ExxonMobil
Environmental Services Company

4096 Piedmont Avenue #194 Oakland, California 94611 510 547 8196 Telephone 510 547 8706 Facsimile **Jennifer C. Sedlachek** Project Manager

E‰onMobil

December 21, 2011

Mr. Jerry T. Wickham Alameda County Health Care Services Agency Department of Environmental Health 1131 Harbor Bay Parkway, Room 250 Alameda, California 94502-6577 **RECEIVED**

11:10 am, Dec 23, 2011

Alameda County Environmental Health

RE: Former Exxon RAS #73399/2991 Hopyard Road, Pleasanton, California.

Dear Mr. Wickham:

Attached for your review and comment is a copy of the letter report entitled *Remediation Status Report, Third Quarter 2011*, dated December 21, 2011, for the above-referenced site. The report was prepared by Cardno ERI of Petaluma, California, and details activities at the subject site.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

If you have any questions or comments, please contact me at 510.547.8196.

Sincerely,

Jennifer C. Sedlachek Project Manager

Attachment:

Cardno ERI's Remediation Status Report, Third Quarter 2011, dated December 21, 2011

cc:

w/ attachment

Ms. Cherie McCaulou, California Regional Water Quality Control Board, San Francisco Bay Region Mr. Matthew Katen, Zone 7 Water Agency

w/o attachment

Ms. Paula Sime, Cardno ERI



Cardno ERI License A/C10-611383

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 707 766 2000

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December 21, 2011 Cardno ERI 2776C.R01

Ms. Jennifer C. Sedlachek ExxonMobil Environmental Services 4096 Piedmont Avenue, #194 Oakland, California 94611

SUBJECT

Remediation Status Report, Third Quarter 2011

Former Exxon Service Station 73399 2991 Hopyard Road, Pleasanton, California

Alameda County File No. R0362

INTRODUCTION

At the request of ExxonMobil Environmental Services (EMES), on behalf of Exxon Mobil Corporation, Cardno ERI operated a GWPTS at the subject site during third quarter 2011. Relevant plates, tables, and appendices are included at the end of this report. Currently, a Valero-branded service station and an auto repair shop is in operation at the site.

REMEDIAL OPERATIONS

Groundwater Pump and Treat System

A GWPTS was installed in March 2001. Groundwater is pumped through two sediment filter housings and two 1,000-pound GAC vessels prior to being discharged to the sanitary sewer system under permit with the Dublin San Ramon Services District. The GWPTS currently operates using wells MW9A and VR1. Pumping wells OW1 and OW2 were shut down in October 2004.

GWPTS start-up date:

March 2001

GWPTS discharge permit:

Dublin San Ramon Service District

Permit No. 10026

GWPTS reporting period:

06/15/11 - 09/06/11

System modifications during reporting period:

None

GWPTS status during reporting period:

Active

Wells used for extraction:

MW9A and VR1

December 21, 2011

Cardno ERI 2776C.R01 Former Exxon Service Station 73399, Pleasanton, California

Laboratory:

Calscience Environmental Laboratories, Inc.

Garden Grove, California

Effluent analyses performed:

EPA Method 8015B

TPHa. TPHd

EPA Method 8260B

BTEX, MTBE

Discharge permit non-compliance events and exceptions:

None

GWPTS performance:

Period	Volume of Groundwater Treated (gallons)	Mass of TPHg Removed (pounds)	Mass of Benzene Removed (pounds)	Mass of MTBE Removed (pounds)
06/15/11 – 09/06/11	275,760	0.3906	<0.0096	0.5244
To Date:	10,446,140	<10.2075	<0.2011	<10.6860

LIMITATIONS

For any documents cited that were not generated by Cardno ERI, the data taken from those documents is used "as is" and is assumed to be accurate. Cardno ERI does not guarantee the accuracy of this data and makes no warranties for the referenced work performed nor the inferences or conclusions stated in these documents.

This document was prepared in accordance with generally accepted standards of environmental, geological, and engineering practices in California at the time of investigation. No soil engineering or geotechnical references are implied or should be inferred. The evaluation of the geologic conditions at the site for this investigation is made from a limited number of data points. Subsurface conditions may vary away from these data points.

Please contact Ms. Paula Sime, Cardno ERI's project manager for this site, at paula.sime@cardno.com or at (707) 766-2000 with any questions regarding this report.

Sincerely,

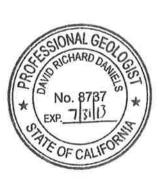
Matthew T. Herman Project Engineer for Cardno ERI 707 766 2000

Email: matthew.herman@cardno.com

David R. Daniels P.G. 8737 for Cardno ERI

707 766 2000

Email: david.daniels@cardno.com



December 21, 2011

Cardno ERI 2776C.R01 Former Exxon Service Station 73399, Pleasanton, California

Enclosures:

Acronym List

Plate 1

Site Vicinity Map

Table 1

Operation and Performance Data for Groundwater Pump and Treat System

Appendix A

Laboratory Analytical Reports and Chain-of-Custody Records

Appendix B

SOP-25: "Hydrocarbons Removed from Vadose Well"

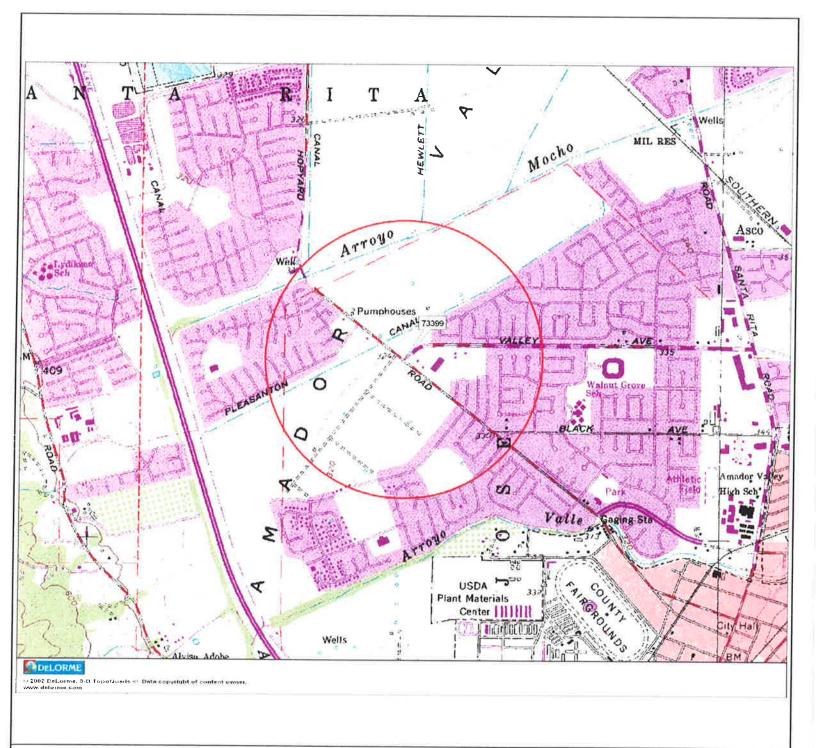
cc: Mr. Jerry T. Wickham, Alameda County Health Care Services Agency, 1131 Harbor Bay Parkway, Alameda, California, 94502-6577

Ms. Cherie McCaulou, California Regional Water Quality Control Board, San Francisco Bay Region, 1515 Clay Street, Suite 1400, Oakland, California, 94612

Mr. Matthew Katen, Zone 7 Water Agency, 100 North Canyons Parkway, Livermore, California, 94551

ACRONYM LIST

μg/L	Micrograms per liter	NEPA	National Environmental Policy Act
μs	Microsiemens	NGVD	National Geodetic Vertical Datum
1,2-DCA	1,2-dichloroethane	NPDES	National Pollutant Discharge Elimination System
acfm	Actual cubic feet per minute	O&M	Operations and Maintenance
AS	Air sparge	ORP	Oxidation-reduction potential
bgs	Below ground surface	OSHA	Occupational Safety and Health Administration
BTEX	Benzene, toluene, ethylbenzene, and total xylenes	OVA	Organic vapor analyzer
CEQA	California Environmental Quality Act	P&ID	Process & Instrumentation Diagram
cfm	Cubic feet per minute	PAH	Polycyclic aromatic hydrocarbon
COC	Chain of Custody	PCB	Polychlorinated biphenyl
CPT	Cone Penetration (Penetrometer) Test	PCE	Tetrachloroethene or perchloroethylene
DIPE	Di-isopropyl ether	PID	Photo-ionization detector
DO	Dissolved oxygen	PLC	Programmable logic control
DOT	Department of Transportation	POTW	Publicly owned treatment works
DPE	Dual-phase extraction	ppmv	Parts per million by volume
DTW	Depth to water	PQL	Practical quantitation limit
EDB	1,2-dibromoethane	psi	Pounds per square inch
EPA	Environmental Protection Agency	PVC	Polyvinyl chloride
ESL	Environmental screening level	QA/QC	Quality assurance/quality control
ETBE	Ethyl tertiary butyl ether	DDGI	Risk-based screening levels
FID	Flame-ionization detector	RCRA	Resource Conservation and Recovery Act
fpm	Feet per minute	RL	Reporting limit
GAC	Granular activated carbon	scfm	Standard cubic feet per minute
gpd	Gallons per day	SSTL	Site-specific target level
gpm	Gallons per minute	STLC	Soluble threshold limit concentration
GWPTS	Groundwater pump and treat system	SVE	Soil vapor extraction
HVOC	Halogenated volatile organic compound	SVOC	Semivolatile organic compound
j	Estimated value between MDL and PQL (RL)	TAME	Tertiary amyl methyl ether
LEL	Lower explosive limit	TBA	Tertiary butyl alcohol
LPC	Liquid-phase carbon	TCE	Trichloroethene
LRP	Liquid-ring pump	TOC	Top of well casing elevation; datum is msl
LUFT	Leaking underground fuel tank	TOG	Total oil and grease
LUST	Leaking underground storage tank	TPHd	Total petroleum hydrocarbons as diesel
MCL	Maximum contaminant level	TPHg	Total petroleum hydrocarbons as gasoline
MDL	Method detection limit	TPHmo	Total petroleum hydrocarbons as motor oil
mg/kg	Milligrams per kilogram	TPHs	Total petroleum hydrocarbons as stoddard solvent
mg/L	Milligrams per liter	TRPH	Total recoverable petroleum hydrocarbons
mg/m ³	Milligrams per cubic meter	UCL	Upper confidence level
MPE	Multi-phase extraction	USCS	Unified Soil Classification System
MRL	Method reporting limit	USGS	United States Geologic Survey
msl	Mean sea level	UST	Underground storage tank
MTBE	Methyl tertiary butyl ether	VCP	Voluntary Cleanup Program
MTCA	Model Toxics Control Act	VOC	Volatile organic compound
NAI	Natural attenuation indicators	VPC	Vapor-phase carbon
NAPL	Non-aqueous phase liquid		solitor larrest same.
	-		

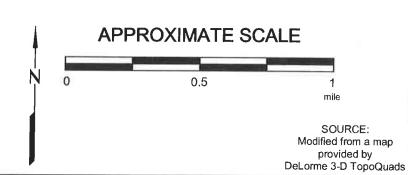


FN 2776TOPO

EXPLANATION



1/2-mile radius circle





SITE VICINITY MAP

FORMER EXXON SERVICE STATION 73399 2991 Hopyard Road Pleasanton, California PROJECT NO. 2776

PLATE 1

1

TABLE 1 OPERATION AND PERFORMANCE DATA FOR GROUNDWATER PUMP AND TREAT SYSTEM

Former Exxon Service Station 73399 2991 Hopyard Road Pleasanton, California (Page 1 of 1)

