Well 28 W-E-5 was not sampled.
It should be done in April.
And total Pb was not analyzed
in well W-15
Next time MtBE is detected
it should be confirmed w/
method 8240

FIELD ACTIVITY REPORT FOR
ARROW RENTAL
LIVERMORE, CALIFORNIA

QUARTER 2 GROUNDWATER SAMPLING EVENT
OCTOBER 1997

Prepared for: Don-Sul Inc.
187 North L Street
Livermore, California 94607

Date Prepared: November 15, 1997

By: Environmental Sampling Services
6680 Alhambra Avenue, #102
Martinez, California 94553

AQUIFER SCIENCES, INC.

3680-A Mt. Diablo Blvd.
Lafayette, CA 94549
(510) 283-9098

December 19, 1997
971275

Ms. Rita Sullins
Don-Sul, Inc.
187 North L Street
Livermore, CA 94550

Subject: Groundwater Monitoring, October 1997
187 North L Street, Livermore, California

Dear Ms. Sullins:

Groundwater monitoring was conducted in October 1997 at the Arrow Rentals site, located at 187 North L Street in Livermore, California. This report presents the groundwater measurement and sampling procedures, evaluation of hydrogeologic data, and the results of laboratory analyses.

MEASUREMENT AND SAMPLING PROCEDURES

On October 29, 1997, groundwater monitoring was performed at the site by Environmental Sampling Services of Martinez, California. The locations of the groundwater monitoring wells are illustrated on Figure 1. The field activity report describing sampling activities is included in Appendix A.

Prior to sampling, the depth of static groundwater was measured in all four wells (W-1s, W-3s, W-Bs, and W-Es) to the nearest 0.01 foot using an electrical water level recorder. The interface probe was decontaminated between water level measurements, using Alconox soap and clean water. Groundwater elevation data for each well are listed in Table 1. The potentiometric surface map, corresponding to groundwater elevations measured on October 29, 1997, is shown on Figure 2.

Three of the four wells (W-1s, W-3s, and W-Bs) were purged and sampled after the static water level measurements were recorded. A minimum of three casing volumes of groundwater was removed from each well prior to sampling. Each well was purged using a 2-inch diameter submersible Grundfos pump equipped with discharge tubing dedicated to each well. The pump and each discharge hose were washed in an Alconox solution, rinsed with tap water, and rinsed

with deionized water before each use. Purge water from the monitoring wells was collected in labeled 55-gallon drums pending the analytical results.

Water quality parameters (pH, specific conductance, temperature, turbidity, color, and odor) were recorded at regular intervals during well purging. Water quality parameters for the three wells were recorded in the sampling logs. Copies of the well sampling logs are included in Appendix A.

Groundwater samples were collected from each well using new disposable bailers and rope. Groundwater samples were collected in clean bottles supplied by the analytical laboratory, labeled, stored on ice in a cooler, and transported under chain-of-custody protocol within 24 hours of collection to Columbia Analytical Services, a California-certified laboratory located in San Jose. A travel blank was prepared by the laboratory and accompanied the groundwater samples for quality assurance purposes.

The three groundwater samples and the travel blank were analyzed for total petroleum hydrocarbons quantified as gasoline (TPH-gasoline) and diesel (TPH-diesel) by EPA Method 8015 Modified; benzene, toluene, ethylbenzene, xylenes (BTEX) by EPA Method 8020; and methyl tertiary butyl ether (MTBE) by EPA Method 8020 Modified.

HYDROGEOLOGIC DATA EVALUATION

Groundwater elevations in the four monitoring wells range from 437.98 feet in well W-Es to 442.64 feet in well W-1s. Based upon measurements recorded on October 29, 1997, groundwater generally flows to the west under a hydraulic gradient of 0.008 ft/ft (Figure 2).

RESULTS OF LABORATORY ANALYSES

Results of laboratory analyses for groundwater samples collected from wells W-1s, W-3s, and W-Bs in October 1997 are summarized in Table 2. The laboratory report and chain-of-custody record are included in Appendix B.

TPH-diesel was detected in the groundwater samples collected from well W-1s at 180,000 µg/L, well W-Bs at 27,000 µg/L, and well W-3s at 750 µg/L. The laboratory noted that heavy oil was also detected in the three samples at concentrations ranging from 88 to 4,000 µg/L. Gasoline was detected in all three wells at concentrations ranging from 2,800 to 650,000 µg/L. Benzene was detected in the samples collected from well W-1s (14,000 µg/L), well W-Bs (6,000 µg/L), and well W-3s (630 µg/L). These concentrations exceed the Maximum Contaminant Level (MCL) of 1 µg/L, established for benzene in drinking water. Toluene (up to 19,000 µg/L), ethylbenzene (up to 7,800 µg/L), and xylenes (up to 35,000 µg/L) were detected in the three groundwater

samples. The levels of toluene, ethylbenzene, and xylenes in wells W-1s and W-Bs exceed the MCLs for these chemicals.

