monitoring wells and was found in the highest concentration in wells OW-6 and OW-7. The highest concentration of gasoline was detected in the upgradient well OW-7. All samples were below the method detection limit for hydrocarbon oil and grease (O&G).

Table 3.1 Petroleum Hydrocarbons in Groundwater, in mg/l

| Well | Oil & Grease | TPH-Diesel | TVH-gasoline |
|---|---|---|---|
| OW-1 | ND | 3.10 | 0.10 |
| OW-2 | ND | 0.67 | ND |
| OW-4 | ND | 2.10 | ND |
| OW-5 | ND | 0.84 | 0.12 |
| OW-6 | ND | 4.90 | ND |
| OW-7 | ND | 4.40 | 0.70 |
| Travel Blank | NA | NA | ND |
| Field Blank | NA | NA | ND |

Notes:

1) ND = Not Detected at or above Method Detection Limit (MDL)
2) NA = Not Analyzed
3) Oil & Grease = Hydrocarbon Oil & Grease (Gravimetric) Method SMWW 17:5520BF, Reporting Limit = 5 mg/l
4) TPH-Diesel = Extractable Petroleum Hydrocarbons, Diesel Range, LUFT Manual October 1989; Reporting Limit = 0.05 mg/l.
5) TVH-Gasoline = Total Volatile Hydrocarbons by California DHS Method LUFT Manual October 1989.

Table 3.2 presents the results of groundwater analyses for soluble lead. The EPA and State maximum contaminant level (MCL) for lead is 50 µg/l. None of the samples contained lead concentrations above the reporting limit of 3 µg/l.

Table 3.3 presents the analytical results for volatile organic compounds. The State MCL for 1,4-Dichlorobenzene of 5 µg/l was substantially exceeded in monitoring well OW-7 and was 120 µg/l. In OW-2 and OW-5, benzene was detected at 1.4 and 1.5 µg/l, respectively, exceeding the MCL of 1 µg/l. 1,1,1-Trichloroethane (TCA) was found in upgradient well OW-7 460 µg/l. This is above the MCL of 200 µg/l.

Table 3.2 Lead in Groundwater, in µg/l

| Well | Reporting Limit | Soluble Lead |
|---|---|---|
| OW-1 | 3.0 | ND |
| OW-2 | 3.0 | ND |
| OW-4 | 3.0 | ND |
| OW-5 | 3.0 | ND |
| OW-6 | 3.0 | ND |
| OW-7 | 3.0 | ND |

1) Method EPA 7421
2) ND = Not Detected or above Method Detection Limit (MDL)

## Table 3.3 Volatile Organic Compounds in Groundwater, in ug/l

| PURGEABLE HALOCARBONS | MCL | Well Number | | | | | |
|---|---|---|---|---|---|---|---|
| | | OW-1 | OW-2 | OW-4 | OW-5 | OW-6 | OW-7 |
| Chloromethane | | ND | ND | ND | ND | ND | ND |
| Bromomethane | | ND | ND | ND | ND | ND | ND |
| Vinyl chloride | 0.5 | ND | ND | ND | ND | ND | ND |
| Chloroethane | | ND | ND | ND | ND | ND | ND |
| Methylene Chloride | 5# | ND | ND | ND | ND | ND | ND |
| Trichlorofluoromethane | 150 | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloroethene | 6 | ND | ND | ND | ND | ND | ND |
| 1,1-Dichloroethane | 5 | ND | ND | 7 | 4 | 1 | 16 |
| cis-1,2-Dichloroethene | 6 | ND | ND | ND | ND | ND | ND |
| trans-1,2-Dichloroethene | 10 | ND | ND | ND | ND | ND | ND |
| Chloroform | 100#* | ND | ND | ND | ND | ND | ND |
| Freon 113 | 1200 | ND | ND | ND | ND | ND | ND |
| 1,2-Dichloroethane | 0.5 | ND | ND | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 200 | ND | ND | ND | 12 | ND | 460 |
| Carbon Tetrachloride | 0.5 | ND | ND | ND | ND | ND | ND |
| Bromodichloromethane | 100#* | ND | ND | ND | ND | ND | ND |
| 1,2-Dichloropropane | 5 | ND | ND | ND | ND | ND | ND |
| cis-1,3-Dichloropropene | 5*** | ND | ND | ND | ND | ND | ND |
| Trichloroethylene | 5 | ND | ND | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | 32 | ND | ND | ND | ND | ND | ND |
| trans-1,3-Dichloropropene | 5*** | ND | ND | ND | ND | ND | ND |
| Dibromochloromethane | 100#* | ND | ND | ND | ND | ND | ND |
| 2-Chloroethylvinyl Ether | | ND | ND | ND | ND | ND | ND |
| Bromoform | 100#* | ND | ND | ND | ND | ND | ND |
| Tetrachloroethylene | 5 | ND | ND | ND | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | 1 | ND | ND | ND | ND | ND | ND |
| Chlorobenzene | 30 | ND | ND | ND | ND | ND | ND |
| 1,3-Dichlorobenzene | | ND | ND | ND | ND | ND | 130 |
| 1,2-Dichlorobenzene | 600# | ND | ND | ND | ND | ND | 22 |
| 1,4-Dichlorobenzene | 5 | ND | ND | ND | ND | ND | 120 |
| PURGEABLE AROMATICS | | | | | | | |
| Benzene | 1 | ND | 1.4 | ND | 15 | ND | 0.8 |
| Toluene | 1000# | ND | ND | ND | 1.1 | ND | 0.6 |
| Ethylbenzene | 680 | ND | ND | ND | 0.6 | ND | ND |
| Total Xylenes | 1750** | 3.2 | ND | 0.7 | 5.1 | ND | 2.1 |