Date	Totalizer	Totalizer	Average Flow	Total Flow Per				Laboratory Ar	alytical Result	8					Removal C	alculations		
Date	Reading	Reading	Rate	Period	Sample	TPHd	TOUG	T n					TF	PHg	Ben	zene	M	TBE
	(gallons)	(gallons)	(gpm)	(gallons)	ID	(μg/L)	TPHg (µg/L)	B (µg/L)	Τ (μg/L)	Ε (μg/L)	Χ (μg/L)	MTBE (µg/L)	Per Period (pounds)	Cumulative (pounds)	Per Period (pounds)	Cumulative (pounds)	Per Period (pounds)	Cumulative
3/17/11	Cumulative to	als reported h	y EΠC Enginee	erina Inc										1 1	(position)	(pounds)	(pourids)	(pounds)
	1,933,870	9,728,040	3.6	30,530	Influent	<50	400-											
	.,,	01, 20,0 10	0.0	30,330	Intermediate	<50 <50	160a	3.7	<2.5	0.28b	0.54b	170	0.0407	<9.1866	0.0009	< 0.1767	0.0420	<9.3606
					Effluent	<50	<50	<0.50	<0.50	< 0.50	< 0.50	< 0.50					0.0120	\3.5000
25/11	Cumulative tot	als reported b	y ETIC Enginee	nina las	Emiyent	<50	<50	<0.50	<0.50	< 0.50	< 0.50	< 0.50						
	1,970,740	9,764,910	3.2															
/28/11	Cumulative tol		J.Z	36,870														
2011	1,989,320	9,783,490																
/20/11	System runnin		4,3	18,580														
20/11	2,113,610	9,907,780																
	2,113,010	9,907,780	2.5	124,290	W-HT	<50	170a	3.8	< 0.50	< 0.50	0.56	220	0.2474	<9.4341	0.0056	<0.1823	0.0004	-0.0500
					W-OUT-WC1	_		< 0.50	< 0.50	<0.50	< 0.50	< 0.50	012111	91.011	0.0000	V.1023	0.2924	<9.6530
100/44	04				W-DSCHG	<50	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50						
/02/11	System runnin											0.00						
140144	2,178,360	9,972,530	3.7	64,750														
/16/11	System runnin	g on amival an																
	2,251,670	10,045,840	3.6	73,310	W-HT	<50	170a	<4.0	<4.0	<4.0	<4.0	230	0.1958	<9.6299				
					W-OUT-WC1	-	0	< 0.50	< 0.50	< 0.50	<0.50	< 0.50	0.1900	~5.0299	<0.0045	<0.1868	0.2592	<9.9122
					W-DSCHG	<50	<50	< 0.50	< 0.50	<0.50	<0.50	<0.50						
01/11	System runnin		d departure.							-0.00	-0.00	~0.50						
	2,334,320		3.6	82,650														
/15/11	System down	on arrival and	running on depart	arture.														
	2,376,210	10,170,380	2.1	41,890	W-HT	<50	190a	<5.0	<5.0	<5.0	<5.0							
					W-OUT-WC1	-	_	<0.50	<0.50	<0.50		250	0.1870	<9.8169	<0.0047	<0.1915	0.2494	<10.1616
					W-DSCHG	<50	<50	<0.50	<0.50	<0.50	<0.50	0.50						
30/11	System down	on arrival and	unning on depa	arture.		•	-00	10.50	~0.50	<0.50	<0.50	<0.50						
		10,220,730	2.3	50,350														
/13/11	System running	on arrival an		,														
		10,266,350	2.4	45,620	W-HT	<50	130a	<4.0	-4.0	-10								
			70.	10,020	W-OUT-WC1	_	1308	<0.50	<4.0	<4.0	<4.0	190	0.1281	<9.9450	< 0.0036	< 0.1951	0.1762	<10.3377
					W-DSCHG	<50	<50		< 0.50	<0.50	<0.50	3.3						
26/11	System running	on arrival an	denarture		***-D3C(1G	-30	\50	<0.50	<0.50	<0.50	< 0.50	<0.50						
	2,519,190		2.5	47,010														
/08/11	System down			arturo														
	2,550,540	10 344 710	1.7	31,350	W-HT	₹FO	000-											
		10,014,710	1.7	31,330		<50	220a	<4.0	<4.0	<4.0	<4.0	280	0.1144	<10.0594	<0.0026	< 0.1977	0.1536	<10.4914
					W-OUT-WC1	— <50	_	<0.50	<0.50	<0.50	< 0.50	3.8			- 57		0.1000	-10.4314
22/11	System running	on amiral an	d donative		W-DSCHG	<50	<50	<0.50	< 0.50	<0.50	< 0.50	< 0.50						
	2,601,380		2.5	E0.040														
06/11				50,840														
OUFII	System running					_												
	2,651,970	10,446,140	2.3	50,590	W-HT	<50	130	<4.0	<4.0	<4.0	<4.0	180	0.1481	<10.2075	< 0.0034	<0.2011	0.1046	~10 coco
					W-OUT-WC1	_	-	< 0.50	< 0.50	< 0.50	< 0.50	6.2			-0.000-	-0.2011	0.1946	<10.6860
					W-DSCHG	<50	<50	< 0.50	< 0.50	< 0.50	< 0.50	<0.50						

** 1141 111		YY OLD HINDERL.
W-OUT-WC1	=	Water intermediate after first carbon vessel.
W-DSCHG	=	Water effluent.
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using modified EPA Method 8015B.
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using modified EPA Method 8015B.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
MTBE	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B.
gpm	=	Gallons per minute.
μg/L	=	Micrograms per liter.
<	=	Less than the stated laboratory reporting limit.
_	=	Not sampled/Not analyzed/Not measured/Not calculated/Not applicable.
a	=	Does not match the typical chromatographic pattern.
b	=	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
С	=	Sample container had air bubbles >6mm diameter.

APPENDIX A

LABORATORY ANALYTICAL REPORS AND CHAIN-OF-CUSTODY RECORDS

alscience

Environmental & Marine Chemistry Laboratories



CALSCIENCE

WORK ORDER NUMBER: 11-07-1086

The difference is service





AIR : SOIL : WATER : MARINE CHEMISTRY

Analytical Report For

Client: Cardno ERI

Client Project Name: ExxonMobil 73399/022776C

Attention: Paula Sime

601 North McDowell Blvd. Petaluma, CA 94954-2312

Cecile & ex Soia

Approved for release on 07/25/2011 by: Cecile deGuia **Project Manager**



ResultLink > Email your PM)

Calscience Environmental Laboratories certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety. Note that the Chain-of-Custody Record and Sample Receipt Form are integral parts of this report.



Environmental & Marine Chemistry Laboratories

Contents

Client Project Name: ExxonMobil 73399/022776C

Work Order Number: 11-07-1086

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	1.1 EPA 8015B (M) TPH Diesel (Aqueous)	3
	1.2 EPA 8015B (M) TPH Gasoline (Aqueous)	4
	1.3 EPA 8260B Volatile Organics (Aqueous)	5
2	Quality Control Sample Data	6
	2.1 MS/MSD and/or Duplicate	6
	2.2 LCS/LCSD	8
3	Glossary of Terms and Qualifiers	11
4	Chain of Custody/Sample Receipt Form	12

Cardno ERI

601 North McDowell Blvd.

Petaluma, CA 94954-2312

Analytical Report

Date Received: 07/16/11
Work Order No: 11-07-1086

Work Order No: Preparation:

EPA 3510C

Method:

EPA 8015B (M)

Project: ExxonMobil 73399/022776C

Page 1 of 1

Project: Exxo	nMobil /3399/0	22776C						Pa	ge i oi i
Client Sample Numb	er		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
W-DSCHG			11-07-1086-1-E	07/13/11 17:20	Aqueous	GC 48	07/18/11	07/19/11 05:53	110718B13
Comment(s):	-The sample extract	was subjected to	Silica Gel treatment	prior to analy	sis.				
<u>Parameter</u>		Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>			
TPH as Diesel		ND	50	1	U	ug/L			
Surrogates:		REC (%)	Control Limits		Qual				
Decachlorobiphenyl		138	68-140						
W-HT			11-07-1086-3-E	07/13/11 17:40	Aqueous	GC 48	07/18/11	07/19/11 06:08	110718B13S
Comment(s):	-The sample extract	was subjected to	Silica Gel treatment	prior to analys	sis.				
<u>Parameter</u>		Result	RL	<u>DF</u>	Qual	<u>Units</u>			
ΓPH as Diesel		ND	50	1	U	ug/L			
Surrogates:		REC (%)	Control Limits		Qual				
Decachlorobiphenyl		125	68-140						
Method Blank			099-12-330-1,953	N/A	Aqueous	GC 48	07/18/11	07/19/11 03:53	110718B13S



TPH as Diesel

<u>Parameter</u>

ND REC (%)

Result

<u>RL</u> 50 <u>DF</u> 1 <u>Qual</u> U <u>Units</u>

ug/L

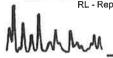
Qual

Decachlorobiphenyl

111

68-140

Control Limits



Analytical Report



Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation:

Method:

07/16/11 11-07-1086

EPA 5030C

EPA 8015B (M)

Project: ExxonMobil 73399/022776C

Page 1 of 1

W-НТ		11-07-1086-3-D	07/13/11 17:40	Aqueous	GC 18	07/18/11	07/18/11 14:44	110718B01
1,4-Bromofluorobenzene	80	38-134						
Surrogates:	REC (%)	Control Limits		<u>Qual</u>				
TPH as Gasoline	ND	50	1	U	ug/L			
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>			
W-DSCHG		11-07-1086-1-D	07/13/11 17:20	Aqueous	GC 18	07/18/11	07/18/11 14:07	110718B01
Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID

Comment(s):

TPH as Gasoline

-The sample chromatographic pattern for TPH does not match the chromatographic pattern of the specified standard. Quantitation

of the unknown hydrocarbon(s) in the sample was based upon the specified standard.

<u>Parameter</u>

Result 130

81

RL 50

<u>Units</u>

ug/L

Surrogates:

REC (%)

Qual

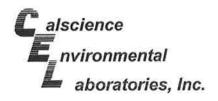
Control Limits

1,4-Bromofluorobenzene

38-134

Method Blank		099-12-436-6,410	N/A	Aqueous	GC 18	07/18/11	07/18/11 10:23	110718B01
<u>Parameter</u>	Result	RL	DF 4	Qual	<u>Units</u>			
TPH as Gasoline	ND	50	1	U	ug/L			
Surrogates:	<u>REC (%)</u>	Control Limits		<u>Qual</u>				
1,4-Bromofluorobenzene	80	38-134						





Analytical Report



Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation: Method:

Units:

07/16/11 11-07-1086

EPA 5030C

EPA 8260B

ug/L

Project: ExxonMobil 73399/022776C

Page 1 of 1

Project: Exxonivionii	/3399/022//	60								га	ge i bi i
Client Sample Number			L	ab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/		QC Batch ID
W-DSCHG			11-07	-1086-1-A	07/13/11 17:20	Aqueous	GC/MS L	07/21/11	07/2: 04:		110721L05
Parameter	Result	RL	<u>DF</u>	Qual	Parameter			Result	<u>RL</u>	<u>DF</u>	Qual
Benzene	ND	0.50	1	U	Xylenes (tota	I)		ND	0.50	1	U
Toluene	ND	0.50	1	U	Methyl-t-Buty	I Ether (MTB	BE)	ND	0.50	1	U
Ethylbenzene	ND	0.50	1	U							
Surrogates:	REC (%)	Control Limits	Qu	<u>ıal</u>	Surrogates:			REC (%)	Control Limits	2	<u>Qual</u>
1,4-Bromofluorobenzene	97	68-120			Dibromofluor	omethane		100	80-127		
1,2-Dichloroethane-d4	98	80-128			Toluene-d8			98	80-120		
W-OUT-WC1			11-07	-1086-2-A	07/13/11 17:30	Aqueous	GC/MS L	07/21/11	07/22 05:		110721L05
Parameter	Result	RL	<u>DF</u>	Qual	Parameter			Result	RL	DF	Qual
Benzene	ND	0.50	1	U	Xylenes (tota	1)		ND	0.50	1	U
Toluene	ND	0.50	1	Ü	Methyl-t-Buty	•	E)	3.3	0.50	1-	
Ethylbenzene	ND	0.50	1	Ū	·····,	. —	,				
Surrogates:	REC (%)	Control Limits	<u>Qu</u>	al	Surrogates:			REC (%)	Control Limits	<u>C</u>	Qual
1.4-Bromofluorobenzene	91	68-120			Dibromofluore	omethane		101	80-127		
1,2-Dichioroethane-d4	99	80-128			Toluene-d8			97	80-120		
W-HT			11-07	-1086-3-A	07/13/11 17:40	Aqueous	GC/MS L	07/21/11	07/22 05:3		110721L05
										_	
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Parameter</u>			Result	RL	<u>DF</u>	<u>Qual</u>
Benzene	ND	4.0	8	U	Xylenes (total)		ND	4.0	8	U
Foluene	ND	4.0	8	U	Methyl-t-Buty	Ether (MTB)	E)	190	4.0	8	
Ethylbenzene	ND	4.0	8	U						_	
Surrogates:	<u>REC (%)</u>	Control Limits	<u>Q</u> u	<u>al</u>	Surrogates:			REC (%)	Control Limits	<u>C</u>	<u>lual</u>
1,4-Bromofluorobenzene	94	68-120			Dibromofluoro	omethane		99	80-127		
,2-Dichloroethane-d4	95	80-128			Toluene-d8			98	80-120		
Method Blank			099-12	2-880-672	N/A	Aqueous	GC/MS L	07/21/11	07/21 23:3		110721L05
Parameter	Result	RL	<u>DF</u>	Qual	<u>Parameter</u>			Result	<u>RL</u>	<u>DF</u>	Qual
Benzene	ND	0.50	1		Xylenes (total)		ND	0.50	1	U
oluene	ND	0.50	1	Ũ	Methyl-t-Butyl	,	Ε)	ND	0.50	1	U
thylbenzene	ND	0.50	1	Ū	,	,					
Surrogates:	REC (%)	Control Limits	Qu	<u>al</u>	Surrogates:			REC (%)	Control Limits	0	<u>lual</u>
.4-Bromofluorobenzene	96	68-120			Dibromofluoro	methane		102	80-127		
.2-Dichloroethane-d4	99	80-128			Toluene-d8			98	80-120		
,2-Distributed lane-a-											



DF - Dilution Factor ,



Quality Control - Spike/Spike Duplicate



Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: 07/16/11 11-07-1086 EPA 5030C EPA 8015B (M)

Project ExxonMobil 73399/022776C

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
W-DSCHG	Aqueous	GC 18	07/18/11	07/18/11	110718S01
W-Dacrid	riquoduo				

<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	84	82	68-122	1	0-18	

Contents Company

Quality Control - Spike/Spike Duplicate



Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: 07/16/11 11-07-1086 EPA 5030C EPA 8260B

Quality Control Sample ID	Matrix	Instrument	Date Prepared		Date Analyzed	MS/MSD Batch Number
11-07-1241-2	Aqueous	GC/MS L	07/21/11		07/22/11	110721802
<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	100	113	76-124	13	0-20	
Toluene	101	100	80-120	1	0-20	
Ethylbenzene	102	110	78-126	7	0-20	
Methyl-t-Butyl Ether (MTBE)	115	122	67-121	6	0-49	HX
Tert-Butyl Alcohol (TBA)	126	116	36-162	8	0-30	
Diisopropyl Ether (DIPE)	107	116	60-138	8	0-45	
Ethyl-t-Butyl Ether (ETBE)	104	123	69-123	17	0-30	
Tert-Amyl-Methyl Ether (TAME)	102	120	65-120	17	0-20	
Ethanol	121	104	30-180	15	0-72	







Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation:

Method:

N/A 11-07-1086

EPA 3510C

EPA 8015B (M)

Quality Control Sample ID	Matrix	Instrument	Dat Prepa		Date Analyzed	LCS/LCSD Ba Number	tch
099-12-330-1,953	Aqueous	GC 48	07/18	3/11	07/19/11	110718B13S	
<u>Parameter</u>	LCS %	REC LCSD	%REC	%REC	CL RP	D RPD CL	Qualifiers
TPH as Diesel	105	10	5	75-11	7 0	0-13	







Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No: Preparation:

Method:

N/A

11-07-1086 EPA 5030C

EPA 8015B (M)

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Da Anal		LCS/LCSD Batc Number	h
099-12-436-6,410	Aqueous	GC 18	07/18/11	07/18	/11	110718B01	
<u>Parameter</u>	LCS %	REC LCSD	%REC 9	6REC CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	85	86		78-120	1	0-10	







Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: N/A 11-07-1086 EPA 5030C EPA 8260B

Quality Control Sample ID	Matrix	Instrument	Date ment Prepared		ate lyzed	LCS/LCSD Bat Number	ch
099-12-880-672	Aqueous	GC/MS L	07/21/11	07/2	1/11	110721L05	
<u>Parameter</u>	LCS %	REC LCSD	%REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	108	99		80-120	8	0-20	
Toluene	98	99		80-120	1	0-20	
Ethylbenzene	102	101		80-120	1	0-20	
Methyl-t-Butyl Ether (MTBE)	106	112		69-123	5	0-20	
Tert-Butyl Alcohol (TBA)	102	100		63-123	2	0-20	
Diisopropyl Ether (DIPE)	109	111		59-137	2	0-37	
Ethyl-t-Butyl Ether (ETBE)	105	110		69-123	4	0-20	
Tert-Amyl-Methyl Ether (TAME)	108	103		70-120	4	0-20	
Ethanol	105	113		28-160	7	0-57	





Glossary of Terms and Qualifiers

Work Order Number: 11-07-1086

Qualifier	<u>Definition</u>
AZ	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
В	Analyte was present in the associated method blank.
ВА	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
BB	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
BU	Sample analyzed after holding time expired.
CJ	Concentration exceeds the calibration range.
DF	Reporting limits elevated due to matrix interferences.
ET	Sample was extracted past end of recommended max. holding time.
GE	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control
	due to a matrix interference effect. The associated batch LCS/LCSD was in control and,
	hence, the associated sample data was reported without further clarification.
HD	Chromat. profile inconsistent with pattern(s) of ref. fuel stnds.
HT	Analytical value calculated using results from associated tests.
HX	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
J	Analyte was detected at a concentration below the reporting limit and above the
3	laboratory method detection limit. Reported value is estimated.
LD	Analyte presence was not confirmed by second column or GC/MS analysis.
LQ	LCS recovery above method control limits.
LR	LCS recovery below method control limits.
ND	Parameter not detected at the indicated reporting limit.
QO	Compound did not meet method-described identification guidelines. Identification was
	based on additional GC/MS characteristics.
RU	LCS recovery percentage is within LCS ME control limit range.
RV	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
SN	See applicable analysis comment.
U	Undetected at detection limit.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.



Calscience Environmental

7440 Lincoln Way

Garden Grove, CA 92841

Laboratories, Inc.

Phone: 714-895-5494

Fax: 714-894-7501





Consu	HENDE PERMIS	Cardno ERI										_					A	ccou	int#	: NA					F	O#:								
Consulta	nt Address:	601 North Mc	Dowell Blvd														– In	volc	e To	: Ca	rdno i	ERI										_		
Consultant Cir	ty/State/Zip:	Petaluma, Ca	lifornia 94954														_				ula Si	_		_								_	_	_
ExxonMobil F	Project Mgr:	Jennifer C. S	edlachek							•						P	_			_	27760		L							_	_			
Consultant I	Project Mgr:	Paula Sime													Ex					_	399	100				_	Ma	or Proj	act (AE	E 40	_	_	_	_
Consultant Telepho	ne Number:	(707) 766-200	0				F	nx N	lo.: (707	789	-041	4								1 Ho	OVAC	I Ro	arl				OI FIO	act (va	E #)	-	_	_	_
Sampler N	lame (Print):	GRE	G BRI	15Ki											Sit	_					asan	_					_	_						
Sample	r Signature:	- Bel	à											_						_			_			e Di	Istrict				_	_	_	
								苔		r Pi	resol	er alli	(6)		and the last		-		_		Line State						For:	STEROMON .	VINC D	27				_
Sample ID	Flatd Point Name	Date Sampled	Time Sampled	No. of Containers Shipped	Greek	Composite	Field Filtered	Methanol	Sodium Bisultale	MCI (Blee Label)	4,80, Pastic (Yellow Label)	4,50, Glass (Yellow Label)		اوا	None (Black Label)	and an artist of the second	inking Water	do	200	her (specify):	Ι,		T	002				11-2-25-3		SUSH TAT (Pre-Schedule)		andard 10-day TAT		e Date of Report
W-DSCHG	WEFF	7.13.11	1720	(2) 500ml Amber	-	Ť	F	f	۳	+	Н		2	H	2 9	<u> </u> -	P	8	9	10	-		щ		+	-	-		-	12	13	18	4	3
W-DSCHG		7.15.11	1720	Committee of the commit	x	\vdash	⊢	╀	Н	+	Н	+	 	Н	-12	4	+	Н	+	╀	×	_	+	4	+	+	+		_	1	\perp	X	4	
N DOGILO	- VVII.	7.12.11	1120	(4) 40ml VOAs	1	\vdash	⊢	╁	Н	쑤	Н	+	꾸	Н	+P	4	+	Н	+	╀	-	+2	4	X	-	+	+-		_	1	+	_ X	4	
W-OUT-WC1	WC1	7.13.11	1730	(4) 40ml VOAs	x	\vdash	H	t	Н	+	Н	H	╁	Н	+,	+	╀	Н	+	╀	┝	╬	+		+	+	╁		+	╀	╀	+	+	_
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W-HT	WHT	7.13. H	1740	(2) 500ml Amber	V	\vdash	\vdash	t	H	†	Н	H	╁	Н	1,	+	t	Н	+	╁	H.,	╁	+	╅	+	+	╁		+	╁	╀	╀	+	_
W-HT	WHT	7.13.11	1740	(4) 40ml VOAs	x	Н	Н	+	Н	ℷ	Н	Н	Û	Н	ť	+	╁	Н	+	╁	X	-	+		+	+	┿		\dashv	╀	╀	- X	_	_
	11111	11-12-11	1	14) 401111 40745	r	-	┪	t	Н	7	+	H	十	Н	ť	+	╁	Н	+	╁	⊢	+	4	×	+	+	+	-	-	╀	+	X	4	_
Comments/Special Instructions	: "TPHd	to include sil	ica gel clean	up.	_		_		ш			ш		Ц	_		_	Ш	_	La	borat	ory (om	mer	nts:					L	\perp	┸	+	
GLOBAL ID # (T0600100537)				•								,	PLEA					F FILLS			Tem San	pera	ture Cont	Upo	on Re	act?				Y		N		
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NO.