MTBE was detected in the groundwater sample from well W-Bs at 380 µg/L, which exceeds the action level of 35 µg/L. MTBE was not detected in the two other samples; however, the detection limits were elevated due to high concentrations of gasoline and BTEX in the samples. Gasoline, BTEX, and MTBE were not detected in the travel blank.

SUMMARY AND CONCLUSIONS

During the October 1997 monitoring round, a petroleum hydrocarbon odor was evident in groundwater purged from all three wells sampled. A sheen was also noted on the surface of the water purged from well W-1s.

High levels of gasoline, diesel, and BTEX have been consistently detected in wells W-1s, W-3s, and W-Bs. In the past, low levels of petroleum hydrocarbons have also been detected in downgradient well W-Es. Fluctuations in the concentrations of gasoline, diesel, and BTEX in groundwater samples collected from these wells may be related to the seasonal variations in groundwater elevations.

Please call us if you have any questions concerning this report.

Respectfully yours,

Carolyn A. Cavanagh
Hydrogeologist

Rebecca A. Sterbentz, RG, CHG, REA
President

REGISTERED GEOLOGIST
REBECCA A. STERBENTZ
No. 4119
STATE OF CALIFORNIA

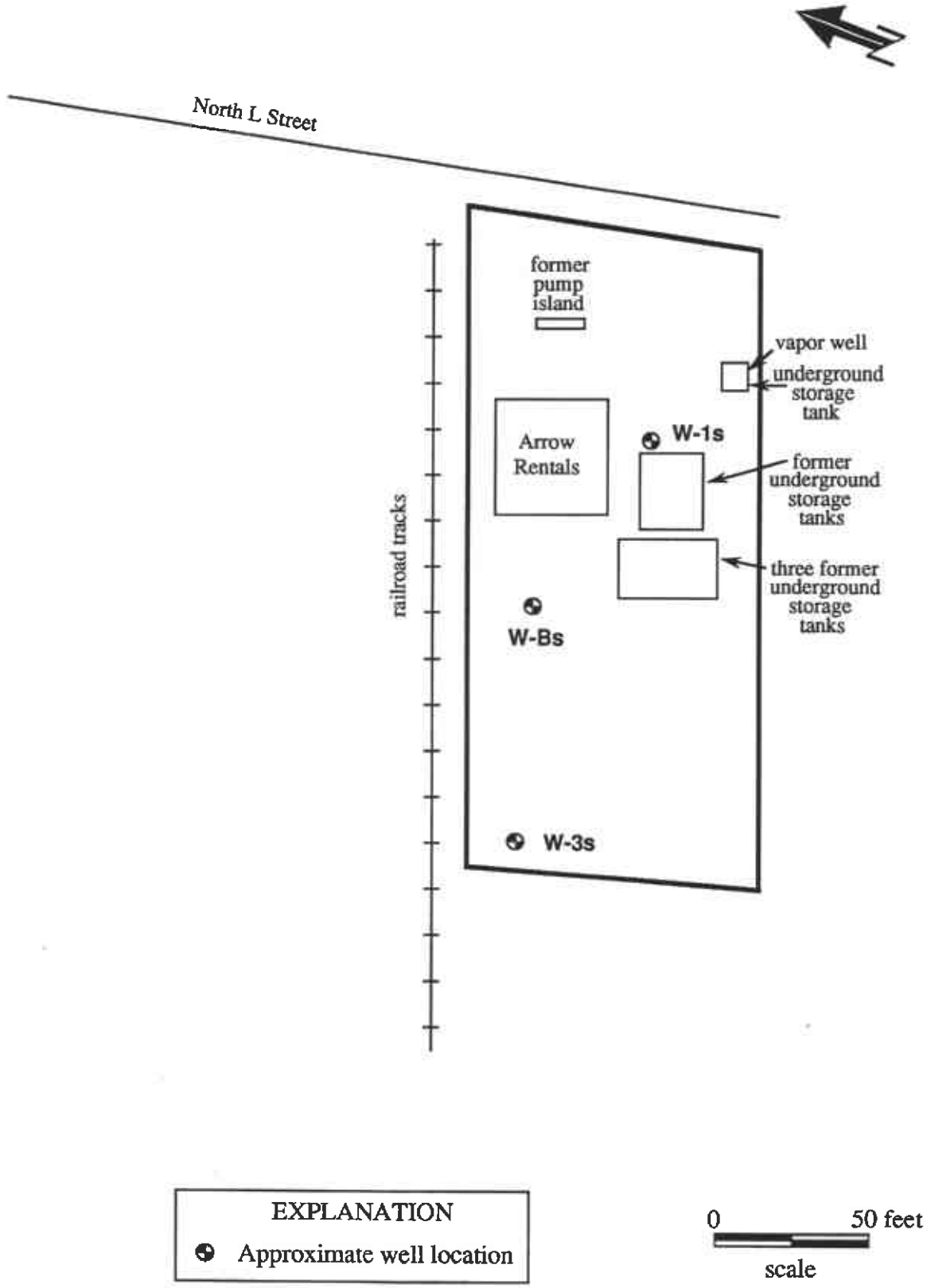

Figure 1. SITE MAP
187 North L Street, Livermore, California

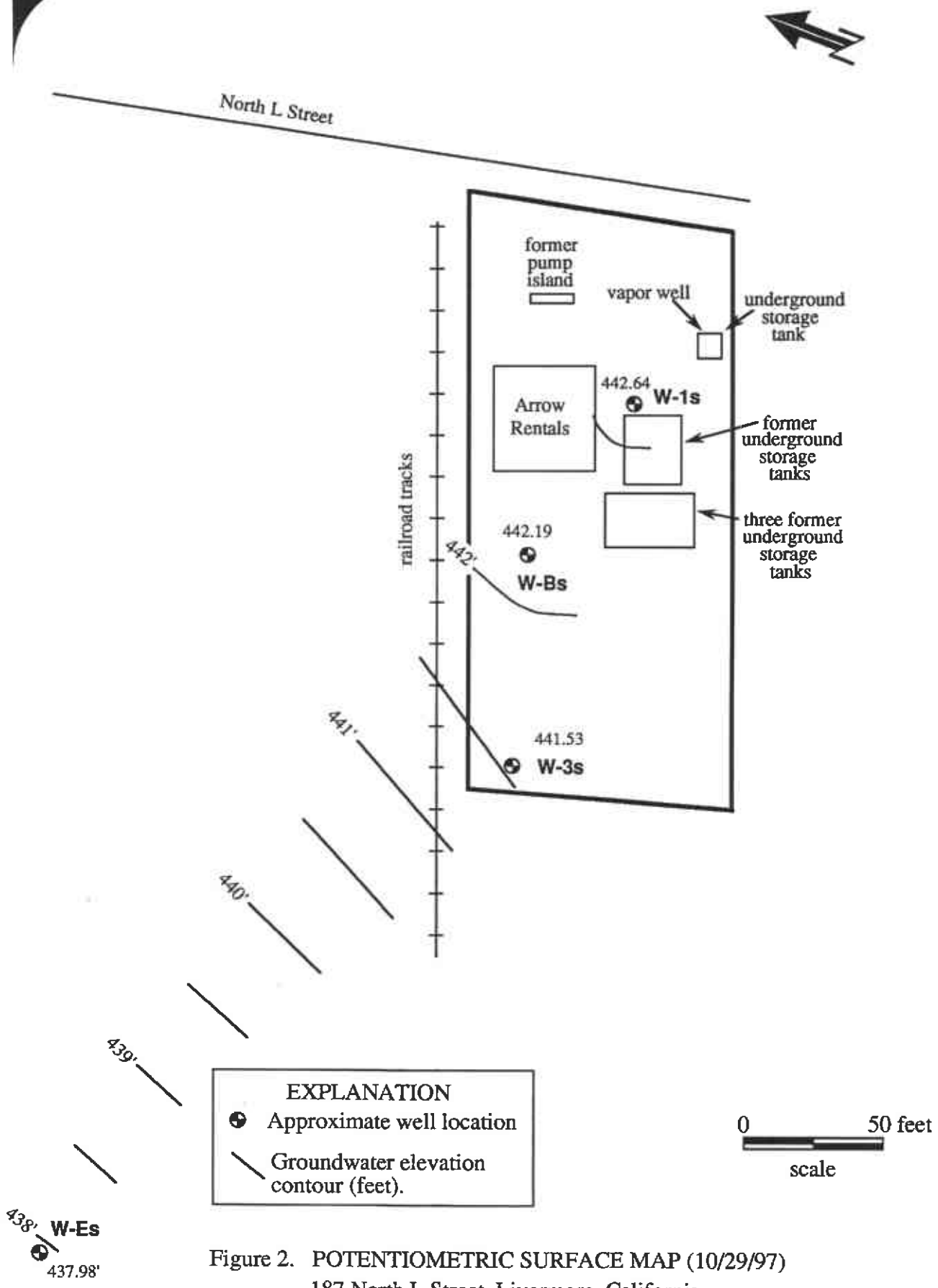

Figure 2. POTENTIOMETRIC SURFACE MAP (10/29/97)
187 North L Street, Livermore, California

Table 1. GROUNDWATER ELEVATION DATA
187 North L Street, Livermore, California
October 29, 1997

Well Number	Top of Casing Elevation (feet above MSL)	Depth to Water (feet below TOC)	Water Elevation (feet above MSL)
W-1s	479.09	36.45	442.64
W-3s	476.98	35.45	441.53
W-Bs	478.82	36.63	442.19
W-Es	474.66	36.68	437.98