Notes:

1) MCL = Maximum Contaminant Level in drinking water (State MCL, if not noted otherwise)

2) # = EPA MCL

3) * = MCL for sum of four compounds

4) ** = MCL for sum of all xylene isomers

5) *** = MCL for sum of trans- and cis-1,3-Dichloropropene

6) ND = Not Detected at or above MDL

7) Purgeable Halocarbons (EPA method 8010)

8) Purgeable Aromatics (EPA method 8020)

## 4.0 GROUNDWATER FLOW DIRECTION

Water level measurements in the monitoring wells were made on March 31, 1992, prior to sampling groundwater in the six onsite wells. Groundwater elevations are shown in relation to a site specific coordinate system reported in previous reports. The top of casing (TOC) elevations for each of these wells is based upon an assumed TOC elevation of 10 feet at well OW-1. The TOC of the two new wells were surveyed by a registered surveyor relative to OW-1 on January 9, 1992. Wells OW-2, OW-4 and OW-5 were resurveyed at this time and found to be within 0.01 feet of their previously measured elevations.

The measured groundwater elevations are presented in Figure 1 along with the relative TOC elevations of each of the wells. The groundwater flow direction calculated from elevations in OW-1, OW-2, and OW-5 indicates the general regional groundwater flow to be to the south at a gradient of approximately 0.0091 ft/ft. This flow direction is different from the one observed last quarter which was to the southwest. The groundwater elevations in all wells were significantly higher, probably due to the winter rainfall. The water level in well OW-5 was only 3.3 inches below surface.

## 5.0 CONCLUSIONS

Results of analyses performed on groundwater samples collected in March 31 and April 1, 1992 from monitoring wells OW-1, OW-2, OW-4, OW-5, OW-6 and OW-7 show that diesel fuel was detected in each well above the method detection limit (MDL). The highest concentration of diesel was observed in well OW-6 and upgradient well OW-7. Lead and oil and grease were not detected in any of the wells at concentrations above the MDL.

Samples from OW-5, OW-6, and OW-7 exceeded the maximum contaminant level for certain volatile organic compounds for drinking water. High concentrations of benzene, detected in OW-5, might indicate an upgradient (off-site) source of fuel contamination. Dichlorobenzenes were found in the other upgradient well, OW-7. However, these concentrations were lower than those observed in December 1991. TCA was found to be present in upgradient wells OW-5 (12 µg/l) and OW-7 (460 µg/l) which might also indicate that offsite source of contamination exists. Water levels in all wells were much higher than those measured during previous sampling events. Groundwater flow across most of the site appears to be to the south.

# APPENDIX A

# CERTIFIED LABORATORY RESULTS

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 04/01/92
DATE REPORTED: 04/16/92

LABORATORY NUMBER: 107008

CLIENT: AQUA RESOURCES, INC.

PROJECT ID: 690262.3

LOCATION: PG&E

RESULTS: SEE ATTACHED



JOB NO. 690262.3
FILE lab results

Reviewed By

Reviewed By

Curtis & Tompkins, Ltd.

Client: Aqua Resources

Laboratory Login Number: 107008

Project Name: PG&E
Project Number: 690262.3

Report Date: 16 April 92

**ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric)** **METHOD: SMWW 17:5520BF**

| Lab ID | Sample ID | Matrix | Sampled | Received | Analyzed | Result | Units | RL | Analyst | QC Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| 107008-001 | W-5 | Water | 01-APR-92 | 01-APR-92 | 07-APR-92 | ND | mg/L | 5 | TR | 4874 |
| 107008-002 | W-6 | Water | 01-APR-92 | 01-APR-92 | 07-APR-92 | ND | mg/L | 5 | TR | 4874 |
| 107008-003 | W-7 | Water | 01-APR-92 | 01-APR-92 | 07-APR-92 | ND | mg/L | 5 | TR | 4874 |

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd.

# Q C  B a t c h  R e p o r t

Client: Aqua Resources
Project Name: PG&E
Project Number: 690262.3

Laboratory Login Number: 107008
Report Date: 16 April 92

**ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric)** **QC Batch Number: 4874**

Blank Results

| Sample ID | Result | MDL | Units | Method | Date Analyzed |
|---|---|---|---|---|---|
| BLANK | ND | 5 | mg/L | SMWW 17:5520BF | 07-APR-92 |

Spike/Duplicate Results

| Sample ID | Recovery | Method | Date Analyzed |
|---|---|---|---|
| BS | 84% | SMWW 17:5520BF | 07-APR-92 |
| BSD | 89% | SMWW 17:5520BF | 07-APR-92 |

| | | Control Limits |
|---|---|---|
| Average Spike Recovery | 86% | 80% - 120% |
| Relative Percent Difference | 5.5% | < 20% |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE ANALYZED: 04/02,03/92
DATE REPORTED: 04/16/92

## Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
## TVH by California DOHS Method/LUFT Manual October 1989
## BTXE by EPA 5030/8020

| LAB ID | SAMPLE ID | TVH AS GASOLINE (ug/L) | BENZENE (ug/L) | TOLUENE (ug/L) | ETHYL BENZENE (ug/L) | TOTAL XYLENES (ug/L) |
|---|---|---|---|---|---|---|
| 107008-1 | W-5 | 120 | 15 | 1.1 | 0.6 | 5.1 |
| 107008-2 | W-6 | ND(50) | ND(0.5) | ND(0.5) | ND(0.5) | ND(0.5) |
| 107008-3 | W-7 | 700 | 0.8 | 0.6 | ND(0.5) | 2.1 |
| 107008-4 | TRAVEL BLANK | ND(50) | ND(0.5) | ND(0.5) | ND(0.5) | ND(0.5) |
| 107008-7 | FIELD BLANK 3 | ND(50) | ND(0.5) | ND(0.5) | ND(0.5) | ND(0.5) |

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

| | |
|---|---|
| RPD, % | 4 |
| RECOVERY, % | 96 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE EXTRACTED: 04/06/92
DATE ANALYZED: 04/06,07/9
DATE REPORTED: 04/16/92

## Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

| LAB ID | CLIENT ID | KEROSENE RANGE (ug/L) | DIESEL RANGE (ug/L) | REPORTING LIMIT* (ug/L) |
|---|---|---|---|---|
| 107008-1 | W-5 | ** | 840 | 50 |
| 107008-2 | W-6 | ** | 4,900 | 50 |
| 107008-3 | W-7 | ** | 4,400 | 50 |

*Reporting limit applies to all analytes.

**Sample quantitated as diesel.

QA/QC SUMMARY

| | |
|---|---|
| RPD, % | 6 |
| RECOVERY, % | 90 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE ANALYZED: 04/09/92
DATE REPORTED: 04/16/92

ANALYSIS: LEAD
ANALYSIS METHOD: EPA 7421

| LAB ID | SAMPLE ID | RESULT | UNITS | REPORTING LIMIT |
|---|---|---|---|---|
| 107008-1 | W-5 | ND | ug/L | 3.0 |
| 107008-2 | W-6 | ND | ug/L | 3.0 |
| 107008-3 | W-7 | ND | ug/L | 3.0 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY:

| | |
|---|---|
| RPD, % | 2 |
| RECOVERY, % | 101 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008-1
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: W-5

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE ANALYZED: 04/10/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | 4 | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | 12 | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 110 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008-2
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: W-6

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE ANALYZED: 04/10/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | 1 | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 112 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008-3
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: W-7

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE ANALYZED: 04/13/92
DATE REPORTED: 04/16/92

## EPA 8010
## Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 10 |
| Bromomethane | ND | 10 |
| Vinyl chloride | ND | 10 |
| Chloroethane | ND | 10 |
| Methylene chloride | ND | 100 |
| Trichlorofluoromethane | ND | 5 |
| 1,1-Dichloroethene | ND | 5 |
| 1,1-Dichloroethane | 16 | 5 |
| cis-1,2-Dichloroethene | ND | 5 |
| trans-1,2-Dichloroethene | ND | 5 |
| Chloroform | ND | 5 |
| Freon 113 | ND | 5 |
| 1,2-Dichloroethane | ND | 5 |
| 1,1,1-Trichloroethane | 460 | 50 |
| Carbon tetrachloride | ND | 5 |
| Bromodichloromethane | ND | 5 |
| 1,2-Dichloropropane | ND | 5 |
| cis-1,3-Dichloropropene | ND | 5 |
| Trichloroethylene | ND | 5 |
| 1,1,2-Trichloroethane | ND | 5 |
| trans-1,3-Dichloropropene | ND | 5 |
| Dibromochloromethane | ND | 5 |
| 2-Chloroethylvinyl ether | ND | 10 |
| Bromoform | ND | 5 |
| Tetrachloroethene | ND | 5 |
| 1,1,2,2-Tetrachloroethane | ND | 5 |
| Chlorobenzene | ND | 5 |
| 1,3-Dichlorobenzene | 130 | 5 |
| 1,2-Dichlorobenzene | 22 | 5 |
| 1,4-Dichlorobenzene | 120 | 5 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| Surrogate Recovery, % | 107 |
|---|---|

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008-5
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: FIELD BLANK 1

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE ANALYZED: 04/11/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | ND | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 113 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008-6
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: FIELD BLANK 2

DATE SAMPLED: 04/01/92
DATE RECEIVED: 04/01/92
DATE ANALYZED: 04/11/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | ND | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 114 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: METHOD BLANK

DATE ANALYZED: 04/10/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | ND | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 111 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107008
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: METHOD BLANK

DATE ANALYZED: 04/13/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | ND | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 113 |

Curtis & Tompkins, Ltd.