<WebShip>>>>>

800-322-5555 www.gso.com

Ship From: ALAN KEMP CAL SCIENCE- CONCORD 5063 COMMERCIAL CIRCLE #H CONCORD, CA 94520

Ship To:
SAMPLE RECEIVING
CEL
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD: \$0.00

Reference: CARDNO ERI

Delivery Instructions:

Signature Type: SIGNATURE REQUIRED Tracking #: 516998933

SDS

ORC

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GARDEN GROVE

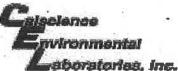
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Print Date: 07/15/11 16:52 PM

Package 1 of 1



WORK ORDER #: 11-07- 1 0 8 6

🚣 aboratories, inc.	SAMPLE RE	CEIPT FO	RM	Coole	r <u>/</u> of /
CLIENT: <u>Cardno</u>	ERI		DATE	41	1/6/11
TEMPERATURE: Thermom Temperature	°C + 0.5°C (CF) =ature criteria (PM/APM contacture criteria but received on ice forerature, placed on ice forerature)	ted by:).	Blank	ling.	ample
CUSTODY SEALS INTACT	``			-	V.
Cooler 🗆		□ Not Present	□ N/A	lr	nitial:
□ Sample □	□ No (Not Intact)	☑ Not Present		lr	nitial: W/C
SAMPLE CONDITION: Chain-Of-Custody (COC) docu COC document(s) received co	mplete	ples		No	N/A
		me relinquished.	6		
Sampler's name indicated on (æ		
Sample container label(s) cons	sistent with COC				- · I
Sample container(s) intact and	good condition	•••••	2		
Proper containers and sufficien	nt volume for analyses requ	ested	<u>a</u>		0
Analyses received within holding	ng time		₫		
pH / Res. Chlorine / Diss. Sulfice	de / Diss. Oxygen received	within 24 hours			
Proper preservation noted on C	COC or sample container				
☐ Unpreserved vials received for	or Volatiles analysis				2
Volatile analysis container(s) from	ee of headspace				
Tedlar bag(s) free of condensate CONTAINER TYPE:	tion				A
Solid: □4ozCGJ □8ozCGJ	□16ozCGJ □Sleeve (_) □EnCores	[®] □TerraC	ores® [
Water: □VOA ☑VOAh □VOA	Ana₂ □125AGB □125AG	Bh □125AGBp	□1AGB □	11AGBna	a₂ □1AGBs
□500AGB	GJs □250AGB □250C	GB □250CGBs	□1PB □	1500PB (□500PBna
□250PB □250PBn □125PB				<u> </u>	
Air: Tediar Summa O Container: C: Clear A: Amber P: Plastic Preservative: h: HCL n: HNO3 nas:Nas	G: Glass J: Jar B: Bottle Z: Ziplor	:/Resealable Bag E: Ei	nvelope Re	l beweive	by:



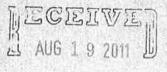
Environmental & Marine Chemistry Laboratories



CALSCIENCE

WORK ORDER NUMBER: 11-08-0702

The difference is service



BY:----



AIR SOIL WATER MARINE CHEMISTRY

Analytical Report For

Client: Cardno ERI

Client Project Name: ExxonMobil 73399/022776C

Attention: Paula Sime

601 North McDowell Blvd. Petaluma, CA 94954-2312

Cecile & ex Sain

Approved for release on 08/18/2011 by: Cecile deGuia

Project Manager



ResultLink

Email your PM

Calscience Environmental Laboratories certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety. Note that the Chain-of-Custody Record and Sample Receipt Form are integral parts of this report.



Environmental & Marine Chemistry Laboratories

Contents

Client Project Name: ExxonMobil 73399/022776C

Work Order Number: 11-08-0702

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Analytical Report

Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312

Date Received: Work Order No: Preparation: Method:

08/10/11 11-08-0702 **EPA 3510C** EPA 8015B (M)

Project: ExxonMobil 73399/022776C

Page 1 of 1

Project: ExxonMobil /:	3399/022776C						Pa	age 1 of 1
Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
W-DSCHG		11-08-0702-1-F	08/08/11 12:00	Aqueous	GC 48	08/13/11	08/15/11 23:09	110813B05
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	Units			
TPH as Diesel	ND	50	1	SG,U	ug/L			
Surrogates:	<u>REC (%)</u>	Control Limits		Qual				
Decachlorobiphenyl	104	68-140						
W-HT		11-08-0702-3-F	08/08/11 12:30	Aqueous	GC 48	08/13/11	08/15/11 23:25	110813B05
Parameter	Result	<u>RL</u>	DF	Qual	Units			
TPH as Diesel	ND	50	1.	SG,U	ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
Decachlorobiphenyl	105	68-140						
Method Blank		099-12-330-1,980	N/A	Aqueous	GC 48	08/13/11	08/15/11 21:53	110813B05
Parameter	Result	PI	DE.	Qual	<u>Units</u>			
TPH as Diesel	ND	<u>RL</u> 50	<u>DF</u> 1	<u>Quai</u> U	ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
Decachlorobiphenyl	111	68-140						

Analytical Report



Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation:

Method:

08/10/11 11-08-0702

EPA 5030C

EPA 8015B (M)

Project: ExxonMobil 73399/022776C

Page 1 of 1

Client Sample Numbe	r		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
W-DSCHG			11-08-0702-1-C	08/08/11 12:00	Aqueous	GC 57	08/12/11	08/12/11 13:15	110812B01
Parameter		Result	RL	DF	Qual	<u>Units</u>			
TPH as Gasoline		ND	50	1	U	ug/L			
Surrogates:		REC (%)	Control Limits		<u>Qual</u>				
1,4-Bromofluorobenzei	пе	71	38-134						
W-HT			11-08-0702-3-C	08/08/11 12:30	Aqueous	GC 57	08/12/11	08/12/11 14:49	110812B01
Comment(s):	The sample chroma of the unknown hydr	atographic patteri ocarbon(s) in the	n for TPH does not ma sample was based up	atch the chror	matographic p	pattern of the	specified sta	andard. Quar	ititation
Parameter Parameter	•	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>			
TPH as Gasoline		220	50	1		ug/L			
Surrogates:		REC (%)	Control Limits		Qual				
,4-Bromofluorobenzen	e	93	38-134						
Method Blank			099-12-436-6,502	N/A	Aqueous	GC 57	08/12/11	08/12/11	110812B01

A.	
A.A.	
商	
1000	
TO TO	

11:41 <u>Parameter</u> Result <u>RL</u> DF <u>Units</u> Qual TPH as Gasoline ND 50 U ug/L **REC (%)** Surrogates: Control Limits <u>Quai</u> 1,4-Bromofluorobenzene 93 38-134



nvironmental aboratories, Inc.

Analytical Report

Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: Units:

08/10/11 11-08-0702 **EPA 5030C EPA 8260B** ug/L

Project: ExxonMobil 73	3399/02277	6C								Pa	ge 1 of 2
Client Sample Number			L	ab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/ Anal		QC Batch ID
W-DSCHG			11-08	-0702-1-B	08/08/11 12:00	Aqueous	GC/MS FFF	08/16/11	08/1: 21:		110816L03
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	<u>Qual</u>	Parameter			Result	<u>RL</u>	DF	Qual
Benzene	ND	0.50	1	U	Xylenes (tota	!)		ND	0.50	1	U
Toluene	ND	0.50	1	U	Methyl-t-Buty	/l Ether (MTE	BE)	ND	0.50	1	U
Ethylbenzene	ND	0.50	1	U				DEO (0/)		_	
Surrogates:	<u>REC (%)</u>	Control Limits	Qu	<u>al</u>	Surrogates:			REC (%)	Control Limits	<u>C</u>	<u>Qual</u>
1.4-Bromofluorobenzene	106	68-120			Dibromofluor	omethane		99	80-127		
1.2-Dichloroethane-d4	114	80-128			Toluene-d8			99	80-120		
W-OUT-WC1			11-08-	-0702-2-B	08/08/11 12:15	Aqueous	GC/MS FFF	08/16/11	08/10 21:		110816L03
Parameter Parameter	Result	<u>RL</u>	DF	Qual	Parameter			Result	RL	DE	Qual
Benzene	ND	0.50	1	U	Xylenes (tota	l)		ND	0.50	1	U
Toluene	ND	0.50	1	ŭ	Methyl-t-Buty	,	BE)	3.8	0.50	1	
Ethylbenzene	ND	0.50	1	U	•	· ·					
Surrogates:	<u>REC (%)</u>	Control Limits	Qu	<u>al</u>	Surrogates:			REC (%)	Control Limits	<u>C</u>	<u>)ual</u>
1,4-Bromofluorobenzene	107	68-120			Dibromofluor	omethane		99	80-127		
1,2-Dichloroethane-d4	112	80-128			Toluene-d8			101	80-120		
W-HT			11-08-	0702-3-A	08/08/11 12:30	Aqueous	GC/MS BB	08/11/11	08/11 19:		110811L01
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Parameter</u>			Result	<u>RL</u>	<u>DF</u>	Qual
Benzene	ND	4.0	8	U	Xylenes (total	,		NĎ	4.0	8	U
Toluene	ND	4.0	8	U	Methyl-t-Buty	Ether (MTB	E)	280	4.0	8	
Ethylbenzene	ND	4.0	8	. U				DEC (9/)	Control		u al
Surrogates:	<u>REC (%)</u>	Control Limits	Qua	<u>al</u>	Surrogates:			REC (%)	Control Limits	<u></u>	<u>ual</u>
1,4-Bromofluorobenzene	97	68-120			Dibromofluoro	omethane		82	80-127		
1,2-Dichloroethane-d4	91	80-128			Toluene-d8			96	80-120		
Method Blank			099-12	-880-682	N/A	Aqueous	GC/MS BB	08/11/11	08/11 14:0		110811L01
Parameter	Result	RL	DF	Qual	Parameter			Result	<u>RL</u>	<u>DF</u>	Qual
Benzene	ND	0.50	1	U	Xylenes (total)		ND	0.50	1	U
Toluene	ND	0.50	1	Ü	Methyl-t-Buty	•	E)	ND	0.50	1	Ü
Ethylbenzene	ND	0.50	1	Ū		•					
Surrogates:	REC (%)	Control Limits	Qua	<u>al</u>	Surrogates:			REC (%)	Control Limits	Q	<u>ual</u>
1,4-Bromofluorobenzene	94	68-120			Dibromofluoro	methane		85	80-127		
1,4-Bromondorobenzene 1,2-Dichloroethane-d4	89	80-128			Toluene-d8			96	80-120		
1,Z-DIGNIGIOGNANC-04		50 120			. 0.00110-00						

DF - Dilution Factor ,

Qual - Qualifiers



Analytical Report

Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No: Preparation:

Method: Units: 08/10/11 11-08-0702

11-08-0702 EPA 5030C EPA 8260B

ug/L

Page 2 of 2

Client Sample Number				b Sample lumber	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/ Analy		QC Batch ID
Method Blank			099-12-	880-687	N/A	Aqueous	GC/MS FFF	08/16/11	08/16 16:		110816L03
Parameter Benzene Toluene Ethylbenzene	<u>Result</u> ND ND ND	RL 0.50 0.50 0.50	<u>DF</u> 1 1	Qual U U U	Parameter Xylenes (total) Methyl-t-Butyl		E)	<u>Result</u> ND ND	<u>RL</u> 0.50 0.50	<u>DF</u> 1	<u>Qual</u> U U
Surrogates: 1,4-Bromofluorobenzene 1,2-Dichloroethane-d4	REC (%) 105 109	<u>Control</u> <u>Limits</u> 68-120 80-128	<u>Qual</u>		Surrogates: Dibromofluoror Toluene-d8	methane		REC (%) 100 100	Control Limits 80-127 80-120	Q	<u>ual</u>

Quality Control - Spike/Spike Duplicate



Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method:

08/10/11 11-08-0702 EPA 5030C EPA 8015B (M)

Quality Control Sample ID	Matrix	Instrument	Date Prepared		Date Analyzed	MS/MSD Batch Number
W-DSCHG	Aqueous	GC 57	08/12/11		08/12/11	110812S01
<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	<u>RPD</u>	RPD CL	Qualifiers
TPH as Gasoline	88	87	68-122	2	0-18	



Quality Control - Spike/Spike Duplicate

inel

Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: 08/10/11 11-08-0702 EPA 5030C EPA 8260B

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
11-08-0536-1	Aqueous	GC/MS BB	08/11/11	08/11/11	110811S01