TOC = top of PVC casing
MSL = mean sea level (elevations based on City of Livermore datum)

Table 2. GROUNDWATER ANALYTICAL RESULTS
187 North L Street, Livermore, California
October 29, 1997

Well Number	TPH-gasoline (µg/L)	TPH-diesel (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
W-1s	650,000	180,000*§	14,000	19,000	7,800	35,000	< 3000
W-3s	2,800	750†§	630	31	71	69	< 30
W-Bs	44,000	27,000‡§	6,000	500	1,500	6,400	380
Travel Blank	ND	NA	ND	ND	ND	ND	ND
MDL	50-50,000	50-5,000	0.5-500	0.5-500	0.5-500	0.5-500	3-3,000
MCL	NE	NE	1	150	700	1,750	NE
AL	NE	NE	NE	NE	NE	NE	35

TPH-gasoline = total petroleum hydrocarbons quantified as gasoline
TPH-diesel = total petroleum hydrocarbons quantified as diesel
MTBE = methyl tertiary butyl ether
µg/L = micrograms per liter [parts per billion (ppb)]
NA = not analyzed
ND = not detected
NE = none established
MDL = method detection limit
MCL = Maximum Contaminant Level, November 1996
AL = Action Level, November 1996

* Sample contained heavy oil at 1,600 µg/L
† Sample contained heavy oil at 88 µg/L
‡ Sample contained heavy oil at 4,000 µg/L
§ This sample contained a mixture of gasoline and diesel quantified as diesel

APPENDIX A

FIELD ACTIVITY REPORT

Environmental
Sampling Services

FIELD ACTIVITY REPORT
FOR OCTOBER 1997 GROUNDWATER MONITORING EVENT
ARROW RENTAL,
LIVERMORE, CALIFORNIA

ESS Personnel: Jacki Lee and Steve Penman
Duration of Activities: October 29, 1997

Decontamination Procedures

All downhole equipment was cleaned with a solution of Alconox® laboratory-grade detergent and potable water, rinsed with potable water, followed by a final rinse with distilled water.

Water Level and Total Depth Measurements

A total of four (4) monitoring wells were measured for static water level. All readings were performed with Solinst® electrical water level indicator (Table 1). Water level measurements were referenced to the surveyor's mark (a black mark on the top of well casing).

Field Equipment Calibration

All field measurements were performed in accordance with the instruments' calibration and operating procedures. Field measurements included: pH, specific conductance, and temperature.

Field Activities

Wednesday, October 29, 1997: Measured static water level measurements in the following wells: W-1S, W-BS, W-3S and W-E (Table 1). Purged and sampled W-1S, W-BS, and W-3S for the following analysis: Wells were purged with either a submersible pump or disposable bailer. EPA Method 8015M (TPH(Gasoline)/BTEX, and MTBE) and TPH (Diesel).

W-3S was evacuated a total of three (3) casing volumes and sampled accordingly. Two wells, W-BS and W-1S, were purged a total of 1.6 casing volumes each. These wells exhibited slow recovery rates. The two wells were purged dry numerous times prior to sampling.

Each well was sampled with a disposable bailers. The contracted laboratory, Columbia Analytical Laboratories, supplied all sample containers and packing material and performed all required analyses. All samples were properly preserved according to analysis.

Following completion of sampling, each length of tubing was washed with a solution of Alconox® laboratory-grade detergent and potable water, rinsed with potable water, and stored in labeled plastic storage bags. The bags were left on-site for future sampling events.

Environmental
Sampling Services

QA/QC

Trip blanks for EPA Method 8015M were placed in the cooler containing all samples. No other QA/QC samples were required nor requested.

All work was performed under satisfactory workmanship and according to the Alameda County Health and Care Services.

Jacqueline Lee
President

enclosure
Table 1
Water Sample Log Sheets
Chain of Custodies

Environmental
Sampling Services

TABLE 1: SUMMARY OF WATER LEVEL MEASUREMENTS ARROW RENTAL LIVERMORE, CALIFORNIA

WELL IDENTIFICATION	DEPTH TO GROUNDWATER (Measured October 29, 1997)	TOTAL WELL DEPTH
W-1S	36.45	44.64
W-BS	35.45	44.47
W-3S	36.63	44.76
W-E	36.68	NA

NA = Not Applicable

Environmental Sampling Services

WELL SAMPLE LOG SHEET	Well Identification: W-35 Date: 10/29/97

Project Name: Arrow Rentals — Client Project Number: _____
Well Description: 2" (4") 5" 6" 8" — Well Type: (PVC) Stainless Steel
Is well secured? (YES) / NO — Type of lock / lock number: Master Lock
Observations/Comments: Well key is located @ front Desk.