# LABORATORY CONTROL SAMPLE SUMMARY SHEET FOR EPA 8010/8020

| | | | |
|---|---|---|---|
| Operator: | MBP | Spike file: | 101W/X002 |
| Analysis date: | 4/10/92 | Instrument : | GC12 (QUANT COLUMN) |
| Sample type: | WATER | Sequence Name | APR10 |

## LCS SPIKE DATA (spiked at 20 ppb)

| 8010 COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| 1,1-Dichloroethene | 17.22 | 86 % | OK | 60 - 133 |
| Trichloroethene | 19.78 | 99 % | OK | 88 - 125 |
| Chlorobenzene | 18.92 | 95 % | OK | 90 - 127 |
| SURROGATES | | | | |
| Bromobenzene | 107.80 | 108 % | OK | 98 - 115 |

| 8020 COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| Benzene | 19.47 | 97 % | OK | 62 - 120 |
| Toluene | 19.28 | 96 % | OK | 61 - 121 |
| Chlorobenzene | 21.30 | 107 % | OK | 84 - 115 |
| SURROGATES | | | | |
| Bromobenzene | 100.71 | 101 % | OK | 91 - 107 |

LIMITS ARE BASED ON CONTROL CHARTS (NOV. 91).

Curtis & Tompkins, Ltd.

MS/MSD SUMMARY SHEET FOR EPA 8010/8020
INSTRUMENT: HP-5890 COLUMN: RESTEK 502.2 DETECTORS: HALL/PID

| | | | |
|---|---|---|---|
| Operator: | MBP | Spike file: | 101W/X022 |
| Analysis date: | 4/11/92 | Spike dup file: | 101W/X023 |
| Sample type: | WATER | Instrument: | GC12 |
| Sample ID: | 107012-004 1:200 | Sequence name: | APR10 |

8010 MS/MSD DATA (spiked at 20 ppb) Ave Rec= 99 %

| SPIKE COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| 1,1-Dichloroethene | 20.36 | 102 % | OK | 61 - 145 |
| Trichloroethene | 19.76 | 99 % | OK | 71 - 120 |
| Chlorobenzene | 18.91 | 95 % | OK | 75 - 130 |
| SPIKE DUP COMPOUNDS | | | | |
| 1,1-Dichloroethene | 21.36 | 107 % | OK | 61 - 145 |
| Trichloroethene | 18.85 | 94 % | OK | 71 - 120 |
| Chlorobenzene | 19.45 | 97 % | OK | 75 - 130 |
| SURROGATES | | | | |
| BROMOBENZENE (MS) | 108.89 | 109 % | OK | 75 - 115 |
| BROMOBENZENE (MSD) | 105.95 | 106 % | OK | 75 - 115 |

8020 MS/MSD DATA (spiked at 20 ppb) Ave Rec= 100 %

| SPIKE COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| Benzene | 18.98 | 95 % | OK | 76 - 127 |
| Toluene | 18.55 | 93 % | OK | 76 - 125 |
| Chlorobenzene | 20.11 | 101 % | OK | 75 - 130 |
| SPIKE DUP COMPOUNDS | | | | |
| Benzene | 20.27 | 101 % | OK | 76 - 127 |
| Toluene | 20.23 | 101 % | OK | 76 - 125 |
| Chlorobenzene | 21.58 | 108 % | OK | 75 - 130 |
| SURROGATES | | | | |
| BROMOBENZENE (MS) | 100.42 | 100 % | OK | 75 - 120 |
| BROMOBENZENE (MSD) | 100.93 | 101 % | OK | 75 - 120 |

RPD DATA 8010 RPD= 4.1 % 8020 RPD= 7.4 %

| 8010 COMPOUNDS | SPIKE | SPIKE DUP | RPD | STATUS | LIMITS |
|---|---|---|---|---|---|
| 1,1-Dichloroethene | 20.36 | 21.36 | 5 % | OK | < 14 |
| Trichloroethene | 19.76 | 18.85 | 5 % | OK | < 14 |
| Chlorobenzene | 18.91 | 19.45 | 3 % | OK | < 13 |
| 8020 COMPOUNDS | | | | | |
| Benzene | 18.98 | 20.27 | 7 % | OK | < 11 |
| Toluene | 18.55 | 20.23 | 9 % | OK | < 13 |
| Chlorobenzene | 20.11 | 21.58 | 7 % | OK | < 13 |

SPIKE RECOVERY LIMITS FROM SW-846 METHODS 8010/8020 TABLE 3;
SURROGATE RECOVERY LIMITS FROM LCS CONTROL CHARTS (NOV. 91);
RPD LIMITS FROM CLP SOW 2/88 VOLATILES.

Curtis & Tompkins, Ltd.

# LABORATORY CONTROL SAMPLE SUMMARY SHEET FOR EPA 8010/8020

| | | | |
|---|---|---|---|
| Operator: | MBP | Spike file: | 104W/X002 |
| Analysis date: | 4/13/92 | Instrument: | GC12 (QUANT COLUMN) |
| Sample type: | WATER | Sequence name: | APR13 |

## LCS SPIKE DATA (spiked at 20 ppb)

| 8010 COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| 1,1-Dichloroethene | 21.87 | 109 % | OK | 60 - 133 |
| Trichloroethene | 21.44 | 107 % | OK | 88 - 125 |
| Chlorobenzene | 19.40 | 97 % | OK | 90 - 127 |
| SURROGATES | | | | |
| Bromobenzene | 114.12 | 114 % | OK | 98 - 115 |

| 8020 COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| Benzene | 19.51 | 98 % | OK | 62 - 120 |
| Toluene | 19.70 | 99 % | OK | 61 - 121 |
| Chlorobenzene | 20.45 | 102 % | OK | 84 - 115 |
| SURROGATES | | | | |
| Bromobenzene | 101.60 | 102 % | OK | 91 - 107 |

SPIKE RECOVERY LIMITS FROM SW-846 METHODS 8010/8020 TABLE 3;
SURROGATE RECOVERY LIMITS FROM LCS WATER CONTROL CHARTS (NOV. 91).