<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	110	107	76-124	3	0-20	
Toluene	105	102	80-120	3	0-20	
Ethylbenzene	115	108	78-126	6	0-20	
Methyl-t-Butyl Ether (MTBE)	91	90	67-121	1	0-49	
Tert-Butyl Alcohol (TBA)	113	103	36-162	8	0-30	
Diisopropyl Ether (DIPE)	96	95	60-138	1	0-45	
Ethyl-t-Butyl Ether (ETBE)	92	91	69-123	1	0-30	
Tert-Amyl-Methyl Ether (TAME)	96	95	65-120	0	0-20	
Ethanol	139	103	30-180	30	0-72	



Quality Control - Spike/Spike Duplicate



Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: 08/10/11 11-08-0702 EPA 5030C EPA 8260B

Project ExxonMobil 73399/022776C

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
11-08-0986-3	Aqueous	GC/MS FFF	08/16/11	08/16/11	110816S01

<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	<u>RPD</u>	RPD CL	Qualifiers
Benzene	102	99	76-124	3	0-20	
Toluene	101	99	80-120	2	0-20	
Ethylbenzene	102	100	78-126	2	0-20	
Methyl-t-Butyl Ether (MTBE)	112	109	67-121	3	0-49	
Tert-Butyl Alcohol (TBA)	123	148	36-162	18	0-30	
Diisopropyl Ether (DIPE)	107	104	60-138	4	0-45	
Ethyl-t-Butyl Ether (ETBE)	107	102	69-123	4	0-30	
Tert-Amyl-Methyl Ether (TAME)	107	104	65-120	3	0-20	
Ethanol	100	121	30-180	20	0-72	

o Contents





0-13

Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312

TPH as Diesel

Date Received: Work Order No: Preparation: Method:

75-117

N/A 11-08-0702 EPA 3510C EPA 8015B (M)

Project: ExxonMobil 73399/022776C

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Bat Number	ch
099-12-330-1,980	Aqueous	GC 48	08/13/11	08/15/11	110813B05	
<u>Parameter</u>	LCS %	REC LCSD	%REC %R	EC CL RPD	RPD CL	Qualifiers

91







Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: N/A 11-08-0702 EPA 5030C EPA 8015B (M)

Quality Control Sample ID	Matrix	Matrix Instrument		Date Prepared		te zed	LCS/LCSD Bato Number	h
099-12-436-6,502	Aqueous	GC	57 0	8/12/11	08/12	/11	110812B01	
P <u>arameter</u>	LCS %	<u>4REC</u>	LCSD %REC	<u>%R</u>	EC CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	87		89	78	B-120	3	0-10	







Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation:

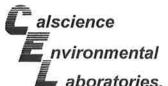
Method:

N/A

11-08-0702 EPA 5030C

EPA 8260B

Quality Control Sample ID	Matrix	Instrument		Date Prepared	200	ate lyzed	LCS/LCSD Bate Number	ch .
099-12-880-682	Aqueous	GC/	GC/MS BB		08/1	1/11	110811L01	
<u>Parameter</u>	LCS %	REC	LCSD %R	<u>EC</u>	%REC CL	RPD	RPD CL	Qualifiers
Benzene	97		107		80-120	10	0-20	
Toluene	95		105		80-120	10	0-20	
Ethylbenzene	100		111		80-120	10	0-20	
Methyl-t-Butyl Ether (MTBE)	87		93		69-123	6	0-20	
Tert-Butyl Alcohol (TBA)	89		110		63-123	21	0-20	
Diisopropyl Ether (DIPE)	89		96		59-137	8	0-20	
Ethyl-t-Butyl Ether (ETBE)	86		92		69-123	7	0-20	
Tert-Amyl-Methyl Ether (TAME)	86		97		70-120	12	0-20	
Ethanol	98		117		28-160	18	0-57	





aboratories, Inc.

Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method: N/A 11-08-0702 EPA 5030C EPA 8260B

Quality Control Sample ID	Matrix	Matrix Instrument		Date Prepared	Date Da Prepared Analy		LCS/LCSD Bate Number	atch	
099-12-880-687	Aqueous	GC/I	AS FFF	08/16/11	08/1	6/11	110816L03		
<u>Parameter</u>	LCS %REC		LCSD %	<u> REC</u>	%REC CL	RPD	RPD CL	Qualifiers	
Benzene	108	3	99		80-120	9	0-20		
Toluene	109)	100		80-120	8	0-20		
Ethylbenzene	109)	99		80-120	10	0-20		
Methyl-t-Butyl Ether (MTBE)	113	;	104		69-123	8	0-20		
Tert-Butyl Alcohol (TBA)	99		100		63-123	1	0-20		
Diisopropyl Ether (DIPE)	111		102		59-137	8	0-37		
Ethyl-t-Butyl Ether (ETBE)	111		102		69-123	8	0-20		
Tert-Amyl-Methyl Ether (TAME)	110		102		70-120	8	0-20		
Ethanol	99		89		28-160	11	0-57		







Glossary of Terms and Qualifiers



Work Order Number: 11-08-0702

<u>Qualifier</u>	Definition
AZ	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the
В	sample data was reported without further clarification.
В	Analyte was present in the associated method blank. The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD
BA	was in control and, therefore, the sample data was reported without further clarification.
ВВ	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
BU	Sample analyzed after holding time expired.
CJ	Concentration exceeds the calibration range.
DF	Reporting limits elevated due to matrix interferences.
ET	Sample was extracted past end of recommended max. holding time.
GE	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and,
HD	hence, the associated sample data was reported without further clarification. Chromat, profile inconsistent with pattern(s) of ref. fuel stnds.
HT	Analytical value calculated using results from associated tests.
HX	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out
ПА	of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
LD	Analyte presence was not confirmed by second column or GC/MS analysis.
LQ	LCS recovery above method control limits.
LR	LCS recovery below method control limits.
ND	Parameter not detected at the indicated reporting limit.
QO	Compound did not meet method-described identification guidelines. Identification was based on additional GC/MS characteristics.
RU	LCS/LCSD Recovery Percentage is within Marginal Exceedance (ME) Control Limit range.
RV	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
SG	A silica gel cleanup procedure was performed.
SN	See applicable analysis comment.
U	Undetected at detection limit.
	Out at the control to the control and a control data is accorded as a control to be a control and a

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.



Calscience Environmental

7440 Lincoln Way

Garden Grove, CA 92841

Laboratories, Inc.

Phone: 714-895-5494

Fax: 714-894-7501

EXonMobil

11-08-0702 Consultant Name: Cardno ERI Account #: NA Consultant Address: 601 North McDowell Blvd. Consultant City/State/Zip: Petaluma, California 94954 Invoice To: Cardno ERI Report To: Paula Sime ExxonMobil Project Mgr: Jennifer C. Sedlachek Project Name: 022776C (AUG) Consultant Project Mgr: Paula Sime ExxonMobil Site #: 73399 Consultant Telephone Number: (707) 766-2000 Major Project (AFE #): Fax No.: (707) 789-0414 Site Address: 2991 Hopyard Road Sampler Name (Print): Site City, State, Zip: Pleasanton, California Sampler Signature: Oversight Agency: Dublin San Ramon Services District Analyze For: Standard 10-day TAT BTEXMTBE 8015B TPHg Sample ID W-DSCHG (2) 500ml Amber W-DSCHG WEFF x (4) 40ml VOAs XX W-OUT-WC1 (4) 40ml VOAs W-HT (2) 500ml Amber W-HT (4) 40ml VOAs X ** TPHd to include silica gel cleanup. Temperature Upon Receipt: GLOBAL ID # (T0600100537) PLEASE E-MAIL ALL POF FILES TO Sample Containers Intact? Relinquished by: (NORCALLABS@ERI-US.COM VOCs Free of Headspace? N QC Deliverables (please circle one) 1020 1020 Level 2 1737 Site Specific - if yes, please attach pre-schedule w/ TestAmerica Project Manager or attach specific instructions

2ane 15 of 18

NPS



< WebShip >>>

800-322-5555 www.gso.com

Ship From: ALAN KEMP CAL SCIENCE- CONCORD 5063 COMMERCIAL CIRCLE #H CONCORD, CA 94520

Ship To: SAMPLE RECEIVING CEL 7440 LINCOLN WAY

GARDEN GROVE, CA 92841

COD: \$0.00

Reference: BTS, CARDNO ERI

Signature Type: SIGNATURE REQUIRED

Delivery Instructions:

Tracking #: 517162165

GARDEN GROVE

D92843A



Print Date: 08/09/11 16:04 PM Package 1 of 1

Send Label To Printer

Print All

Edit Shipment

Finish

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

STEP 1 - Use the "Send Label to Printer" button on this page to print the shipping label on a laser or inkjet printer.

STEP 2 - Fold this page in half.

STEP 3 - Securely attack this label to your package, do not cover the barcode.

STEP 4 - Request an on-call pickup for your package, if you do not have scheduled daily pickup service or Drop-off your package at the nearest GSO drop box. Locate nearest GSO dropbox locations using this link.

ADDITIONAL OPTIONS:

Send Label Via Email

Create Return Label

TERMS AND CONDITIONS:

By giving us your shipment to deliver, you agree to all the service terms and conditions described in this section. Our liability for loss or damage to any package is limited to your actual damages or \$100 whichever is less, unless you pay for and declare a higher authorized value. If you declare a higher value and pay the additional charge, our liability will be the lesser of your declared value or the actual value of your loss or damage. In any event, we will not be liable for any damage, whether direct, incidental, special or consequential, in excess of the declared value of a shipment whether or not we had knowledge that such damage might be incurred including but not limited to loss of income or profit. We will not be liable for your acts or omissions, including but not limited to improper or insufficient packaging, securing, marking or addressing. Also, we will not be liable if you or the recipient violates any of the terms of our agreement. We will not be liable for loss, damage or delay caused by events we cannot control, including but not limited to acts of God, perils of the air, weather conditions, act of public enemies, war, strikes, or civil commotion. The highest declared value for our GSO Priority Letter or GSO Priority Package is \$500. For other shipments the highest declared value is \$10,000 unless your package contains items of "extraordinary value", in which case the highest declared value we allow is \$500. Items of "extraordinary value" include, but or not limited to, artwork, jewelry, furs, precious metals, tickets, negotiable instruments and other items with intrinsic value.