Purge Method: Teflon Disposable Bailer Centrifugal pump (GRUNDFOS Redi-flow pump) Other: _____
Pump lines: NEW/CLEANED/DEDICATED — Bailer lines: NEW / CLEANED
Method of cleaning pump: (Alconox) Liquidnox (Tap Water) (DI Rinse) Other: _____
Method of cleaning bailer: Alconox Liquidnox Tap Water DI Rinse Other: _____
Sampling Method: Teflon Disp. Tef. bailer (Disp. PVC bailer) Redi-Flow 2 pump Other: _____
pH Meter Serial Number: 330089 — Specific Conductance Meter Serial Number: 96H0203AB
Date(s) Calibrated: 10/29/97 @ 12:10 (4) (7) (10) — Specific Conductance Meter: SELF @ 100 umhos/cm @ ___°C
Method to measure water level: Solinst # 21752 — Specific Conductance Meter: _____ @ 1000 umhos/cm @ ___°C
Water Level at Start (DTW): 36.63 — Water Level Prior to Sampling: 39.31
TD= 44.76 36.63 (DTW) x "k" = 5.3 gallons/casing volume x 3 = 15.9 gallons for 3 casing volumes
"k"= 0.163 (2" well) (k"= 0.653 (4" well)) "k"=1.02 (5" well) "k"=1.46 (6" well) "k"=2.61 (8" well)

FIELD WATER QUALITY PARAMETERS

Date	Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance ms (uS)	Turbidity (NTU's)	Color	Comments
10/29/97	1301	3	6.78	21.2	851	Low	Lt Tan	Lite petroleum odor
	1306	6	6.84	21.7	900	very Low	slightly cloudy	"
	1310	9	6.89	21.7	914	Low	Lt Tan	" shut pump off let well recover
	1335	12	6.92	22.7	926	High	Lt Brown	" pulled pump from well Hand Bail
↓	1435	15	6.98	20.2	893	"	"	" Dry @ 16 gallons.
								▽ 41.25 @ 15:02
								• 41.10 @ 15:57
10/29/97	1615	Aft. Sampl	7.05	19.7	882	Moderate	Lt Brown	Lite Odor

Total Discharge: 16 gallons — Casing Volumes Removed: 3.02
Method of disposal of discharged water: To labeled 55 gallon drum
Date/Time sampled: 10/29/97 @ 16:10 — Analysis: EPA 8015M (TPHg/BTEX, MTBE) TPH(Diesel)
Comments: WE's ▽ = 36.63' (Approx 20 gallons in Drum)
QA/QC: NONE @ _____ as Eq. Blank Duplicate MS/MSD Split
Sampled By: S. Penman / J. Lee

Environmental Sampling Services
6680 Alhambra Ave. Martinez, CA 94553
Tel/Fax: (510) 372-8108

Environmental Sampling Services

WELL SAMPLE LOG SHEET	Well Identification: WBS Date: 10/29/97

Project Name: Arrow Rentals — Client Project Number:
Well Description: 2" 4" 5" (6") 8" — Well Type: (PVC) Stainless Steel
Is well secured? (YES) / NO — Type of lock / lock number: Master Lock
Observations/Comments: Well key is located @ front Desk.

Purge Method: Teflon Disposable Bailer Centrifugal pump (GRUNDFOS Redi-flow pump) Other:
Pump lines: NEW/(CLEANED)/DEDICATED — Bailer lines: (NEW) / CLEANED
Method of cleaning pump: (Alconox) Liquidnox (Tap Water) (DI Rinse) Other:
Method of cleaning bailer: Alconox Liquidnox Tap Water DI Rinse Other:
Sampling Method: Teflon Disp. Tef. bailer (Disp. PVC bailer) Redi-Flow 2 pump Other:
pH Meter Serial Number: 330089 — Specific Conductance Meter Serial Number: 96110203AB
Date(s) Calibrated: 10/29/97 @ 12:10 (4.00) — Specific Conductance Meter: _____ @ 100 umhos/cm @ ___ °C
Method to measure water level: Solinst 217252 — Specific Conductance Meter: _____ @ 1000 umhos/cm @ ___ °C
Water Level at Start (DTW): 35.45 — Water Level Prior to Sampling: 41.21

TD= 44.47 - 35.45 (DTW) x "k" = 13.2 gallons/casing volume x 3 = 39.6 gallons for 3 casing volumes
"k"= 0.163 (2" well) "k"= 0.653 (4" well) "k"=1.02 (5" well) (k =1.46 (6" well)) "k"=2.61 (8" well)

FIELD WATER QUALITY PARAMETERS

Date	Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance ms (uS)	Turbidity (NTU's)	Color	Comments
10/29/97	1415	10	6.79	21.3	839	Clear	None	strong petroleum odor
	1418	20	6.79	20.7	842	[illegible]	Lt gray	well pumped Dry ∑=42.7
	1513	22	6.78	20.6	859	High	Gray	∑ 40.9 @ 15:05
								∑ 41.9 @ 1515
	16:35	Aft. Sampl	6.72	20.0	852	"	"	