Curtis & Tompkins, Ltd.

# MS/MSD SUMMARY SHEET FOR EPA 8010/8020

| | | | |
|---|---|---|---|
| Operator: | MBP | Spike file: | 104W/X005 |
| Analysis date: | 4/13/92 | Spike dup file: | 104W/X006 |
| Sample type: | WATER | Instrument: | GC12 (QUANT COLUMN) |
| Sample ID: | 107008-003 1:5 | Sequence Name: | APR13 |

8010 MS/MSD DATA (spiked at 20 ppb)

| SPIKE COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| 1,1-Dichloroethene | 19.88 | 99 % | OK | 28 - 167 |
| Trichloroethene | 19.76 | 99 % | OK | 35 - 146 |
| Chlorobenzene | 18.90 | 95 % | OK | 38 - 150 |
| SPIKE DUP COMPOUNDS | | | | |
| 1,1-Dichloroethene | 19.25 | 96 % | OK | 28 - 167 |
| Trichloroethene | 19.06 | 95 % | OK | 35 - 146 |
| Chlorobenzene | 18.42 | 92 % | OK | 38 - 150 |
| SURROGATES | | | | |
| BROMOBENZENE (MS) | 104.96 | 105 % | OK | 98 - 115 |
| BROMOBENZENE (MSD) | 109.20 | 109 % | OK | 98 - 115 |

8020 MS/MSD DATA (spiked at 20 ppb)

| SPIKE COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| Benzene | 19.21 | 96 % | OK | 39 - 150 |
| Toluene | 19.32 | 97 % | OK | 46 - 148 |
| Chlorobenzene | 20.30 | 102 % | OK | 55 - 135 |
| SPIKE DUP COMPOUNDS | | | | |
| Benzene | 18.93 | 95 % | OK | 39 - 150 |
| Toluene | 19.12 | 96 % | OK | 46 - 148 |
| Chlorobenzene | 20.46 | 102 % | OK | 55 - 135 |
| SURROGATES | | | | |
| BROMOBENZENE (MS) | 100.19 | 100 % | OK | 91 - 107 |
| BROMOBENZENE (MSD) | 99.59 | 100 % | OK | 91 - 107 |

RPD DATA

| 8010 COMPOUNDS | SPIKE | SPIKE DUP | RPD | STATUS | LIMITS |
|---|---|---|---|---|---|
| 1,1-Dichloroethene | 19.88 | 19.25 | 3 % | OK | <= 14 |
| Trichloroethene | 19.76 | 19.06 | 4 % | OK | <= 14 |
| Chlorobenzene | 18.90 | 18.42 | 3 % | OK | <= 13 |
| 8020 COMPOUNDS | | | | | |
| Benzene | 19.21 | 18.93 | 1 % | OK | <= 11 |
| Toluene | 19.32 | 19.12 | 1 % | OK | <= 13 |
| Chlorobenzene | 20.30 | 20.46 | 1 % | OK | <= 13 |

SPIKE RECOVERY LIMITS FROM SW-846 METHODS 8010/8020 TABLE 3;
SURROGATE RECOVERY LIMITS FROM LCS CONTROL CHARTS (NOV. 91);
RPD LIMITS FROM CLP SOW 2/88 VOLATILES.

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 03/31/92
DATE REPORTED: 04/16/92

LABORATORY NUMBER: 107005

CLIENT: AQUA RESOURCES, INC.

PROJECT ID: 690262.3

LOCATION: PG&E

RESULTS: SEE ATTACHED

Reviewed By

Reviewed By

AQUA RESOURCES INC
RECEIVED
APR 3 1992
JOB NO. 690262.3
FILE lab results

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107005
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E

DATE SAMPLED: 03/31/92
DATE RECEIVED: 03/31/92
DATE ANALYZED: 04/03/92
DATE REPORTED: 04/16/92

ANALYSIS: LEAD
ANALYSIS METHOD: EPA 7421

| LAB ID | SAMPLE ID | RESULT | UNITS | REPORTING LIMIT |
|---|---|---|---|---|
| 107005-1 | W-2 | ND | ug/L | 3.0 |
| 107005-2 | W-1 | ND | ug/L | 3.0 |
| 107005-3 | W-4 | ND | ug/L | 3.0 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY:

| | |
|---|---|
| RPD, % | 2 |
| RECOVERY, % | 106 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107005
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E

DATE SAMPLED: 03/31/92
DATE RECEIVED: 03/31/92
DATE EXTRACTED: 04/06/92
DATE ANALYZED: 04/07/92
DATE REPORTED: 04/16/92

## Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

| LAB ID | CLIENT ID | KEROSENE RANGE (ug/L) | DIESEL RANGE (ug/L) | REPORTING LIMIT* (ug/L) |
|---|---|---|---|---|
| 107005-1 | W-2 | ** | 670 | 50 |
| 107005-2 | W-1 | ** | 3,100 | 50 |
| 107005-3 | W-4 | ** | 2,100 | 50 |

*Reporting limit applies to all analytes.

**Sample qauntitated as diesel.

QA/QC SUMMARY

| | |
|---|---|
| RPD, % | 6 |
| RECOVERY, % | 90 |

Curtis & Tompkins, Ltd.