WORK ORDER #: 11-08-0 子 0 2

SAMPLE RECEIPT FORM	Cool	er <u>(</u> of <u>)</u>
		8/10/11
TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen)		
Temperature 2.6°C+0.5°C(CF) = 3.1°C Deliant		Sample
 ☐ Sample(s) outside temperature criteria (PM/APM contacted by:). ☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sample(s). 	nling	\sim
☐ Received at ambient temperature, placed on ice for transport by Courier.	ping.	
Ambient Temperature:		Initial: 01
Attoletic Temperature, Li Ali Li Tilitor		Initial:
CUSTODY SEALS INTACT:		2
☑ Cooler □ □ No (Not Intact) □ Not Present □ N//	A	Initial: <i>QQ</i>
□ Sample □ □ No (Not Intact) ☑ Not Present	*	Initial:
SAMPLE CONDITION: Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples		
COC document(s) received complete		
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.		
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.		
Sampler's name indicated on COC		
Sample container label(s) consistent with COC		_
Sample container(s) intact and good condition		
Proper containers and sufficient volume for analyses requested		
Analyses received within holding time		
pH / Res. Chlorine / Diss. Sulfide / Diss. Oxygen received within 24 hours □		2
Proper preservation noted on COC or sample container		
☐ Unpreserved vials received for Volatiles analysis		
Volatile analysis container(s) free of headspace	2	
Tedlar bag(s) free of condensation		
Solid: □4ozCGJ □8ozCGJ □16ozCGJ □Sleeve () □EnCores® □Terr	aCores®	
Water: □VOA □VOAna₂ □125AGB □125AGBh □125AGBp □1AGB	□1AGB	na₂ □1AGBs
□500AGB	□500PI	B □500P Bna
□250PB □250PBn □125PB □125PBznna □100PJ □100PJna ₂ □ □		
Air: ☐Tedlar® ☐Summa® Other: ☐ Trip Blank Lot#: Labeled Centainer: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag	/Checked	

Preservative: h: HCL n: HNO₃ na₂:Na₂S₂O₃ na: NaOH p: H₃PO₄ s: H₂SO₄ znna: ZnAc₂+NaOH f: Field-filtered Scanned by:



SAMPLE ANOMALY FORM

SAMP	LES - C	ONTAI	NERS &	LABELS:			Comi	nents:	000
☐ Sai ☐ Hol ☐ Ins ☐ Imp ☐ No ☐ San ☐ San	mple(s)/ mple(s)/ lding tin ufficient proper c proper p preserv mple lab mple lab Date a Projec # of Co	Contain Contain ne expire t quantit container ative no nels illeg el(s) do le ID and/or Ti ct Inform ontainer	er(s) NO er(s) reco ed — list s ties for an r(s) used tive used ted on Co ible — not not mate ime Colle- nation r(s)	FRECEIVED eived but No ample ID(s) nalysis – list – list test – list test OC or label e test/contai th COC – No	or LISTE and test test - list test ner type te in con	ED on COC			
				e container		11101760	-		78
	Broke		•				-		
☐ Sam	iple con	tainer(s) not labe	eled					
☐ Air	sample	contain	er(s) com	promised -	- Note in	comments			
	Flat		•		•				•
	Very lo	w in vol	lume						
				d - duplicate					
				o Calscienc					<u></u>
		g (trans	ferred int	o Client's T	edlar® B	ag*)			
☐ Othe	er:		211-1-1-1				_		
HEADS	PACE -	- Conta	iners wit	h Bubble >	6mm o	or ¼ inch:		1	
Sample #	Container IO(s)	# of Vials Received	Sample #	Container (D(s)	# of Vials Received	Sample #	Container ID(a)	# of Cont.	Analysis
2	P	4							
3	β, ρ	4		. 19					
*									14/.
-									
Comment	s:			.3	<u></u>				7(1)
Transferre	ed at Clie	nt's requ	est.	•			ln	itial / Date	A
					- 3				SOP T100_090 (09/17/10)

Calscience

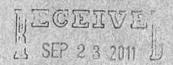
Environmental & Marine Chemistry Laboratories



CALSCIENCE

WORK ORDER NUMBER: 11-09-0391

The difference is service



BY:----



AIR SOIL WATER MARINE CHEMISTRY

Analytical Report For

Client: Cardno ERI

Client Project Name: ExxonMobil 73399/022776C

Attention: Paula Sime

601 North McDowell Blvd. Petaluma, CA 94954-2312

Cecile & ex Sain

Approved for release on 09/19/2011 by: Cecile deGuia Project Manager

ResultLink > Email your PM)

Calscience Environmental Laboratories certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety. Note that the Chain-of-Custody Record and Sample Receipt Form are integral parts of this report.



Environmental & Marine Chemistry Laboratories

Contents

Client Project Name: ExxonMobil 73399/022776C

Work Order Number: 11-09-0391

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2	Quality Control Sample Data	6 6 8
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4	Chain of Custody/Sample Receipt Form	12



Analytical Report



Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received: Work Order No: Preparation: Method:

09/08/11 11-09-0391 EPA 3510C EPA 8015B (M)

Project: ExxonMobil 73399/022776C

Page 1 of 1

Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch II
W-DSCHG		11-09-0391-1-G	09/06/11 11:45	Aqueous	GC 47	09/12/11	09/13/11 01:17	110912B08
<u>Parameter</u>	Result	RL	<u>DF</u>	Qual	Units			
TPH as Diesel	ND	50	1	SG,U	ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
Decachlorobiphenyl	121	68-140						
W-HT		11-09-0391-3-E	09/06/11 12:30	Aqueous	GC 47	09/12/11	09/13/11 01:32	110912B08
<u>Parameter</u>	Result	RL	DE	Qual	Units			
PH as Diesel	ND	50	1	SG,U	ug/L			
urrogates:	REC (%)	Control Limits		<u>Qual</u>				
lecachlorobiphenyl	109	68-140						
Method Blank		099-12-330-2,007	N/A	Aqueous	GC 47	09/12/11	09/12/11 22:32	110912B088
<u>arameter</u>	Result	RL	<u>DF</u>	Qual	Units			
PH as Diesel	ND	50	1	U	ug/L			
urrogates:	REC (%)	Control Limits		Qual				
ecachlorobiphenyl	96	68-140						





Page 1 of 1

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Analytical Report

Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312

Date Received: Work Order No: Preparation: Method:

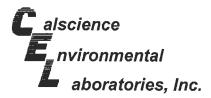
09/08/11 11-09-0391 **EPA 5030C** EPA 8015B (M)

Project: ExxonMobil 73399/022776C

DESCRIPTION OF THE PROPERTY OF							F	age i oi i
Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch I
W-DSCHG		11-09-0391-1-C	09/06/11 11:45	Aqueous	GC 18	09/09/11	09/10/11 06:26	110909B0
<u>Parameter</u>	Result	RL	DF	<u>Qual</u>	Units			
TPH as Gasoline	ND	50	1	υ	ug/L			
Surrogates:	<u>REC (%)</u>	Control Limits		<u>Qual</u>				
1,4-Bromofluorobenzene	86	38-134						
W-HT		11-09-0391-3-C	09/06/11 12:30	Aqueous	GC 18	09/09/11	09/10/11 07:03	110909B02
Parameter	Result	<u>RL</u>	DF	Qual	Units			
PH as Gasoline	130	50	1	HD	ug/L			
urrogates:	REC (%)	Control Limits		Qual				
,4-Bromofluorobenzene	84	38-134						
Method Blank		099-12-436-6,606	N/A	Aqueous	GC 18	09/09/11	09/10/11 03:57	110909B02
<u>arameter</u>	Result	<u>RL</u>	DF	Qual	Units			
PH as Gasoline	ND	50	1	U	ug/L			
urrogates:	REC_(%)	Control Limits		Qual				
4-Bromofluorobenzene	82	38-134		<u></u>				







Analytical Report



Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation:

Method: Units:

09/08/11

11-09-0391

EPA 5030C EPA 8260B

ug/L

Project: ExxonMobil 73399/022776C

Pa	age	1	of	1

Result ND ND ND REC (%)	RL 0.50 0.50 0.50 0.50 Control Limits 68-120 80-128	DF 1 1	Qual U U U ual	Date/Time Collected 09/06/11 11:45 Parameter Xylenes (tota Methyl-t-Buty Surrogates:	Matrix Aqueous		Troparc	d Anal	0/11	QC Batch II 110909L06 Qual U
ND ND ND REC (%)	0.50 0.50 0.50 Control Limits 68-120	DF 1 1	Qual U U U	Parameter Xylenes (tota Methyl-t-Buty			Result ND	RL 0.50	.09 DF 1	<u>Qual</u> U
ND ND ND REC (%)	0.50 0.50 0.50 Control Limits 68-120	1 1 1	U U	Xylenes (tota Methyl-t-Buty	,	BE)	ND	0.50	1	U
ND ND <u>REC (%)</u> 90	0.50 0.50 Control Limits 68-120	1	U	Methyl-t-Buty	,	BE)			1	_
ND <u>REC (%)</u> 90	0.50 Control Limits 68-120	1	U	Methyl-t-Buty	,	BE)				_
REC (%)	Control Limits 68-120		_		•	-7		0.00		U
90	<u>Limits</u> 68-120	Qı	<u>ıal</u>	Surrogates:						Ū
							REC (%)	Control Limits	<u> </u>	<u>Qual</u>
103	80-128			Dibromofluor	omethane		88	80-127		
				Toluene-d8		95	80-120			
		11-09	-0391-2-A	09/06/11 12:00	Aqueous	GC/MS BB	09/09/11	09/10 05:		110909L06
Result	RL	DE	Qual	Parameter			Result	RL	DF	Qual
ND	0.50)				_	U
			_	• (•	F)				U
ND			Ü	mounty, c 2 day		_,	0.2	0.50	'	
REC (%)			<u>al</u>	Surrogates:			REC (%)		<u>C</u>	<u>lual</u>
90	68-120			Dibromofluoromethane 8		88				
103	80-128					95				
		11-09-			Aqueous	GC/MS BB	09/09/11	09/10		110909L06
				12.30				Ub:U	18	
Result	RL	<u>DF</u>	Qual	Parameter			Result	<u>RL</u>	<u>DF</u>	Qual
ND	4.0	8	U	Xylenes (total)	1		ND	4.0	8	U
ND	4.0	8	U	Methyl-t-Butyl	Ether (MTBI	≣)	180	4.0	8	
ND	4.0	8	U							
REC (%)	Control Limits	Qua	<u>al</u>	Surrogates:			REC (%)	Control Limits	Q	<u>ual</u>
	68-120			Dibromofluoro	methane		89	80-127		
100	80-128			Toluene-d8			96	80-120		
		099-12	-880-701	N/A	Aqueous	GC/MS BB	09/09/11			110909L06
Result	RL	DF	Qual	Parameter			Result	RI	DE	Qual
	_							_	_	
					Ether (MTRE					U
ND			U			.,	.10	0.50	1	U
REC (%)	Control Limits		_	Surrogates:					<u>Q</u> ı	<u>al</u>
				Dibromofluoror	nethane					
	ND ND ND ND REC (%) 90 103 Result ND ND REC (%) 92 100 Result ND ND REC (%) 93	ND 0.50 ND 0.50 ND ND ND ND ND ND ND N	ND 0.50 1 ND 0.50 1 ND ND ND ND ND ND ND	ND	ND	ND 0.50 1 U Xylenes (total) ND 0.50 1 U Methyl-t-Butyl Ether (MTB ND 0.50 1 U Methyl-t-Butyl Ether (MTB ND 0.50 1 U Surrogates:	ND	ND 0.50 1 U Xylenes (total) ND ND 0.50 1 U Methyl-t-Butyl Ether (MTBE) 6.2 ND 0.50 1 U Methyl-t-Butyl Ether (MTBE) 6.2 ND 0.50 1 U Surrogates: REC (%) 103 80-120 Dibromofluoromethane 88 103 80-128 Toluene-d8 95 Result Result ND 4.0 8 U Xylenes (total) ND ND 4.0 8 U Xylenes (total) ND ND 4.0 8 U Methyl-t-Butyl Ether (MTBE) 180 ND 4.0 8 U Xylenes (total) ND ND 4.0 8 U Xylenes (total) REC (%) REC (%) Control Limits Qual Surrogates: REC (%) 92 68-120 Dibromofluoromethane 96 Result ND ND ND ND ND 0.50 1 <td< td=""><td> ND</td><td> ND</td></td<>	ND	ND



DF - Dilution Factor ,

Qual - Qualifiers



alscience nvironmental aboratories, Inc.

Quality Control - Spike/Spike Duplicate



Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312

Date Received: Work Order No: Preparation: Method:

09/08/11 11-09-0391 EPA 5030C EPA 8015B (M)

Project ExxonMobil 73399/022776C

Quality Control Sample ID	Matrix	Matrix Instrument		Date Prepared			MSD Batch lumber
11-09-0384-1	Aqueous	GC 18	09/09/11		09/10/11	110909802	
<u>Parameter</u>	SPIKE ADDED	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	2000	86	84	68-122	2	0-18	

alscience nvironmental aboratories, Inc.