Total Discharge: 22 gallons — Casing Volumes Removed: 1.6
Method of disposal of discharged water: To labeled 55 gallon Drum
Date/Time sampled: 10/29/97 @ 1625 — Analysis: EPA 8015m (TPH g/ BTEX, MTBE), TPH Diesel

Comments: approx. 25 gallons in drum
QA/QC: None @ _____ as Eq. Blank Duplicate MS/MSD Split
Sampled By: S. Penman / J. Lee

Environmental Sampling Services
6680 Alhambra Ave. Martinez, CA 94553
Tel/Fax: (510) 372-8108

Environmental Sampling Services

WELL SAMPLE LOG SHEET	Well Identification: W-15 Date: 10/29/97

Project Name: Arrow Rentals — Client Project Number: _____
Well Description: 2" 4" 5" (6") 8" — Well Type: (PVC) Stainless Steel
Is well secured? (YES) / NO — Type of lock / lock number: Master Lock
Observations/Comments: Well key is located @ Front Desk

Purge Method: Teflon Disposable Bailer Centrifugal pump (GRUNDFOS Redi-flow pump) Other: _____
Pump lines: NEW (CLEANED) DEDICATED — Bailer lines: (NEW) / CLEANED
Method of cleaning pump: (Alconox) Liquidnox (Tap Water) (DI Rinse) Other: _____
Method of cleaning bailer: Alconox Liquidnox Tap Water DI Rinse Other: _____
Sampling Method: Teflon Disp. Tef. bailer (Disp. PVC bailer) Redi-Flow 2 pump Other: _____
pH Meter Serial Number: 330087 — Specific Conductance Meter Serial Number: 96H0203AB
Date(s) Calibrated: 10/29/97 @ 12:10 @ (7) (10) — Specific Conductance Meter: _____ @ 100 umhos/cm @ ___ °C
Method to measure water level: Solinst #217252 — Specific Conductance Meter: _____ @ 1000 umhos/cm @ ___ °C
Water Level at Start (DTW): 36.45 — Water Level Prior to Sampling: 39.89

TD= 44.64 - 36.45 (DTW) x "k" = 12 gallons/casing volume x 3 = 36 gallons for 3 casing volumes
"k"= 0.163 (2" well) "k"= 0.653 (4" well) "k"=1.02 (5" well) ("k"=1.46 (6" well)) "k"=2.61 (8" well)

FIELD WATER QUALITY PARAMETERS

Date	Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance ms (uS)	Turbidity (NTU's)	Color	Comments
10/29/97	1458	6	6.76	20.8	904	Low	Cloudy Lt. Tan	Lt. sheen on water Strong petroleum odor
	1500	12	6.72	20.9	916	Moderate	greyish Lt. Brown	" Purged dry @ 20 gal.
	15:38	20	6.79	20.7	952	HIGH	"	T= 42.20' @ 15:45 Dry @ 20 gallons.
								T= 42.10' @ 15:40
		Aft. Sampl						

Total Discharge: 20 gallons — Casing Volumes Removed: 1.6
Method of disposal of discharged water: 10 labeled 55 gallon Drum
Date/Time sampled: 10/29/97 @ 1645 — Analysis: EPA 8015M (TpHg/BTEX, MTBE), TpH Diesel
Comments: 40 gallons in drum
QA/QC: None @ _____ as Eq. Blank Duplicate MS/MSD Split
Sampled By: D. Penman / T. Lee

Environmental Sampling Services
6680 Alhambra Ave. Martinez, CA 94553
Tel/Fax: (510) 372-8108

CHAIN OF CUSTODY/LABORATORY ANALYSIS REPORT FORM

Columbia Analytical Services Inc.
2059 Junction Avenue • San Jose, CA 95131 • (408) 437-2400 • FAX (408) 437-9356

SERVICE REQUEST NO. _____ P.O.# _____ PAGE 1 OF 1

PROJECT NAME Arrow Rentals #
PROJECT MGR. Stephen Penman / Jacki Lee
COMPANY Environmental Sampling Services
ADDRESS 6680 Alhambra Avenue #102
Martinez, CA 94553 PHONE (510) 372-8108
FAX (510) 372-6705
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Volatile Organics GC/MS 624/8240/8260	Halogenated or Aromatic Volatiles 601/8010 ☐ 602/8020 ☐	TPH as Gas/BTEX MTBE ☐ DHS LUFT / 8020	TPH as Diesel/HBHC DHS LUFT	Base/Neu/Acid Organics GC/MS 625/8270	Pesticides / PCBs 608/8080	TRPH - 418.1	Oil and Grease Method ___	Metals (total or dissolved) List Below	pH, Cond, Cl, SO_4, F, TDS, TSS Alk, NO_3, NO_2 (circle)	NH_3-N, COD, Total-P, TKN, NO_3 / NO_2 (circle)	Total Organic Carbon TOC	Total Phenols	Cyanide				REMARKS
					PRESERVATIVE			HCl	HCl	HCl	NP	NP	NP	HCl	HCl	HNO3	NP	H_2SO_4	H_2SO_4	H_2SO_4	NaOH			
Trip Blank	10/29/97	1000		Water	4			4															
W-3S	10/29/97	1610		↓	5			3	2														
W-BS	10/29/97	1625			5			3	2														
W-1S	10/29/97	1645			5			3	2														