**Client:** Aqua Resources

**Laboratory Login Number:** 107005

Project Name: P.G.&E.
Project Number: 690262.3

Report Date: 16 April 92

**ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric)** **METHOD: SMWW 17:5520BF**

| Lab ID | Sample ID | Matrix | Sampled | Received | Analyzed | Result | Units | RL | Analyst | QC Batch |
|---|---|---|---|---|---|---|---|---|---|---|
| 107005-001 | W-2 | Water | 31-MAR-92 | 31-MAR-92 | 07-APR-92 | ND | mg/L | 5 | TR | 4874 |
| 107005-002 | W-1 | Water | 31-MAR-92 | 31-MAR-92 | 07-APR-92 | ND | mg/L | 5 | TR | 4874 |
| 107005-003 | W-4 | Water | 31-MAR-92 | 31-MAR-92 | 07-APR-92 | ND | mg/L | 5 | TR | 4874 |

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd.

# Q C  B a t c h  R e p o r t

Client: Aqua Resources
Project Name: P.G.&E.
Project Number: 690262.3

Laboratory Login Number: 107005
Report Date: 16 April 92

**ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric)** **QC Batch Number: 4874**

Blank Results

| Sample ID | Result | MDL | Units | Method | Date Analyzed |
|---|---|---|---|---|---|
| BLANK | ND | 5 | mg/L | SMWW 17:5520BF | 07-APR-92 |

Spike/Duplicate Results

| Sample ID | Recovery | Method | Date Analyzed |
|---|---|---|---|
| BS | 84% | SMWW 17:5520BF | 07-APR-92 |
| BSD | 89% | SMWW 17:5520BF | 07-APR-92 |

| | | Control Limits |
|---|---|---|
| Average Spike Recovery | 86% | 80% - 120% |
| Relative Percent Difference | 5.5% | < 20% |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107005
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E

DATE SAMPLED: 03/31/92
DATE RECEIVED: 03/31/92
DATE ANALYZED: 04/01/92
DATE REPORTED: 04/16/92

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
TVH by California DOHS Method/LUFT Manual October 1989
BTXE by EPA 5030/8020

| LAB ID | SAMPLE ID | TVH AS GASOLINE (ug/L) | BENZENE (ug/L) | TOLUENE (ug/L) | ETHYL BENZENE (ug/L) | TOTAL XYLENES (ug/L) |
|---|---|---|---|---|---|---|
| 107005-1 | W-2 | ND(50) | 1.4 | ND(0.5) | ND(0.5) | ND(0.5) |
| 107005-2 | W-1 | 100 | ND(0.5) | ND(0.5) | ND(0.5) | 3.2 |
| 107005-3 | W-4 | ND(50) | ND(0.5) | ND(0.5) | ND(0.5) | 0.7 |

ND = Not detected at or above reporting limit; Reporting limit indicated in parentheses.

QA/QC SUMMARY

| | |
|---|---|
| RPD, % | 1 |
| RECOVERY, % | 105 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107005-1
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: W-2

DATE SAMPLED: 03/31/92
DATE RECEIVED: 03/31/92
DATE ANALYZED: 04/10/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | ND | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 113 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107005-2
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: W-1

DATE SAMPLED: 03/31/92
DATE RECEIVED: 03/31/92
DATE ANALYZED: 04/10/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | ND | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 113 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107005-3
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: W-4

DATE SAMPLED: 03/31/92
DATE RECEIVED: 03/31/92
DATE ANALYZED: 04/10/92
DATE REPORTED: 04/16/92

## EPA 8010
## Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | 7 | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 113 |

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 107005
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.3
LOCATION: PG&E
SAMPLE ID: METHOD BLANK

DATE ANALYZED: 04/10/92
DATE REPORTED: 04/16/92

EPA 8010
Purgeable Halocarbons in Water

| Compound | Result ug/L | Reporting Limit ug/L |
|---|---|---|
| Chloromethane | ND | 2 |
| Bromomethane | ND | 2 |
| Vinyl chloride | ND | 2 |
| Chloroethane | ND | 2 |
| Methylene chloride | ND | 20 |
| Trichlorofluoromethane | ND | 1 |
| 1,1-Dichloroethene | ND | 1 |
| 1,1-Dichloroethane | ND | 1 |
| cis-1,2-Dichloroethene | ND | 1 |
| trans-1,2-Dichloroethene | ND | 1 |
| Chloroform | ND | 1 |
| Freon 113 | ND | 1 |
| 1,2-Dichloroethane | ND | 1 |
| 1,1,1-Trichloroethane | ND | 1 |
| Carbon tetrachloride | ND | 1 |
| Bromodichloromethane | ND | 1 |
| 1,2-Dichloropropane | ND | 1 |
| cis-1,3-Dichloropropene | ND | 1 |
| Trichloroethylene | ND | 1 |
| 1,1,2-Trichloroethane | ND | 1 |
| trans-1,3-Dichloropropene | ND | 1 |
| Dibromochloromethane | ND | 1 |
| 2-Chloroethylvinyl ether | ND | 2 |
| Bromoform | ND | 1 |
| Tetrachloroethene | ND | 1 |
| 1,1,2,2-Tetrachloroethane | ND | 1 |
| Chlorobenzene | ND | 1 |
| 1,3-Dichlorobenzene | ND | 1 |
| 1,2-Dichlorobenzene | ND | 1 |
| 1,4-Dichlorobenzene | ND | 1 |

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

| | |
|---|---|
| Surrogate Recovery, % | 111 |

Curtis & Tompkins, Ltd.