Quality Control - Spike/Spike Duplicate



Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312

Date Received: Work Order No: Preparation: Method: 09/08/11 11-09-0391 EPA 5030C EPA 8260B

Project ExxonMobil 73399/022776C

Quality Control Sample ID	Matrix	Instrumen	t	ate pared	Date Analyzed		ISD Batch umber
11-09-0474-2	Aqueous	GC/MS BE	3 09/0	09/09/11		110	909802
<u>Parameter</u>	SPIKE ADDED	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	10.00	94	96	76-124	2	0-20	
Toluene	10.00	97	99	80-120	2	0-20	
Ethylbenzene	10.00	92	93	78-126	0	0-20	
Methyl-t-Butyl Ether (MTBE)	10.00	33	55	67-121	3	0-49	HX
Tert-Butyl Alcohol (TBA)	50.00	71	90	36-162	10	0-30	
Diisopropyl Ether (DIPE)	10.00	92	96	60-138	4	0-45	
Ethyl-t-Butyl Ether (ETBE)	10.00	89	93	69-123	4	0-30	
Tert-Amyl-Methyl Ether (TAME)	10.00	84	86	65-120	3	0-20	
Ethanol	100.0	93	111	30-180	18	0-72	





Quality Control - LCS/LCS Duplicate



Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation:

Method:

N/A 11-09-0391

EPA 3510C

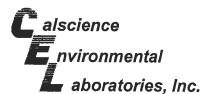
EPA 8015B (M)

Project: ExxonMobil 73399/022776C

099-12-330-2,007	Aqueous	GC 47	09/12/11	09/12/11	110912B08S
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number

SPIKE ADDED LCS %REC LCSD %REC CL <u>Parameter</u> <u>RPD</u> RPD CL Qualifiers TPH as Diesel 2000 85 75-117 0-13





Quality Control - LCS/LCS Duplicate



Cardno ERI

601 North McDowell Blvd. Petaluma, CA 94954-2312 Date Received:

Work Order No:

Preparation:

Method:

N/A

11-09-0391 **EPA 5030C**

EPA 8015B (M)

Project: ExxonMobil 73399/022776C

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed 09/10/11		LCS/LCSD Batch Number	
099-12-436-6,606	Aqueous	GC 18	09/09/11			110909B02	
<u>Parameter</u>	SPIKE AD	DDED LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Gasoline	2000	97	96	78-120	0	0-10	





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Quality Control - LCS/LCS Duplicate



Cardno ERI 601 North McDowell Blvd. Petaluma, CA 94954-2312

Date Received: Work Order No: Preparation: Method: N/A 11-09-0391 EPA 5030C EPA 8260B

Project: ExxonMobil 73399/022776C

							1	
Quality Control Sample ID	Matrix	Ins	strument	Date Prepared	Date Analyzed	d	LCS/LCSD Batch Number	
099-12-880-701	Aqueous	Aqueous GC/MS BB		09/09/11	09/10/11		110909L06	
Parameter	SPIKE AD	DED	LCS %REC	LCSD %REC	% DEC CI	DDD	DDD OI	0 ""
					%REC_CL	<u>RPD</u>	RPD CL	Qualifiers
Benzene	10.00)	96	95	80-120	1	0-20	
Toluene	10.00		99	94	80-120	4	0-20	
Ethylbenzene	10.00		95	94	80-120	1	0-20	
Methyl-t-Butyl Ether (MTBE)	10.00		90	91	69-123	1	0-20	
Tert-Butyl Alcohol (TBA)	50.00		82	92	63-123	11	0-20	
Diisopropyl Ether (DIPE)	10.00		97	96	59-137	1	0-37	
Ethyl-t-Butyl Ether (ETBE)	10.00		92	93	69-123	1	0-20	
Tert-Amyl-Methyl Ether (TAME)	10.00		86	86	70-120	0	0-20	
Ethanol	100.0		89	105	28-160	17	0-57	







Glossary of Terms and Qualifiers



Work Order Number: 11-09-0391

Qualifier	<u>Definition</u>
AZ	Surrogate compound recovery was out of control due to matrix interference. The
	associated method blank surrogate spike compound was in control and, therefore, the
_	sample data was reported without further clarification.
В	Analyte was present in the associated method blank.
BA	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD
ВВ	was in control and, therefore, the sample data was reported without further clarification.
ББ	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or
	greater.
BU	Sample analyzed after holding time expired.
CJ	Concentration exceeds the calibration range.
DF	Reporting limits elevated due to matrix interferences.
ĒΤ	Sample was extracted past end of recommended max. holding time.
GE	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control
	due to a matrix interference effect. The associated batch LCS/LCSD was in control and,
HD	hence, the associated sample data was reported without further clarification. Chromat. profile inconsistent with pattern(s) of ref. fuel stnds.
HT	Analytical value calculated using results from associated tests.
HX	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out
	of control due to matrix interference. The associated LCS and/or LCSD was in control
	and, therefore, the sample data was reported without further clarification.
ĭ∟	Relative percent difference out of control.
J	Analyte was detected at a concentration below the reporting limit and above the
LD	laboratory method detection limit. Reported value is estimated.
LD LQ	Analyte presence was not confirmed by second column or GC/MS analysis.
LR	LCS recovery above method control limits. LCS recovery below method control limits.
ND	Parameter not detected at the indicated reporting limit.
QO	Compound did not meet method-described identification guidelines. Identification was
QU	based on additional GC/MS characteristics.
RU	LCS/LCSD Recovery Percentage is within Marginal Exceedance (ME) Control Limit
	range.
RV	Surrogate compound recovery was out of control due to a required sample dilution,
80	therefore, the sample data was reported without further clarification.
SG SN	A silica gel cleanup procedure was performed.
U	See applicable analysis comment. Undetected at detection limit.
U	Ondetected at detection innit.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.



Sandy Tat

From: Sent:

Judy Hutton [judy.hutton@cardno.com] Monday, September 12, 2011 12:56 PM

To: Cc: Cecile de Guia Sandy Tat

Subject:

RE: ExxonMobil 73399/022776C (11-09-0391)

HI Cecile,

I talk to the crew about this sample. Jon Herman stated that all the samples for W-DSCHG should be 11:45. Please make all samples time for 11:45. Sorry for all the confusion. Jon will do a better job writing the correct time on the COC and sample container.

Thank you, Judy

Judy Hutton

Operations & Maintenance Administrator

Cardno ERI

601 North McDowell Blvd., Petaluma, CA 94954

Phone: 707 766 2000 Direct: 707 766 2016 Mobile: 707 338 8399 Fax: 707 789 0414

From: Cecile de Guia [mailto:cdeguia@calscience.com]

Sent: Friday, September 09, 2011 2:58 PM

To: Judy Hutton **Cc:** Sandy Tat

Subject: FW: ExxonMobil 73399/022776C (11-09-0391)

Importance: High

Hi Judy,

Please verify the sampling time for W-DSCHG samples? The Diesel containers have 12:00 collection time on the label while the VOA vials have 11:45 collection time on the labels. Please advice.

Thank you.

Cecile de Guia Project Manager Calscience Environmental Laboratories, Inc. 7440 Lincoln Way Garden Grove, CA 92841-1427 Phone: 714-895-5494 x221

Fax: 714-894-7501 cdeguia@calscience.com

From: Judy Hutton [mailto:judy.hutton@cardno.com]

Sent: Friday, September 09, 2011 11:37 AM

To: Sandy Tat

Subject: RE: ExxonMobil 73399/022776C (11-09-0391)

HI Sandy,

Please go with the container label time of 12:00. Thank you



Thank you, Judy

Judy Hutton

Operations & Maintenance Administrator

Cardno ERI

601 North McDowell Blvd., Petaluma, CA 94954

Phone: 707 766 2000 Direct: 707 766 2016 Mobile: 707 338 8399 Fax: 707 789 0414

From: Sandy Tat [mailto:stat@calscience.com] Sent: Friday, September 09, 2011 10:37 AM

To: Judy Hutton

Subject: ExxonMobil 73399/022776C (11-09-0391)

Importance: High

Hi Judy,

Please verify the sampling time for sample (W-DSCHG). On the COC, it labeled as 11:45, but on the containers, it labeled as 12:00. Therefore, which sampling time should we follow? Thanks!

Best Regards,

Sandy Tat Project Manager Assistant Calscience Environmental Laboratories, Inc. 7440 Lincoln Way Garden Grove, CA 92841-1427 Phone: 714-895-5494 x220

Fax: 714-894-7501 stat@calscience.com



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Calscience Environmental

7440 Lincoln Way

Garden Grove, CA 92841

Laboratories, Inc.

Phone: 714-895-5494

Fax: 714-894-7501

ExonMobil 11-09-0391

		ne: Cardno ERI																					11.	-09-	·n:	20	1	
Co	nsultant Addres	ss: 601 North Mo	Dowell Blvd						_					_		Ac	coun	t #: j	IA				PO#:			9		
Consult	ant City/State/Z	ip: Petaluma, Ca	ilifornia 9495	54			_				_	_	-			inv	oice	To: C	ardno	ERI						_		_
Exxoni	fiobil Project M	gr: Jennifer C. S	Sedlachek			_				_		-	_						aula S							-		_
	Itant Project M							_	_				_	_	Pr	ojec	t Nar	ne: C	22776	C (SE	PT)							
Consultant Te	lephone Numbe	er: (707) 786-200	00				-	EI	- 4 67	-			_	Exx	onM	obil	Site	# Z	3399				Ma	ajor Projec	*/^55	an.		
	pler Name (Prin		Herry	wan			- 1	IX N	o.: <u>(</u> 7	07) 7	89-04	14			S	lte A	ddre	55: 2	991 H	opyar	Ro	ad		-jui i tojec	MAPE	. #);		
Sa	ımpler Signatuı	In In	enn	_	-		-	_		-		-	_	Site	City	, Su	ate, Z	ip: F	leasar	ton,	Califo	rnia						-
		<u>U</u>	10.00									_	_	Ov	ersi	ght /	Agen	cy: D	ublin S	en R	amoi	Servic	es District					_
1	1			8	П			13	SPECIAL	Pres	ervat	VO		100	81H9	Mu	trix.	100	1	191797	£0.5		lyze For:	. Succion		_	-	
Sample ID W-DSCHG W-DSCHG	WELL Field Point Name		Time Sampled	(2) 500ml Amber	X X Grab	Composite	Field Filtered	Methanol	X HCI (Blue Label)	NaCH (Orange Label) H ₂ SO ₄ Pisetic (Yellow Label)	H ₂ SO ₂ Glass (Yellow Label)	(down read) Court	None (Black Label)	X X Groundwater	Wassewater	Drinking Water Studee	Sol	Other femority	X	-	X BTEXMTBE 8260					RUSH TAT (Pre-Schedule)	X Standard 10-day TAT	_
W-OUT-WC1	WC1	9/6/11	1200	i no	Н			Ц		2	\prod	П		П	7	+	H	1	+	+^	+^	++	+		+		X	
		Linin	11-	(2) 40ml VOAs	Х			Ц	x			x	Т	x	T	\top	Ħ	1	1	+	x	+	+		+	1		
W-HT	WHT	9/6/11	1230	0.12	\vdash			Ц				П	Т	П	1	\top	П	+		+	1^	1-1-	+		+	1	X	
W-HT	WHT	1			X			Ш	\perp 1		П	x	П	x		\top	П	+	x	+-	╁		+-		\perp	_		
		116/11	1230	(4) 40ml VOAs	X			Ш	x		П	x		x	\top	+	H	+	 ^	1	+-	\vdash	+-		\perp		X	
Comments/Special Instruction	ions: "TPH	to include sillo	a gel clean									11		Ť	+	+	Н	+		X	X	\vdash	-		\perp		x	
GLOBAL ID # (T0600100537 Relinquished by: Relinquished by:)	7/7/ 9/7/	111	10 4S Time		10	ved by	0	b pers	Pall	les .	CEC	ORC	Date Date	2///	, la	Time	Ler Ler Sitt	VOC Delivered 2 rel 3 rel 4	peration of the Control of the Contr	re U ontain of H s (ple	pon Rec ners Inta leadspa ase circl	ct? ce? e one)	chedule w/1		erica	N N	

Calscience Environmental

7440 Lincoln Way

Garden Grove, CA 92841

Laboratories, Inc.

Phone: 714-895-5494

Fax: 714-894-7501

EXonMobil

Cons	ultant Name	Cardno ERI																								11-02-0	13	y		
Consult	ant Address	601 North Mo	Dowell Blvd				-	-	-	_	-	_	_							NA					PC	O#:			9	
		Petaluma, Ca		4	-		_			_				_	_	_				-	rdno E									
		Jennifer C. S						_	_		_	-	-	-		_					ıla Sir									
		Paula Sime				_					-	-	_		_						776C	(SE	T)							
Consultant Telepho	ne Number	(707) 766-20	00								_	_	_	- ·	XXO	nMo	bll :	Site	#:	73	399					Major Project (A	FE#	1:		
	Name (Print)		11	a ám		_	ra	X NC	o.: <u>(</u>	707)	789-	0414			_						1 Hop									
Sample	r Signature	1 to	0	4/10/50		_		_	-		_		-								asanto							-		
	10	J			_			TO SEC.							Ove	rsig	jht A	ger	icy:	Dut	din Sa	n Ra	mon	Sen	vices	District				
				2	П		_			eere	serv	ative			國民	(国)	Mat	rix	遊響			Z AJN	N. 5	A	naly	ze For:	57			
Sample ID	eld Point Name	Date Sampled	Time Sampled	o. of Containers Shipp	Grab	Composite	Field Filtered	Theroof	Rum Bisulfate (Rhas Label)	OH (Orange Label)	O _a Plastic (Yellow Label) O _a Glass (Yellow Label)	S, (Red Laber)		e (Black Label)	undwater	Sewaler The Wilson	dng water			er (specify):	8015B TPHd**	8015B TPHg	BTEX/MTBE 8260				RUSH TAT (Pre-Schedule)	TAT	ird 10-day TAT	ile of Report
W-DSCHG	- E	01.1		ž	ŏ	8	E	3 .	잃	Ž	R.S.H	ΙĔ	8 8	ş	g :	Westerwa	Studo	Sod	₹	Othe	5	12	빝	1	П			5-day	Standa	1 0
W-DSCHG	WEFF	Alven	1145	(2) 500ml Amber	х						П	П	x	П	x	7	\top	\vdash	Ħ		X		۱.	┢	Н		15	18	_	
W-DOOMS	WEFF	216/11	1145	(4) 40ml VOAs	х			Ш	x		T	П	x	П	x	\top	\top	\vdash	Ħ		^	x	x	-	Н	 	+	╀	X	-
W-OUT-WC1	-	011.			Ш			Ш		П	П	П	T	П		1	\top	\vdash	Н	\dashv	-	 ^	1^	┝	Н		+	╀	X	
W-001-WC1	WC1	9/4/11	1200	(4) 40mi VOAs	х				x	П	T	П	x	П	x	+	T	T	H	7		1	x	⊢	Н		╀	╀	╀	
	+	21.6						П	T	П	Т	П	T	П		十	+	\vdash	Н	┪		┢	^	H	Н	 	+	+	X	
W-HT	WHT	9/6/11		(2) 500ml Amber	x			П	T	П	T	\Box	v	Ħ	v	+	+	\vdash	Н	-		-	\vdash	-	Н		+	╀	\perp	
W-HT	WHT	9/6/11	1230	(4) 40ml VOAs	x			\Box	x	H	+	H	⇡	H	≎	╁	+	┝	Н	-	Х	-	H	H	Н		1	┺	х	
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GLOBAL ID # (T0600100537) Relinquished by:	T	/ Da	te	Time	R	ecel	ved b	v-				PLI	EASE (N	E-MA	LLAB	SOE	RI-U	S.CC	TO (M)	,	Fempe Sampl /OCs	eratur e Co Free	re Up ntain of H	ers I	Recei	?	Y		N	
Relinquished by:		9/7/ 1 Dat	111	10 4S		Ze		0	'n	20	-	, (EZ	- 5	Date 1/2	10		Time	4	QC [Leve	eliver 12	ables	(ple	350 C	ircle	one)	Çă.		N	
100 mg	280	9/7	lı .	1730	S	<u></u>	2/					Ca	_	09	Date /08			73 23	,	Leve	14	c - if	yes,	oleas	e atta	ach pre-schedule w/ Tes	tAmer	ica		



Page 1 of 1

680SOCICE SHAM DOCKEDONS

<WebShip>>>>>

800-322-5555 www.gso.com

Ship From: ALAN KEMP CAL SCIENCE- CONCORD 5063 COMMERCIAL CIRCLE #H CONCORD, CA 94520

Ship To:

SAMPLE RECEIVING

CEL

7440 LINCOLN WAY

GARDEN GROVE, CA 92841

COD: \$0.00

Reference:

CARDNO ERI, CONOCO PHILLIPS, CURTIS & TOM, PARSONS

Delivery Instructions:

Signature Type: SIGNATURE REQUIRED

Tracking #: 517355640

GARDEN GROVE

D92843A



Print Date : 09/07/11 15:58 PM Package 1 of 1

NPS



WORK ORDER #: 11-09- □ 3 9 □

SAMPLE RECEIPT FORM Coole	erl of
	0/08/11
TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C - 6.0 °C, not frozen)	ē
Temperature °C + 0.5 °C (CF) = 6 °C Blank	Sample
☐ Sample(s) outside temperature criteria (PM/APM contacted by:).	
☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.	1
☐ Received at ambient temperature, placed on ice for transport by Courier.	
	Initial: NC
CUSTODY SEALS INTACT:	.16
☑ Cooler □ □ No (Not Intact) □ Not Present □ N/A	Initial: NC
	Initial: <u>PT</u>
SAMPLE CONDITION: Yes No.	
Chain Of Custody (COC) desument/s) reserved with a surely	N/A
COC designant/s) associated associated	
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.	
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.	
Cámplada nama indicatad au 200	_
Sample container label(s) consistent with COC	
Sample container(s) intact and good condition.	
Proper containers and sufficient volume for analyses requested	
Analyses received within holding time.	
pH / Res. Chlorine / Diss. Sulfide / Diss. Oxygen received within 24 hours	
Proper preservation noted on COC or sample container	
☐ Unpreserved vials received for Volatiles analysis	
Volatile analysis container(s) free of headspace	
Tedlar bag(s) free of condensation.	
Solid: □4ozCGJ □8ozCGJ □16ozCGJ □Sleeve () □EnCores® □TerraCores®	
Water: □VOA ☑VOAh □VOAna₂ □125AGB □125AGBh □125AGBp □1AGB □1AGBr	na₂ □1AGBs
□500AGB □500AGJ □500AGJs □250AGB □250CGB □250CGBs □1PB □500PB	□500PBna
□250PB □250PBn □125PB □125PBznna □100PJ □100PJna₂ □ □	
Air: DTedlar® DSumma® Other: D Trip Blank Lot#: Labeled/Checked Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope Reviewed	by: PT

Preservative: h: HCL n: HNO₃ na₂:Na₂S₂O₃ na: NaOH p: H₃PO₄ s: H₂SO₄ znna: ZnAc₂+NaOH f: Field-filtered Scanned by:



SAMPLE ANOMALY FORM

SAMP	LES - C	ONTAI	NERS &	LABELS:			Comr	nents:						
☐ Sai ☐ Hol ☐ Ins ☐ Imp ☐ No ☐ San ☐ San	mple(s) mple(s) Iding tin ufficient proper c proper p preserv nple lab nple lab	NOT RE received ne expire t quantit ontainer reserval ative no els illeg el(s) do	CEIVED I but NOT ed – list s ies for ar r(s) used tive used ted on Co ible – not not matc		(-1) 2x500 AGJ collection time per label									
		t Inform		ω.			ic 19	:00 ,	The per xxxxx					
	₫# of C	ontainer	(s)			270-7								
	☐ Analys		. ,		(-1) re	ceived	6 x VOA' W/ HCl.							
☐ Sam	nple con	tainer(s) compro	mised - Not	<u>,</u>	CC (VCV.	B X VOIT -7 17CC 1							
			in sampi	(-2) received 2 × NOA w/HCl.										
	Brokei		_			7-5.17071 -7.110-0-1								
☐ Sam	ple con	tainer(s) not labe	led										
🗆 Air	sample	contain	er(s) com											
	Flat								N					
	_	w in vol					-							
				d - duplicate										
				o Calscienc					991					
		g (trans	ferred int	o Client's T	edlar® B	ag*)								
☐ Othe	er:													
HEADS	PACE -	- Contai	iners wit	h Bubble >	6mm o	or ¼ inch:			к					
Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Cont. received	Analysis					
1	D-F	6	V											
2	A-B	2												
3	B-D	4												
Comment	:s:													
Transferre	ed at Clie	nt's reque	est.				Ini	itial / Dat	te: PT 09 /08/11					

turn to Contents

SOP T100_090 (08/31/11)

APPENDIX B

SOP-25: "HYDROCARBONS REMOVED FROM A VADOSE WELL"

HYDROCARBON REMOVAL FROM A VADOSE WELL **SOP-25**

Rev: JO'C

POUNDS OF HYDROCARBON IN A VAPOR STREAM

INPUT DATA:

1) Vapor flow rate acfm (usually by Pitot tube)

2) Vapor pressure at the flow measuring device (in inches of H₂O) (use {-} for vacuum)

3) Vapor temperature at the flow-measuring device.

4) Hydrocarbon content of vapor (usually in mg/M3) for ppmv you need molecular weight.

5) Length of time (usually hours) over which flow rate occurred)

From periodic measurements, a calculation of total pounds of hydrocarbons removed from a well or from a system is calculated. The input data listed above are measured at a point in time. To calculate quantities removed, some assumptions must be made about what was happening between measurements. The following assumptions will be used for

ASSUMPTIONS:

- 1) Vapor flow for the period equals the average of the initial and final reading for the period.
- 2) Pressure and temperature for the entire period will be the final reading.
- 3) Hydrocarbon concentration for the period equals the average of the initial and final reading.
- 4) The hours of operation can be taken from an hour meter, an electric meter or will be assumed to be equal to the time
- 5) If the unit is found down try to determine how many hours it did operate and use the data taken for the previous period to make the calculations. Restart the unit and then take data to start the next period.

SAMPLE DATA AND CALCULATIONS

Date	Time	Temp deg F	Press in H ₂ O	HC conc Vapor flo mg/M3 acfm	w Calc. lb. rem.	
1/6/95	11:00	70	-46	2000	120	7.4
1/7/95	13:00	55	-50	1350	90	
1/8/95	10:00	80	-13	750	100	

Calculate the pounds of hydrocarbon removed from the system during the basis period from 13:00 (1:00 pm) on the 7th to 10 am on the 8th. Pressure and temperature of the measurements (at the flow meter) must be corrected to the P and T used to report the HC concentration (which are P = 1 atm and T = 70 deg F). 1 atm = 14.7psia, 760 mm Hg, or 407 in H_2O . T_{abs} =

Hours of operation = 21, T = 80, P = -13, HC = (1350+750)/2 = 1050 mg/M³. Flow = 95

21 x 60 x 95 x 0.98 $x = 0.97 + x = 0.0283 \times 1.050 \times 1/454 =$ 7.4 lb.

cumulative lbs. (the running total) = the sum of all the previous periods.

Note: If results are given in ppm, an assumption about the molecular weight of the hydrocarbon must be made to convert ppm into mg/M^3 . ppmv x molecular wt. /24.1 = mg/M^3 . (Use 102 for gasoline)