RELINQUISHED BY:
Signature
Stephen Penman
Printed Name
Environmental Sampling Services
Firm
10/30/97 @ 10:00
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

TURNAROUND REQUIREMENTS
___ 1 day ___ 2 day ___ 3 day
___ 5 day ___ Other
X Standard (10 working days)
Results Due _____

REPORT REQUIREMENTS
X I. Routine Report
___ II. Report (includes MS, MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ MDLs/PQLs/Trace #
___ Electronic Data Deliverables

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time
Shipped Via/Tracking #

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

SAMPLE RECEIPT: Condition _____ Custody Seals _____

SPECIAL INSTRUCTIONS/COMMENTS:

Circle which metals are to be analyzed:

Metals: Al Sb Ba Be B Cd Ca Cr Co Cu Fe Mg Mn Mo Ni K Ag Na Sn V Zn
As Pb Se Tl Hg

Storage:

[redacted] STRIB[redacted] WH[redacted]eturn [redacted]nator; [redacted]OW - I[redacted]INK - [redacted]d by o[redacted]r [redacted] [redacted] [redacted] [redacted] 400-[redacted]

APPENDIX B

LABORATORY DATA SHEETS

AND

CHAIN-OF-CUSTODY RECORD

Columbia Analytical Services INC.

November 12, 1997 Service Request No.: S9702214

Ms. Jacki Lee
Environmental Sampling Services
6680 Alhambra Avenue
#102
Martinez, CA 94553

RE: Arrow Rentals

Dear Ms. Lee:

The following pages contain analytical results for sample(s) received by the laboratory on October 30, 1997. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 13, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely,

Bernadette T. Cox
Project Chemist

1059 Junction Avenue ▪ San Jose, California 95131 ▪ Telephone 408/428-1280 ▪ Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: 10/29/97
Date Received: 10/30/97

TPH as Diesel

Prep Method: EPA 3510
Analysis Method: CA/LUFT
Test Notes:

Units: ug/L (ppb)
Basis: NA

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
W-3S	S9702214-002	50	1	11/6/97	11/7/97	750	D1,D2(88)
W-BS	S9702214-003	50	50	11/6/97	11/10/97	27000	D1,D2(4000)
W-1S	S9702214-004	50	100	11/6/97	11/11/97	180000	D1,D2(1600)
Method Blank	S971106-MB	50	1	11/6/97	11/7/97	ND	

D1 This sample contained a mixture of gasoline and diesel quantified as diesel.
D2 Sample contained heavy oil.

1A/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: 10/29/97
Date Received: 10/30/97

BTEX, MTBE and TPH as Gasoline

Sample Name: Trip Blank
Lab Code: S9702214-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	10/31/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	10/31/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	10/31/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	10/31/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	10/31/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	10/31/97	ND	

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: 10/29/97
Date Received: 10/30/97

BTEX, MTBE and TPH as Gasoline

Sample Name: W-3S
Lab Code: S9702214-002
Test Notes: C1

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	10	NA	11/7/97	2800	
Benzene	EPA 5030	8020	0.5	10	NA	11/7/97	630	
Toluene	EPA 5030	8020	0.5	10	NA	11/7/97	31	
Ethylbenzene	EPA 5030	8020	0.5	10	NA	11/7/97	71	
Xylenes, Total	EPA 5030	8020	0.5	10	NA	11/7/97	69	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	10	NA	11/7/97	<30	C1

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: 10/29/97
Date Received: 10/30/97

BTEX, MTBE and TPH as Gasoline

Sample Name: W-BS
Lab Code: S9702214-003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	100	NA	11/8/97	44000	
Benzene	EPA 5030	8020	0.5	100	NA	11/8/97	6000	
Toluene	EPA 5030	8020	0.5	100	NA	11/8/97	500	
Ethylbenzene	EPA 5030	8020	0.5	100	NA	11/8/97	1500	
Xylenes, Total	EPA 5030	8020	0.5	100	NA	11/8/97	6400	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	100	NA	11/8/97	380	

1322/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Environmental Sampling Services	**Service Request:**	S9702214
Project:	Arrow Rentals	**Date Collected:**	10/29/97
Sample Matrix:	Water	**Date Received:**	10/30/97

BTEX, MTBE and TPH as Gasoline

Sample Name:	W-1S	Units:	ug/L (ppb)
Lab Code:	S9702214-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1000	NA	11/8/97	650000	
Benzene	EPA 5030	8020	0.5	1000	NA	11/8/97	14000	
Toluene	EPA 5030	8020	0.5	1000	NA	11/8/97	19000	
Ethylbenzene	EPA 5030	8020	0.5	1000	NA	11/8/97	7800	
Xylenes, Total	EPA 5030	8020	0.5	1000	NA	11/8/97	35000	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1000	NA	11/8/97	<3000	C1

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S971030-WB1
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	10/30/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	10/30/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	10/30/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	10/30/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	10/30/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	10/30/97	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S971106-WB1
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/6/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/6/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/6/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/6/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/6/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/6/97	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S971107-WB1
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	11/7/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	11/7/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	11/7/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	11/7/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	11/7/97	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	11/7/97	ND	

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
TPH as Diesel

Prep Method: EPA 3510
Analysis Method: CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery p-Terphenyl
W-3S	S9702214-002		63
W-BS	S9702214-003		65
W-1S	S9702214-004		112
Method Blank	S971106-MB		88

CAS Acceptance Limits: 41-140

SUR1/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Environmental Sampling Services
Project: Arrow Rentals
Sample Matrix: Water

Service Request: S9702214
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method: EPA 5030
Analysis Method: 8020 CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	a,a,a-Trifluorotoluene
Trip Blank	S9702214-001		106	94
W-3S	S9702214-002		100	92
W-BS	S9702214-003		101	93
W-1S	S9702214-004		102	102
Method Blank	S971030-WB1		110	92
Method Blank	S971106-WB1		109	89
Method Blank	S971107-WB1		107	92
CAS Acceptance Limits:			69-116	69-116

SUR2/020397p

EXT TPHVOA
F

CHAIN OF CUSTODY/LABORATORY ANALYSIS REPORT FORM

Columbia Analytical Services Inc.
2059 Junction Avenue • San Jose, CA 95131 • (408) 437-2400 • FAX (408) 437-9356

SERVICE REQUEST NO. S9702214 P.O.# _____ PAGE 1 OF 1

PROJECT NAME Arrow Rentals #
PROJECT MGR. Stephen Penman / Jacki Lee
COMPANY Environmental Sampling Services
ADDRESS 6680 Alhambra Avenue #102
Martinez, CA 94553 PHONE (510) 372-8109
FAX (510) 372-6705
SAMPLER'S SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	ANALYSIS REQUESTED																		REMARKS
						PRESERVATIVE	HCl	HCl	HCl	NP	NP	NP	HCl	HCl	HNO_3	NP	H_2SO_4	H_2SO_4	H_2SO_4	NaOH				
						Volatile Organics GC/MS 624/8240/8260	Halogenated or Aromatic Volatiles 601/8010 ☐ 602/8020 ☐	TPH as Gas/BTEX DHS LUFT / 8020 MTBE X	TPH as Diesel/HBHC DHS LUFT	Base/Neu/Acid Organics GC/MS 625/8270	Pesticides / PCBs 608/8080	TRPH - 418.1	Oil and Grease Method	Metals (total or dissolved) List Below	pH, Cond, Cl, SO_4, F, TDS, TSS Alk, NO_3, NO_2 (circle)	NH_3-N, COD, Total-P, TKN, NO_3 / NO_2 (circle)	Total Organic Carbon TOC	Total Phenols	Cyanide				
Trip Blank	10/29/97	1000	1	Water	4			4																
W-35	10/29/97	1610	2	↓	5			3	2															
W-BS	10/29/97	1625	3		5			3	2															
W-15	10/29/97	1645	4	↓	5			3	2															

RELINQUISHED BY:
Signature
Stephen Penman
Printed Name
Environmental Sampling Services
Firm
10/30/97 @ 10:00
Date/Time

RECEIVED BY:
Signature
MOISES
Printed Name
CAS
Firm
10-30-97 10:AM
Date/Time

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

TURNAROUND REQUIREMENTS
___ 1 day ___ 2 day ___ 3 day
___ 5 day ___ Other
X Standard (10 working days)
Results Due _____

REPORT REQUIREMENTS
X I. Routine Report
___ II. Report (includes MS. MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ MDLs/PQLs/Trace #
___ Electronic Data Deliverables

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

Shipped Via/Tracking #

SAMPLE RECEIPT: Condition _____ Custody Seals _____

SPECIAL INSTRUCTIONS/COMMENTS:
Circle which metals are to be analyzed:
Metals: Al Sb Ba Be B Cd Ca Cr Co Cu Fe Mg Mn Mo Ni K Ag Na Sn V Zn
As Pb Se Tl Hg

Storage: R8, R20/553

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-5