# LABORATORY CONTROL SAMPLE SUMMARY SHEET FOR EPA 8010/8020

| | | | |
|---|---|---|---|
| Operator: | MBP | Spike file: | 101W/X002 |
| Analysis date: | 4/10/92 | Instrument : | GC12 (QUANT COLUMN) |
| Sample type: | WATER | Sequence Name | APR10 |

## LCS SPIKE DATA (spiked at 20 ppb)

| 8010 COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| 1,1-Dichloroethene | 17.22 | 86 % | OK | 60 - 133 |
| Trichloroethene | 19.78 | 99 % | OK | 88 - 125 |
| Chlorobenzene | 18.92 | 95 % | OK | 90 - 127 |
| SURROGATES | | | | |
| Bromobenzene | 107.80 | 108 % | OK | 98 - 115 |

| 8020 COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| Benzene | 19.47 | 97 % | OK | 62 - 120 |
| Toluene | 19.28 | 96 % | OK | 61 - 121 |
| Chlorobenzene | 21.30 | 107 % | OK | 84 - 115 |
| SURROGATES | | | | |
| Bromobenzene | 100.71 | 101 % | OK | 91 - 107 |

LIMITS ARE BASED ON CONTROL CHARTS (NOV. 91).

Curtis & Tompkins, Ltd.

# MS/MSD SUMMARY SHEET FOR EPA 8010/8020

INSTRUMENT: HP-5890 COLUMN: RESTEK 502.2 DETECTORS: HALL/PID

| | | | |
|---|---|---|---|
| Operator: | MBP | Spike file: | 101W/X022 |
| Analysis date: | 4/11/92 | Spike dup file: | 101W/X023 |
| Sample type: | WATER | Instrument: | GC12 |
| Sample ID: | 107012-004 1:200 | Sequence name: | APR10 |

8010 MS/MSD DATA (spiked at 20 ppb) Ave Rec= 99 %

| SPIKE COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| 1,1-Dichloroethene | 20.36 | 102 % | OK | 61 - 145 |
| Trichloroethene | 19.76 | 99 % | OK | 71 - 120 |
| Chlorobenzene | 18.91 | 95 % | OK | 75 - 130 |
| SPIKE DUP COMPOUNDS | | | | |
| 1,1-Dichloroethene | 21.36 | 107 % | OK | 61 - 145 |
| Trichloroethene | 18.85 | 94 % | OK | 71 - 120 |
| Chlorobenzene | 19.45 | 97 % | OK | 75 - 130 |
| SURROGATES | | | | |
| BROMOBENZENE (MS) | 108.89 | 109 % | OK | 75 - 115 |
| BROMOBENZENE (MSD) | 105.95 | 106 % | OK | 75 - 115 |

8020 MS/MSD DATA (spiked at 20 ppb) Ave Rec= 100 %

| SPIKE COMPOUNDS | READING | RECOVERY | STATUS | LIMITS |
|---|---|---|---|---|
| Benzene | 18.98 | 95 % | OK | 76 - 127 |
| Toluene | 18.55 | 93 % | OK | 76 - 125 |
| Chlorobenzene | 20.11 | 101 % | OK | 75 - 130 |
| SPIKE DUP COMPOUNDS | | | | |
| Benzene | 20.27 | 101 % | OK | 76 - 127 |
| Toluene | 20.23 | 101 % | OK | 76 - 125 |
| Chlorobenzene | 21.58 | 108 % | OK | 75 - 130 |
| SURROGATES | | | | |
| BROMOBENZENE (MS) | 100.42 | 100 % | OK | 75 - 120 |
| BROMOBENZENE (MSD) | 100.93 | 101 % | OK | 75 - 120 |

RPD DATA 8010 RPD= 4.1 % 8020 RPD= 7.4 %

| 8010 COMPOUNDS | SPIKE | SPIKE DUP | RPD | STATUS | LIMITS |
|---|---|---|---|---|---|
| 1,1-Dichloroethene | 20.36 | 21.36 | 5 % | OK | < 14 |
| Trichloroethene | 19.76 | 18.85 | 5 % | OK | < 14 |
| Chlorobenzene | 18.91 | 19.45 | 3 % | OK | < 13 |
| 8020 COMPOUNDS | | | | | |
| Benzene | 18.98 | 20.27 | 7 % | OK | < 11 |
| Toluene | 18.55 | 20.23 | 9 % | OK | < 13 |
| Chlorobenzene | 20.11 | 21.58 | 7 % | OK | < 13 |

SPIKE RECOVERY LIMITS FROM SW-846 METHODS 8010/8020 TABLE 3;
SURROGATE RECOVERY LIMITS FROM LCS CONTROL CHARTS (NOV. 91);
RPD LIMITS FROM CLP SOW 2/88 VOLATILES.

# APPENDIX B

# CHAIN-OF-CUSTODY DOCUMENTATION

107008

# AQUA RESOURCES, INC.

SHIPMENT NO.: 2

## CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 4/1/92

PROJECT NAME: PG+E

PROJECT NO.: 690262.3

| Sample Number | Location | Type of Sample: Material | Type of Sample: Method | Type of Container | Type of Preservation: Temp | Type of Preservation: Chemical | Analysis Required |
|---|---|---|---|---|---|---|---|
| W-5 | Well W-5 | Water | Bailer | 2x40 ml VOA | ±4°C | HCl | EPA 8010 |
| W-5 | Well W-5 | " | " | 1x VOA | " | " | TVHG & BTEX |
| W-5 | " | " | " | 1 l Amber | " | None | TPH as D, K |
| W-5 | " | " | " | " | " | $H_2SO_4$ | O&G |
| W-5 | " | " | " | Plastic Bottle | " | $HNO_4$ | Lead |
| | | | | | | | |
| W-6 | Well W6 | Water | Bailer | 2 x VOA | " | HCl | EPA 8010 |
| W-6 | " | " | " | 1 x VOA | " | " | TVHG + BTEX |
| W-6 | " | " | " | 1 l Amber | " | None | TPH as D, K |
| W-6 | " | " | " | 1 l Amber | " | $H_2SO_4$ | O&G |
| W-6 | " | " | " | Plastic Bottle | " | $HNO_3$ | Lead |
| TRAVEL BLANK | | Water | | 3 x VOA | " | HCl | TVHG, BTEX |
| W-7 | Well W7 | Water | Bailer | 2 x VOA | " | HCl | EPA 8010 |
| W-7 | " | " | " | 1 x VOA | " | HCl | TVHG & BTEX |
| W-7 | " | " | " | 1 l Amber | " | None | TPH as D, K |
| W-7 | " | " | " | 1 l Amber | " | $H_2SO_4$ | O&G |
| W-7 | " | " | " | Plastic Bottle | " | $HNO_3$ | Lead |
| ~~Field~~ BLANK 1 | Well 7 | Dist. Water | Bailer | 1 x VOA | " | HCl | ~~EPA 8010~~ |
| ~~Field~~ BLANK 2 | " | Dist. Water | " | 1 x VOA | " | HCl | TVHG, BTEX |
| ~~Field~~ BLANK 3 | " | Dist. Water | " | 1 x VOA | " | HCl | |

Total Number of Samples Shipped: 24 | Sampler's Signature:

**Relinquished By:**
Signature
Printed Name Aaron A. Stegeman
Company Aqua Resources
Reason For Analysis

**Received By:**
Signature
Printed Name Nancy J. Wilson
Company Curtis & Tompkins
Date 4/1/92
Time 3:25

**Relinquished By:**
Signature
Printed Name
Company
Reason

**Received By:**
Signature
Printed Name
Company
Date / /
Time

REMARKS:

W-6 pH = 7 measured by indicator strip at lab.

Special Shipment / Handling / Storage Requirements:

107005

# AQUA RESOURCES, INC.

SHIPMENT NO.: 1

## CHAIN OF CUSTODY RECORD

PAGE 1 OF ____

DATE 3/31/92

PROJECT NAME: PG & E

PROJECT NO.: 690262.3

| Sample Number | Location | Type of Sample: Material | Type of Sample: Method | Type of Container | Type of Preservation: Temp | Type of Preservation: Chemical | Analysis Required |
|---|---|---|---|---|---|---|---|
| W-2 -1 | well | water | | 40 ml vial | 4°C | HCl | TVHg & BTXE |
| W-2 | well | water | | 40 ml vial | 4°C | — | EPA 8010 |
| W-2 | well | water | | 1 l bottle | 4°C | — | TPH as D |
| W-2 | well | water | | 1 l bottle | 4°C | $H_2SO_4$ | Oil & Grease |
| W-2 | well | water | | plastic bottle | 4°C | $HNO_3$ | Lead |
| W-1 -2 | well | water | | 40 ml vial | 4°C | HCl | TVHg & BTXE |
| W-1 | well | water | | 40 ml vial | 4°C | — | EPA 8010 |
| W-1 | well | water | | ~~40 ml~~ 1 l | 4°C | — | TPH as D |
| W-1 | well | water | | 1 l bottle | 4°C | $H_2SO_4$ | Oil & Grease |
| W-1 | well | water | | plastic bottle | 4°C | $HNO_3$ | Lead |
| W-4 -3 | well | water | | 40 ml | 4°C | HCl | TVHg & BTXE |
| W-4 | well | water | | 40 ml | 4°C | — | EPA 8010 |
| W-4 | well | water | | 1 l bottle | 4°C | — | TPH as D |
| W-4 | well | water | | 1 l bottle | 4°C | $H_2SO_4$ | O & G |
| W-4 | well | water | | plastic bottle | 4°C | $HNO_3$ | Lead |
| ~~IR-1~~ | | | | | | | |
| ~~TP-2~~ | | | | | | | |

Total Number of Samples Shipped: 15 | Sampler's Signature: Wojciech Boyajian

Relinquished By:
Signature: Wojciech Boyajian
Printed Name: WOJTEK BOYAJARCIECH
Company: ARI
Reason: analyses

Received By:
Signature: Nancy Wilson
Printed Name: Nancy J. Wilson
Company: Curtis & Tompkins

Date: 3/31/92
Time: 5:35

Relinquished By:
Signature: ____
Printed Name: ____
Company: ____
Reason: ____

Received By:
Signature: ____
Printed Name: ____
Company: ____

Date: / /
Time: ____

REMARKS:

Special Shipment / Handling / Storage Requirements: