

**ExxonMobil Environmental Services Company**  
4096 Piedmont Avenue #194  
Oakland, California 94611  
510 547 8196 Telephone  
510 547 8706 Facsimile

**Jennifer C. Sedlachek**  
Project Manager

**ExxonMobil**

December 10, 2010

**RECEIVED**

2:23 pm, Dec 14, 2010

Alameda County  
Environmental Health

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

Subject: Fuel Leak Investigation Site No. RO0002635  
Former Exxon RAS #74121, 10605 Foothill Boulevard, Oakland, California

Dear Mr. Wickham:

Attached for your review and comment is a copy of the *Vapor Sampling Report* for the above-referenced site. The report, prepared by ETIC Engineering, Inc. of Pleasant Hill, California, details the results of the vapor sampling in October 2010.

Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

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

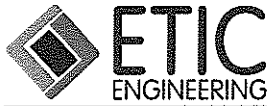
Sincerely,



Jennifer C. Sedlachek  
Project Manager

Attachment: ETIC Vapor Sampling Report

- c: w/ attachment:  
Mr. Ken Phares - MacArthur Boulevard Associates, Oakland, California  
Mr. Peter McIntyre - AEI Consultants
  
- c: w/o attachment:  
Mr. Bryan Campbell - ETIC Engineering, Inc.



10 December 2010

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

Subject:       **Vapor Sampling Report**  
Former Exxon Retail Site 74121, 10605 Foothill Boulevard, Oakland, California  
Fuel Leak Investigation Site No. RO0002635

Dear Ms. Sedlachek:

ETIC Engineering, Inc. (ETIC) has prepared this Vapor Sampling Report for ExxonMobil Environmental Services Company on behalf of ExxonMobil Oil Corporation for former Exxon Retail Site 74121 located at 10605 Foothill Boulevard, Oakland in California. This report was prepared in accordance with the Vapor Sampling Work Plan dated 3 September 2010 (ETIC 2010a) and approved by the Alameda County Health Care Services Agency (ACHCSA) in a letter dated 10 September 2010 (Attachment A).

### **Introduction**

The work plan outlined the collection of soil vapor samples from existing soil vapor wells (VW1 through VW6 and VW9 through VW12) at the site (ETIC 2010a). The sampling was expected to provide adequate information in order to evaluate the potential risk of vapor intrusion to existing adjacent residential properties and future commercial onsite properties following excavation activities. Well construction details are provided in Table 1.

In their letter, dated 10 September 2010, the ACHCSA requested that a report be submitted following the sampling which includes either a recommendation for further action or a request for case closure based on the evaluation of the soil vapor sampling results.

### **Soil Vapor Sample Collection**

An advisory published by the Department of Toxic Substances Control and the California Regional Water Quality Control Board, Los Angeles Region was used as a guideline for the collection of the soil vapor samples (DTSC/LARWQCB 2003 and DTSC 2004).

On 12 October 2010, a purge test was conducted for well VW2 which involved purging the well of 1, 3, and 7 purge volumes and screening the samples with a photoionization detector to determine the relative hydrocarbon content. Based on the results of this purge test, a purge volume of 3 casing

volumes was determined to be the preferred purge volume for the remaining samples to be collected at the site.

On 12 October 2010, soil vapor samples were collected from wells VW1, VW2, VW5, VW6, VW9, and VW10 after purging 3 casing volumes from each well using Summa canisters. The initial pressure and the final pressure readings taken from the gauges on the Summa canisters were recorded. During sampling, helium was used to check for leaks. Vapor samples could not be collected from vapor wells VW3, VW4, and VW11 due to the presence of water in the wells. Per the work plan (ETIC 2010a), attempts were not made to remove water as this may preclude performing proper purging of soil vapor before sampling. Vapor samples could not be collected from vapor well VW12 due to low flow conditions. Per the work plan, (ETIC 2010a), it may not be possible to collect soil vapor samples due to "low-flow" or "no-flow" conditions.

Field protocols are provided in Attachment B. The field documents are included in Attachment C.

### **Soil Vapor Sample Analytical Methods and Results**

Soil vapor samples collected from the wells were submitted to Calscience Environmental Laboratories, Inc., a state-certified laboratory in Garden Grove, California for analysis.

The samples were analyzed for Total Petroleum Hydrocarbons as gasoline (TPH-g) by EPA Method TO-3M and for benzene, toluene, ethylbenzene, and total xylenes, and for the oxygenates methyl tertiary butyl ether, tertiary butyl alcohol, diisopropyl ether, ethyl tertiary butyl ether, tertiary amyl methyl ether, and the additives 1,2-dibromoethane and 1,2-dichloroethane by EPA Method TO-15. The samples were also analyzed for oxygen + argon, methane, and carbon dioxide by ASTM D-1946.

The analytical results for the soil vapor samples are presented in Table 2 and on Figure 1. The laboratory analytical report and chain-of-custody documentation are included in Attachment D.

### **Conclusions and Recommendations**

The work plan outlined the collection of soil gas samples from existing soil vapor wells at the site to provide adequate information in order to evaluate the potential risk of vapor intrusion to existing adjacent residential properties and future commercial onsite properties following excavation activities (ETIC 2010a).

Soil vapor samples were collected from wells VW1, VW2, VW5, VW6, VW9, and VW10 and analyzed. Vapor samples could not be collected from wells VW3, VW4, VW11, and VW12. Results for different areas of the site are listed below as they relate to the Environmental Screening Levels (ESLs) (RWQCB-SF 2007):

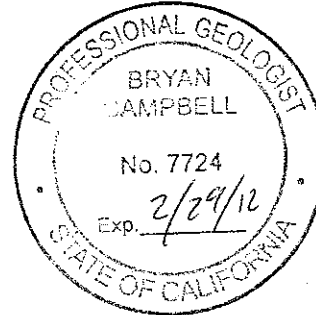
- **Former dispenser islands:** Well VW11 is located near the former dispenser islands. A soil vapor sample could not be collected from well VW11. An additional attempt at vapor sampling of VW11 is recommended.
- **Northern corner of the property:** Well VW10 is located at the northern corner of the property. The soil vapor sample collected from VW10 is below the commercial ESLs and addresses the previous exceedances of commercial ESLs in samples from V1. No further vapor sampling in the northern corner of the property is recommended.
- **Excavation boundary:** Wells VW5, VW6, and VW9 are located near the boundary of the February 2010 excavation (ETIC 2010b). The soil vapor sample collected from VW5 slightly exceeds the commercial ESLs for TPH-g in the duplicate sample which is based on a hazard index of 0.2. The TPH-g concentration is well below the concentration that corresponds to a hazard index of 1. The vapor samples from VW6 and VW9 are below the commercial ESLs. No further vapor sampling along the boundary of the former excavation is recommended.
- **Between the excavation boundary and the residential property:** Wells VW1, VW2, and VW9 are located between the excavation boundary and the adjacent residential property to the southwest. The soil vapor sample collected from VW2 exceeds the commercial ESL for TPH-g. Additional vapor sampling of VW2 is recommended.

If you have any questions, please contact ETIC at (925) 602-4710 (ext. 24 for Bryan Campbell).

Sincerely,



Bryan Campbell, P.G. #7724  
Senior Geologist



**Attachments:**

- Figure 1: Site map showing soil vapor sampling results
- Table 1: Well Construction Details
- Table 2: Soil Vapor Sample Analytical Results
- Attachment A: Regulatory Correspondence
- Attachment B: Field Protocols
- Attachment C: Field Documents
- Attachment D: Laboratory Analytical Reports and Chain-of-Custody Documentation

**References**

DTSC/LARWQCB (Department of Toxic Substances Control and California Regional Water Quality Control Board – Los Angeles Region). 2003. Advisory – Active Soil Gas Investigations. DTSC and LARWQCB, Glendale and Los Angeles, California. 28 January.

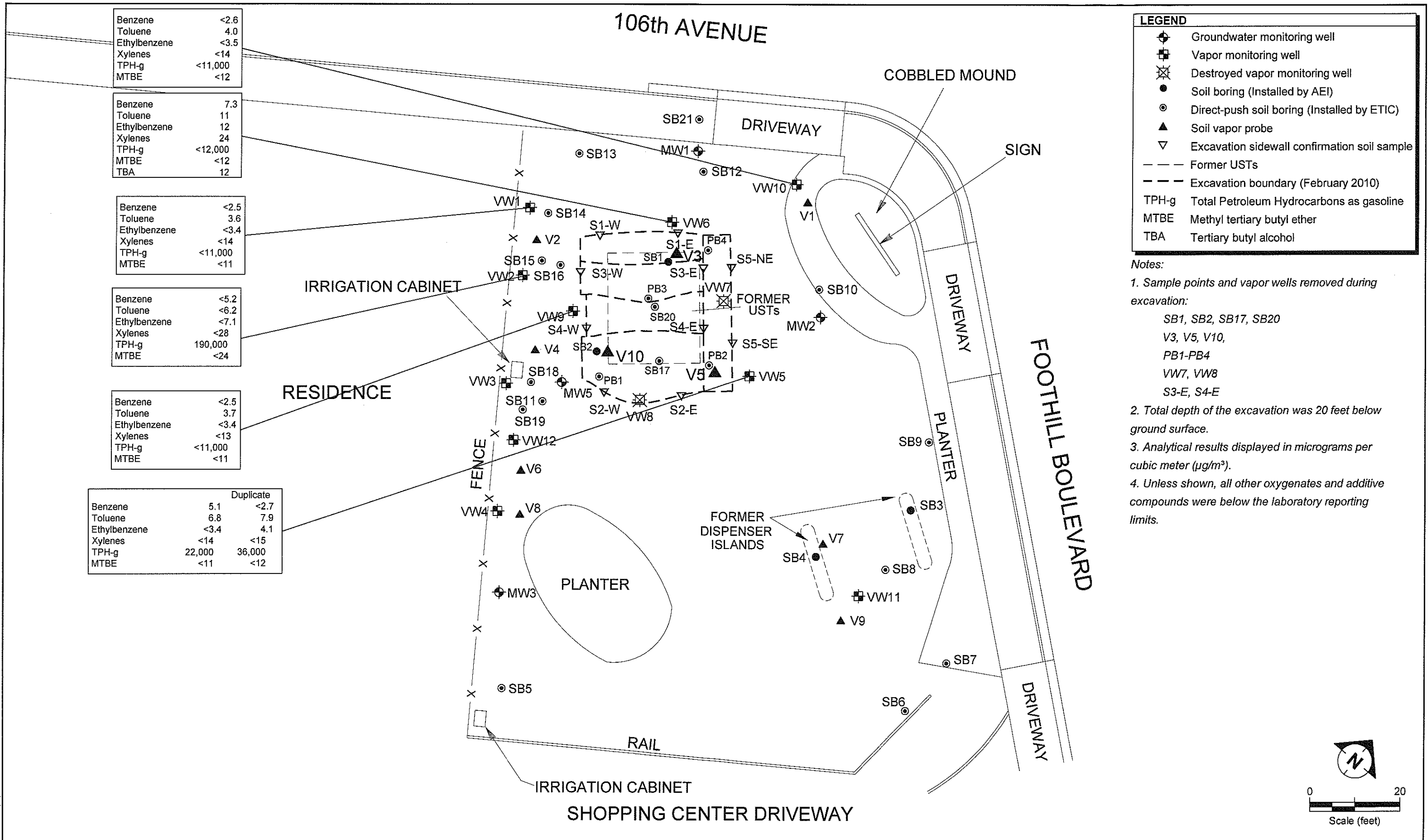
DTSC (Department of Toxic Substances Control). 2004. Guidance for the Evaluation and Mitigation of Substance Vapor Intrusion to Indoor Air – Interim Final. 15 December.

ETIC (ETIC Engineering, Inc.). 2010a. Vapor Sampling Report Work Plan, Former Exxon Retail Site 74121, 10605 Foothill Boulevard, Oakland, California. ETIC, Pleasant Hill, California. 3 September.

ETIC (ETIC Engineering, Inc.). 2010b. Post-Remedial Excavation Report, Former Exxon Retail Site 74121, 10605 Foothill Boulevard, Oakland, California. ETIC, Pleasant Hill, California. June.

RWQCB-SF (California Regional Water Quality Control Board, San Francisco Bay Region). 2007. Screening for Environmental Concerns At Sites With Contaminated Soil and Groundwater. RWQCB-SF, Oakland, California. November with May 2008 updates.

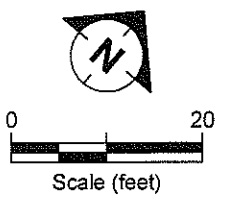
## Figures



**LEGEND**

- ⊕ Groundwater monitoring well
- ⊞ Vapor monitoring well
- ⊗ Destroyed vapor monitoring well
- Soil boring (Installed by AEI)
- ⊙ Direct-push soil boring (Installed by ETIC)
- ▲ Soil vapor probe
- ▽ Excavation sidewall confirmation soil sample
- - - Former USTs
- - - Excavation boundary (February 2010)
- TPH-g Total Petroleum Hydrocarbons as gasoline
- MTBE Methyl tertiary butyl ether
- TBA Tertiary butyl alcohol

- Notes:
- Sample points and vapor wells removed during excavation:
    - SB1, SB2, SB17, SB20
    - V3, V5, V10,
    - PB1-PB4
    - VW7, VW8
    - S3-E, S4-E
  - Total depth of the excavation was 20 feet below ground surface.
  - Analytical results displayed in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).
  - Unless shown, all other oxygenates and additive compounds were below the laboratory reporting limits.



SITE MAP SHOWING SOIL VAPOR SAMPLE ANALYTICAL RESULTS  
 FORMER EXXON RS 74121  
 10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA  
 12 OCTOBER, 2010

FIGURE:  
**1**

FILENAME: Sample0509.DWG 05/1/09



# Tables



TABLE 1 WELL CONSTRUCTION DETAILS, FORMER EXXON RS 74121, 10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA

Well Number	Well Installation Date	Elevation TOC (feet)	Casing Material	Total Depth (feet)	Well Depth (feet)	Borehole Diameter (inches)	Casing Diameter (inches)	Screened Interval (feet)	Slot Size (inches)	Filter Pack Interval (feet)	Filter Pack Material
MW1	a 01/23/07	82.47	PVC	26.5	25	8	2	10 - 25	0.010	8 - 25	#2/12 Sand
MW2	a 01/23/07	84.40	PVC	26.5	25	8	2	10 - 25	0.010	8 - 25	#2/12 Sand
MW3	a 01/24/07	83.25	PVC	26.5	25	8	2	10 - 25	0.010	8 - 25	#2/12 Sand
MW5	a 01/23/07	82.65	PVC	26.5	25	8	2	10 - 25	0.010	8 - 25	#2/12 Sand
VW1	a 01/22/07	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW2	a 01/22/07	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW3	a 01/22/07	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW4	a 01/22/07	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW5	a 01/22/07	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW6	b 03/23/09	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW7	c 03/23/09	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW8	c 03/23/09	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW9	b 03/23/09	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW10	b 03/23/09	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW11	b 03/23/09	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand
VW12	b 03/23/09	--	SS	6	6	6	0.25	5.25 - 5.75	0.0057	5 - 6	#2/12 Sand

TABLE 1 WELL CONSTRUCTION DETAILS, FORMER EXXON RS 74121, 10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA

Well Number	Well Installation Date	Elevation TOC (feet)	Casing Material	Total Depth (feet)	Well Depth (feet)	Borehole Diameter (inches)	Casing Diameter (inches)	Screened Interval (feet)	Slot Size (inches)	Filter Pack Interval (feet)	Filter Pack Material
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Notes:

- a Well surveyed on 12 March 2007 by Morrow Surveying.
  - b Well surveyed on 4 May 2009 by Morrow Surveying.
  - c Well destroyed during remedial excavation.
- PVC Polyvinyl chloride.  
 SS Stainless steel.  
 TOC Top of casing.

TABLE 2 SOIL VAPOR SAMPLE ANALYTICAL RESULTS, FORMER EXXON RETAIL SITE 74121, 10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA

Boring ID	Depth (feet bgs)	Date	Concentration (% by Volume)			Concentration ( $\mu\text{g}/\text{m}^3$ )														
			Oxygen and Argon	Methane	Carbon Dioxide	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	Total Xylenes	TPH-g	MTBE	TBA	DIPE	ETBE	1,2-DCA	TAME	1,2-EDB	1,1-DFA
V1	5.5	05/01/06	9.4	--	--	200	<100	<100	<100	<100	--	790,000	<100	--	--	--	--	--	--	<10,000
V2 <sup>a</sup>	--	05/01/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V3	5.5	05/01/06	19	--	--	120	160	140	<100	<100	--	110,000	<100	--	--	--	--	--	--	<10,000
V3 <sup>a</sup>	10	05/01/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V4 <sup>a</sup>	--	05/01/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V5 <sup>a</sup>	--	05/01/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V6	7.0	05/01/06	9.1	--	--	170	<100	540	410	<100	--	880,000	<100	--	--	--	--	--	--	<10,000
V7	7.5	05/01/06	21	--	--	84	140	<100	110	<100	--	2,200	<100	--	--	--	--	--	--	<10,000
V7 dup	7.5	05/01/06	20	--	--	<80	110	<100	<100	<100	--	2,400	<100	--	--	--	--	--	--	<10,000
V8 <sup>a</sup>	--	05/01/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
V9	7.5	05/01/06	19	--	--	<80	<100	<100	<100	<100	--	360,000	<100	--	--	--	--	--	--	<10,000
V10	8.0	05/01/06	11	--	--	1,100	130	340	180	<100	--	6,600,000	<100	--	--	--	--	--	--	<10,000
V10	10.0	05/01/06	9.0	--	--	1,900	<100	<100	<100	<100	--	17,000,000	<100	--	--	--	--	--	--	<10,000
VW1 <sup>b</sup>	5 - 6	4/27/07	11.1	--	--	<2.4	12	<3.2	10	4.8	--	<20,000	<11	<9.0	<12	<12	<3.0	<19	<5.7	<8.1
VW1 <sup>c</sup>	--	4/23/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>VW1</b>	<b>5 - 6</b>	<b>10/12/10</b>	<b>17.5</b>	<b>&lt;0.785</b>	<b>5.24</b>	<b>&lt;2.5</b>	<b>3.6</b>	<b>&lt;3.4</b>	--	--	<b>&lt;14</b>	<b>&lt;11,000</b>	<b>&lt;11</b>	<b>&lt;9.5</b>	<b>&lt;13</b>	<b>&lt;13</b>	<b>&lt;3.2</b>	<b>&lt;13</b>	<b>&lt;6.0</b>	--
VW2 <sup>c</sup>	--	4/27/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VW2	5 - 6	4/23/09	8.05	<0.770	6.55	<6.1	<7.3	<8.4	--	--	<33	210,000	<28	<23	<32	<32	<7.8	<32	<15	<21
VW2 dup	5 - 6	4/23/09	7.88	<0.780	6.05	<6.2	<7.3	<8.5	--	--	<34	220,000	<28	<24	<33	<33	<7.9	<33	<15	29
<b>VW2</b>	<b>5 - 6</b>	<b>10/12/10</b>	<b>8.13</b>	<b>&lt;0.820</b>	<b>6.90</b>	<b>&lt;5.2</b>	<b>&lt;6.2</b>	<b>&lt;7.1</b>	--	--	<b>&lt;28</b>	<b>190,000</b>	<b>&lt;24</b>	<b>&lt;20</b>	<b>&lt;27</b>	<b>&lt;27</b>	<b>&lt;6.6</b>	<b>&lt;27</b>	<b>&lt;13</b>	--
VW3 <sup>c</sup>	--	4/27/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VW3 <sup>c</sup>	--	4/23/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VW4 <sup>c</sup>	--	4/27/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VW4 <sup>c</sup>	--	4/23/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VW5 <sup>b</sup>	5 - 6	4/27/07	3.49	--	--	4.4	11	4.4	12	4.8	--	<23,000	<12	<9.9	<14	<14	<3.3	<21	<6.3	<8.9
VW5	5 - 6	4/23/09	2.57	<0.710	9.84	<2.3	<2.7	<3.1	--	--	<12	9,800	<10	<8.6	<12	<12	<2.9	<12	<5.5	<7.7
<b>VW5</b>	<b>5 - 6</b>	<b>10/12/10</b>	<b>2.05</b>	<b>&lt;0.790</b>	<b>13.2</b>	<b>5.1</b>	<b>6.8</b>	<b>&lt;3.4</b>	--	--	<b>&lt;14</b>	<b>22,000</b>	<b>&lt;11</b>	<b>&lt;9.6</b>	<b>&lt;13</b>	<b>&lt;13</b>	<b>&lt;3.2</b>	<b>&lt;13</b>	<b>&lt;6.1</b>	--
<b>VW5 dup</b>	<b>5 - 6</b>	<b>10/12/10</b>	<b>2.16</b>	<b>&lt;0.840</b>	<b>12.5</b>	<b>&lt;2.7</b>	<b>7.9</b>	<b>4.1</b>	--	--	<b>&lt;15</b>	<b>36,000</b>	<b>&lt;12</b>	<b>76</b>	<b>&lt;14</b>	<b>&lt;14</b>	<b>&lt;3.4</b>	<b>&lt;14</b>	<b>&lt;6.5</b>	--
VW6 <sup>c</sup>	--	3/27/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 2 SOIL VAPOR SAMPLE ANALYTICAL RESULTS, FORMER EXXON RETAIL SITE 74121, 10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA

Boring ID	Depth (feet bgs)	Date	Concentration (% by Volume)			Concentration ( $\mu\text{g}/\text{m}^3$ )														
			Oxygen and Argon	Methane	Carbon Dioxide	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	Total Xylenes	TPH-g	MTBE	TBA	DIPE	ETBE	1,2-DCA	TAME	1,2-EDB	1,1-DFA
VW6	5 - 6	10/12/10	16.1	<0.835	5.25	7.3	11	12	--	--	24	<12,000	<12	12	<14	<14	<3.4	<14	<6.4	--
VW7	5 - 6	3/27/09	6.94	<0.810	5.52	54	910	180	--	--	860	11,000	<12	<9.8	<14	<14	<3.3	<14	<6.2	<8.8
VW8	5 - 6	3/27/09	2.91	2.61	5.98	<99	<120	<130	--	--	<540	4,400,000	<450	<380	<520	<520	<130	<520	<240	<330
VW9	5 - 6	3/27/09	11.2	<0.820	4.36	25	250	51	--	--	260	65,000	<30	<25	<34	<34	<8.3	<34	<34	<22
VW9 dup	5 - 6	3/27/09	<9.05	<9.05	<9.05	150	1,600	310	--	--	1,600	130,000	<130	<110	<150	<150	<37	<150	<70	<98
VW9	5 - 6	10/12/10	7.01	<0.775	15.4	<2.5	3.7	<3.4	--	--	<13	<11,000	<11	<9.4	<13	<13	<3.1	<13	<6.0	--
VW10	5 - 6	3/27/09	4.21	<0.780	2.69	38	520	120	--	--	550	880,000	<110	<95	<130	<130	<32	<130	<60	<84
VW10	5 - 6	10/12/10	4.83	<0.815	6.32	<2.6	4.0	<3.5	--	--	<14	<11,000	<12	<9.9	<14	<14	<3.3	<14	<6.3	--
VW11	5 - 6	3/27/09	6.18	<0.770	6.69	110	860	230	--	--	1,000	210,000	<110	<93	<130	<130	<31	<130	<59	5,300
VW12	5 - 6	3/27/09	12.9	<1.26	4.78	90	1,700	340	--	--	1,500	17,000	<18	<15	<21	<21	<5.1	<21	<9.7	<14
Lowest Residential ESL <sup>d</sup>			--	--	--	84	63,000	980	21,000	21,000	21,000	10,000	9,400	--	--	--	94	--	4.1	--
Lowest Commercial/Industrial ESL <sup>d</sup>			--	--	--	280	180,000	3,300	58,000	58,000	58,000	29,000	31,000	--	--	--	310	--	14	--

Notes: Soil vapor samples in soil borings V1 through V10 were collected after purging 7 casing volumes or approximately 70 cc of vapor from the tubing (10 cc per 12 feet of tubing).  
ESLs adopted by RWQCB correspond to a  $1 \times 10^{-6}$  target risk level and a target hazard quotient of 0.2.

a Soil vapor could not be extracted at depths between 4 and 10 feet bgs from this boring.

b Soil vapor samples were collected without purging (grab samples).

c Soil vapor samples were not collected due to the presence of water.

d From Table E-1a: Groundwater Screening Levels for Evaluation of Potential Vapor Intrusion Concerns. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater - Interim Final, Regional Water Quality Control Board - San Francisco Bay Region, May 2008.

feet bgs Feet below ground surface.

1,1-DFA 1,1-Difluoroethane.

1,2-DCA 1,2-Dichloroethane.

1,2-EDB 1,2-Dibromoethane.

DIPE Diisopropyl ether.

ETBE Ethyl tertiary butyl ether.

MTBE Methyl tertiary butyl ether.

TAME Tertiary amyl methyl ether.

TBA Tertiary butyl alcohol.

TPH-g Total Petroleum Hydrocarbons as gasoline reported as C6-C12.

dup Duplicate.

ESL Environmental screening level.

TABLE 2 SOIL VAPOR SAMPLE ANALYTICAL RESULTS, FORMER EXXON RETAIL SITE 74121, 10605 FOOTHILL BOULEVARD, OAKLAND, CALIFORNIA

Boring ID	Depth (feet bgs)	Date	Concentration (% by Volume)			Concentration ( $\mu\text{g}/\text{m}^3$ )											
			Oxygen and Argon	Methane	Carbon Dioxide	Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total Xylenes	TPH-g	MTBE	TBA	DIPE	ETBE	1,2-DCA

RWQCB Regional Water Quality Control Board - San Francisco Bay Region

-- Not analyzed or not applicable.  
 $\mu\text{g}/\text{m}^3$  micrograms per cubic meter.

**Attachment A**

**Regulatory Correspondence**



ENVIRONMENTAL HEALTH SERVICES  
ENVIRONMENTAL PROTECTION  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577  
(510) 567-6700  
FAX (510) 337-9335

September 10, 2010

Ms. Jennifer Sedlachek (*Sent via E-mail to: [jennifer.c.sedlachek@exxonmobil.com](mailto:jennifer.c.sedlachek@exxonmobil.com)*)

Exxon Mobil  
4096 Piedmont, #194  
Oakland, CA 94611

MacArthur Boulevard Associates  
c/o Mr. John Jay, Management Agent (*Sent via E-mail to: [johnjay@jayphares.com](mailto:johnjay@jayphares.com)*)  
10700 MacArthur Boulevard, Suite 200  
Oakland, CA 94605

Subject: Work Plan Approval for Fuel Leak Case No. RO0002635 and Geotracker Global ID T0600120383, Exxon #7-4121, 10605 Foothill Boulevard, Oakland, CA 94605

Dear Ms. Sedlachek and Mr. Jay:

Alameda County Environmental Health (ACEH) staff has reviewed the fuel leak case file for the above-referenced site, including the most recently submitted document entitled, "*Vapor Sampling Work Plan*," dated September 3, 2010 (Work Plan). The Work Plan, which was prepared by ETIC Engineering, Inc., proposes collection of soil vapor samples from ten existing soil vapor probes.

The proposed scope of work is acceptable and may be implemented as proposed. Soil vapor sampling results are to be used to evaluate the potential for vapor intrusion to existing adjacent residential properties and future commercial on-site properties. We request that you present and evaluate the soil vapor sampling results in the technical report requested below. The report should include a recommendation for future action or a request for case closure based on an evaluation of the soil vapor sampling results.

Please note that public participation will be required as part of the case closure process. Upon ACEH review of a request for case closure, ACEH will prepare and distribute a fact sheet to notify potentially affected members of the public who live or own property in the surrounding area of the potential for case closure. Public comments on the potential case closure will be accepted for a 30-day period.

#### **TECHNICAL REPORT REQUEST**

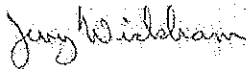
Please submit technical reports to Alameda County Environmental Health (Attention: Jerry Wickham), according to the following schedule:

- **December 10, 2010** – Soil Vapor Sampling Report with Request for Case Closure or Recommendation for Future Action

Jennifer Sedlachek  
John Jay  
RO0002635  
September 10, 2010  
Page 2

If you have any questions, please call me at (510) 567-6791 or send me an electronic mail message at [jerry.wickham@acgov.org](mailto:jerry.wickham@acgov.org).

Sincerely,



Digitally signed by Jerry Wickham  
DN: cn=Jerry Wickham, o=Alameda County  
Environmental Health, ou,  
c=US, email=jerry.wickham@acgov.org, c=US  
Date: 2010.09.10 11:29:35 -0700

Jerry Wickham, California PG 3766, CEG 1177, and CHG 297  
Senior Hazardous Materials Specialist

Attachments: Responsible Party(ies) Legal Requirements/Obligations

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Leroy Griffin, Oakland Fire Department, 250 Frank H. Ogawa Plaza, Ste. 3341, Oakland, CA 94612-2032 (*Sent via E-mail to: [lgriffin@oaklandnet.com](mailto:lgriffin@oaklandnet.com)*)

K. Erik Appel, ETIC Engineering, Inc., 2285 Morello Avenue, Pleasant Hill, CA 94523 (*Sent via E-mail to: [eappel@eticeng.com](mailto:eappel@eticeng.com)*)

Peter McIntyre, AEI Consultants, 2500 Camino Diablo, Suite 200, Walnut Creek, CA 94597 (*Sent via E-mail to: [pmcintyre@aeiconsultants.com](mailto:pmcintyre@aeiconsultants.com)*)

Donna Drogos, ACEH (*Sent via E-mail to: [donna.drogos@acgov.org](mailto:donna.drogos@acgov.org)*)  
Jerry Wickham, ACEH

Jerry Wickham, ACEH  
File



Attachment 1  
Responsible Party(ies) Legal Requirements/Obligations

REPORT REQUESTS

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements ([http://www.swrcb.ca.gov/ust/electronic\\_submittal/report\\_rqmts.shtml](http://www.swrcb.ca.gov/ust/electronic_submittal/report_rqmts.shtml)).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "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." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to \$10,000 per day for each day of violation.

<b>Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)</b>	<b>ISSUE DATE:</b> July 5, 2005
	<b>REVISION DATE:</b> July 8, 2010
	<b>PREVIOUS REVISIONS:</b> December 16, 2005, October 31, 2005
<b>SECTION:</b> Miscellaneous Administrative Topics & Procedures	<b>SUBJECT:</b> Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

#### REQUIREMENTS

- Entire report including cover letter must be submitted to the ftp site as a **single portable document format (PDF) with no password protection**. (Please do not submit reports as attachments to electronic mail.)
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- Signature pages and perjury statements **must** be included and have either original or electronic signature.
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:  
RO#\_Report Name\_Year-Month-Date (e.g., RO#5555\_WorkPlan\_2005-06-14)

#### Additional Recommendations

- A separate copy of the tables in the document should be submitted by e-mail to your Caseworker in **Excel** format. These are for use by assigned Caseworker only.

#### Submission Instructions

- 1) Obtain User Name and Password:
  - a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
    - i) Send an e-mail to [dehloptoxic@acgov.org](mailto:dehloptoxic@acgov.org)
    - Or
    - ii) Send a fax on company letterhead to (510) 337-9335, to the attention of Teena Le Khan.
  - b) In the subject line of your request, be sure to include "**ftp PASSWORD REQUEST**" and in the body of your request, include the **Contact Information, Site Addresses, and the Case Numbers (RO# available in Geotracker) you will be posting for**.
- 2) Upload Files to the ftp Site
  - a) Using Internet Explorer (IE4+), go to <ftp://alcoftp1.acgov.org>
    - (i) Note: Netscape and Firefox browsers will not open the FTP site.
  - b) Click on Page on upper right side of browser, and then scroll down to Open FTP Site in Windows Explorer.
  - c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
  - d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
  - e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.
- 3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
  - a) Send email to [dehloptoxic@acgov.org](mailto:dehloptoxic@acgov.org) notify us that you have placed a report on our ftp site.
  - b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
  - c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
  - d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

**Attachment B**  
**Field Protocols**

## **PROTOCOLS FOR SAMPLING SOIL VAPOR WELLS**

### **SOIL VAPOR SAMPLING PROCEDURES**

To ensure air-tight connections between the tubing, sampling port, valves, and other connections, a vacuum tightness test is performed on each well. The test consists of the application of a vacuum and monitoring of vacuum tightness using vacuum gauges and/or flow meter for 5 to 10 minutes. A leak would be evident if the vacuum gauges registered a decrease in the vacuum.

A purge test will be conducted for one well. The selected well should be the one with the highest expected concentrations. The test consists of the collection of vapor samples using Tedlar bags after purging the well of one (1), three (3), and seven (7) purge volumes by drawing vapor into the Tedlar bag using a vacuum chamber and vacuum pump. The purge volume is estimated based on the internal volume of the tubing used, the volume of the screen, and the voids in the sand pack within the annular space around the screen. The samples are collected through a particulate filter and flow controller which regulates the flow of soil vapor to no more than 200 milliliters per minute. The purge test samples are analyzed in the field using a PID. The results of the purge test are used to dictate the purge volume to be used during the sampling of subsequent wells.

The vapor samples are collected in 1-liter stainless steel Summa canisters. The samples are collected through a particulate filter and flow controller which regulates the flow of soil vapor to no more than 200 milliliters per minute. To ensure an air-tight connection at the well head and that ambient air does not enter the well at the well head, a tracer is applied. The tracer used is helium gas. To apply the tracer, a small shroud is placed over the well head and the tracer gas is allowed to fill the shroud at a constant rate. A hand-held helium detector is used in the field to measure the tracer within the shroud. Vapor is drawn into a Tedlar bag from the well using a vacuum chamber and vacuum pump. A leak will be evident if the concentration of the tracer in the well exceeds 10% of the concentration of the tracer in the shroud.

The 1-liter Summa canisters are labeled and packaged for delivery to a state-certified laboratory for chemical analysis. The initial pressure and the final pressure readings taken from the gauges on the Summa canisters are recorded. A small vacuum of about 5 inches of mercury is left inside the sample canister and is recorded on the chain-of-custody. Upon receipt, the laboratory will check the pressure in the sample canister and compare it to the pressure recorded on the chain-of-custody for quality control purposes.

**Attachment C**

**Field Documents**



## Purge Volume Test Form

Site: 74121	Project #: UP4121 3.12	Page: 1 of 1
Date: 10/12/10	Personnel: Yuko Mamiya	Purge Test Well: VW5

Purge Volume Calculation												
WELL PURGE VOLUME CALCULATION	Tubing Volume (ML)		Screen Volume (ML)		Pore Space Volume (ML)		Volume (ML)	Purge Volumes	Total Purge Volume (ML)	Flow Rate (ML/minute)	Estimated Time to Purge (Minutes)	
	23.42	+	12.35	+	810.98	=	846.75	X	1 vol.	847	200	4
								3 vol.	=	2,540	200	8
								7 vol.		5,927	200	21

Purge Data								Purge Cannister Volume: 6 L
Purge Volumes	Purge Canister Serial Number	Flow Regulator Serial Number	Initial Purge Canister Vacuum (Inches Hg)	Start Time	Stop Time	Final Purge Canister Vacuum (Inches Hg)	PID Reading	
1	D126	A189	-30	1132	1137	-25	-0.3	
3	D126	A189	-25	1145	1155	-17.5	-0.5	
7	D126	A189	-17.5	1203	1223	-1	-0.3	

Notes:

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## SUMMA Canister Soil Vapor Sampling Form

Site: Former Exxon RS 74121  
 Address: 10605 Foothill Blvd, Oakland, CA  
 Project #: UP4121 6.12  
 Date: 10/12/10

Personnel: Yuko Mamiya  
 Page: 1 of 2  
 Purge Canister Volume (liters): 6  
 Sample Canister Volume (liters): 1

Temperature: 81-91 °F  
 Barometric Pressure: 30 inches Hg  
 Precipitation: 0.00 inches  
 Relative Humidity: 20-28 %  
 Purge Volume: 3  
 Flow Rate: 200 liters/minute

Sampling Location	Purge Canister Serial Number	Sample Canister Serial Number	Flow Regulator Serial Number	Leak Check 1		Initial Purge Canister Vacuum (Inches Hg)	Leak Check 2		Purge Canister Vacuum (Inches Hg)	Vapor Purge		Final Purge Canister Vacuum (Inches Hg)	Initial Sample Canister Vacuum (Inches Hg)	Vapor Sample		Final Sample Canister Vacuum (Inches Hg)
				Ambient He Concentration (ppm)	Tubing He Concentration (ppm)		Start Time	Stop Time		Start Time	Stop Time			Start Time	Stop Time	
VW1	D700	LC469	A340	90,000 100,000	0	-30	1403	1407	-30	1407	1423	-15	-30	1423	1429	-5
VW2	D805	LC326	A195	90,000 100,000	0	-30	1530	1534	-30	1534	1548	-17	-30	1548	1555	-5
VW3	D230	—	A110	90,000 100,000	0	-30	1553	1558	-30	1558	—	Water	—	—	—	—
VW4	—	—	—	—	—	—	Water		—	—	—	—	—	—	—	—
VW5	D126	LC170	A189	80,000 100,000	0-25	-30	1128	1132	-30	Purge test conducted		-30	-30	1224	1231	-5
VW5 (DUP)	—	LC177	A189	—	—	-30	1658	1702	-30	—	—	—	-30	1702	1708	-5
VW6	D611	LC198	A249	120,000 150,000	0	-29	1312	1317	-29	1317	1333	-17.5	-30	1333	1342	-5

General Weather Conditions: Sunny

Other: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



## SUMMA Canister Soil Vapor Sampling Form

Site: Former Exxon RS 74121  
 Address: 10605 Foothill Blvd, Oakland, CA  
 Project #: UP4121 6.12  
 Date: 10/12/10

Personnel: Yuko Mamiya  
 Page: 2 of 2  
 Purge Canister Volume (liters): 6  
 Sample Canister Volume (liters): 1

Temperature: \_\_\_\_\_ °F  
 Barometric Pressure: \_\_\_\_\_ inches Hg  
 Precipitation: \_\_\_\_\_  
 Relative Humidity: 2 %  
 Purge Volume: 3  
 Flow Rate: 200 liters/minute

Sampling Location	Purge Canister Serial Number	Sample Canister Serial Number	Flow Regulator Serial Number	Leak Check 1		Initial Purge Canister Vacuum (Inches Hg)	Leak Check 2		Purge Canister Vacuum (Inches Hg)	Vapor Purge		Final Purge Canister Vacuum (Inches Hg)	Initial Sample Canister Vacuum (Inches Hg)	Vapor Sample		Final Sample Canister Vacuum (Inches Hg)
				Ambient He Concentration (ppm)	Tubing He Concentration (ppm)		Start Time	Stop Time		Start Time	Stop Time			Start Time	Stop Time	
VW9	D732	LC045	A100	80,000 11,000	0	-30	1448	1452	-30	1452	1507	-117	-30	1507	1513	-4
VW10	D615	LC408	A58	90,000 120,000	0	-30	1220	1223	-30	1223	1238	-17	-30	1238	1243	-5
VW11	<del>Water</del>															
VW12	D801	/	A136	140,000 120,000	800	-27	1640	1644	-27	1644	1709 <sup>3</sup>	-25	Low-flow NO sample collected			

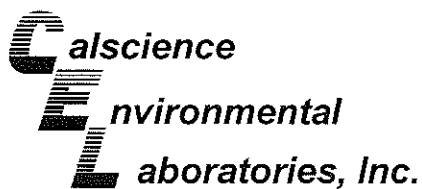
General Weather Conditions:

Other:



**Attachment D**

**Laboratory Analytical Reports and  
Chain-of-Custody Documentation**



October 21, 2010

Erik Appel  
ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Subject: **Calscience Work Order No.: 10-10-1087**  
Client Reference: **ExxonMobil 74121**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 10/14/2010 and analyzed in accordance with the attached chain-of-custody.

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 analysis, 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.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

A handwritten signature in cursive script that reads "Cecile deGuia".

Calscience Environmental  
Laboratories, Inc.  
Cecile deGuia  
Project Manager

## Case Narrative

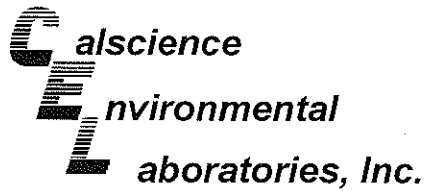
### Work Order # 10-10-1087

### Modified EPA TO-14A or EPA TO-15

EPA Methods TO-14A and TO-15 describe gas chromatographic procedures that will allow for that separation of volatile organic compounds and their qualitative and quantitative analysis by mass spectrometry (GC/MS). A known volume of sample is directed from the container (Summa® canister or Tedlar™ bag) through a solid multi-module (glass beads, tenex, cryofocuser) concentrator. Following concentration, the VOCs are thermally desorbed onto a gas chromatographic column for separation and then detected on a mass selective detector.

### Comparison of EPA TO-14A/TO-15 versus Calscience EPA TO-14A/TO-15 (Modified)

Requirement	EPA Method	Calscience Modifications
BFB Acceptance Criteria	CLP Protocol	SW846 Protocol
Initial Calibration	Allowable % RSD for each Target Analyte $\leq 30\%$ , two analytes allowed $\leq 40\%$	Allowable % RSD for each Target Analyte $\leq 30\%$ , 10% of analytes allowed $\leq 40\%$
Initial Calibration Verification (ICV) - Second Source Standard (LCS)	Not Mentioned	Analytes contained in the LCS standard evaluated against historical control limits for the LCS
Daily Calibration Verification (CCV)	Allowable % Difference for each Target Analyte is $\leq 30\%$	<b>Full List Analysis:</b> Allowable % Difference for each CCC analyte is $\leq 30\%$
		<b>Target List Analysis:</b> Allowable % Difference for each target analytes is $\leq 30\%$
Daily Calibration Verification (CCV) - Internal Standard Area Response	Allowable +/- 40% (Range: 60% to 140%)	Allowable +/- 50% (Range: 50% to 150%)
Method Blank, Laboratory Control Sample and Sample - Internal Standard Area Response	Allowable +/- 40% of the mean area response of most recent Initial Calibration (Range: 60% to 140%)	Allowable +/- 50% of the mean area response of the most recent Calibration Verification (Range: 50% to 150%)
Surrogates	Not Mentioned	1,4-Bromofluorobenzene, 1,2-Dichloroethane-d4 and Toluene-d8 - % Recoveries based upon historical control limits +/-3S



## Analytical Report

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

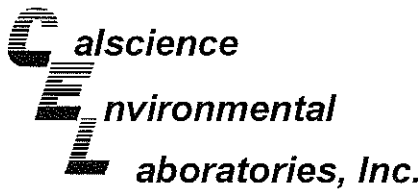
Date Received: 10/14/10  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: ASTM D-1946  
Units: %v

Project: ExxonMobil 74121

Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID		
VW1	10-10-1087-1-A	10/12/10 14:29	Air	GC 36	N/A	10/14/10 12:53	101014L01		
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Methane	ND	0.785	1.57	U	Oxygen + Argon	17.5	0.785	1.57	
Carbon Dioxide	5.24	0.785	1.57						
VW2	10-10-1087-2-A	10/12/10 15:55	Air	GC 36	N/A	10/14/10 13:15	101014L01		
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Methane	ND	0.820	1.64	U	Oxygen + Argon	8.13	0.820	1.64	
Carbon Dioxide	6.90	0.820	1.64						
VW5	10-10-1087-3-A	10/12/10 12:31	Air	GC 36	N/A	10/14/10 13:34	101014L01		
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Methane	ND	0.790	1.58	U	Oxygen + Argon	2.05	0.790	1.58	
Carbon Dioxide	13.2	0.790	1.58						
VW5 (DUP)	10-10-1087-4-A	10/12/10 17:08	Air	GC 36	N/A	10/14/10 13:55	101014L01		
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Methane	ND	0.840	1.68	U	Oxygen + Argon	2.16	0.840	1.68	
Carbon Dioxide	12.5	0.840	1.68						
VW6	10-10-1087-5-A	10/12/10 13:42	Air	GC 36	N/A	10/14/10 14:17	101014L01		
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Methane	ND	0.835	1.67	U	Oxygen + Argon	16.1	0.835	1.67	
Carbon Dioxide	5.25	0.835	1.67						
VW9	10-10-1087-6-A	10/12/10 15:13	Air	GC 36	N/A	10/14/10 14:39	101014L01		
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Methane	ND	0.775	1.55	U	Oxygen + Argon	7.01	0.775	1.55	
Carbon Dioxide	15.4	0.775	1.55						
VW10	10-10-1087-7-A	10/12/10 12:43	Air	GC 36	N/A	10/14/10 14:59	101014L01		
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>
Methane	ND	0.815	1.63	U	Oxygen + Argon	4.83	0.815	1.63	
Carbon Dioxide	6.32	0.815	1.63						

RL - Reporting Limit    DF - Dilution Factor    Qual - Qualifiers



### Analytical Report

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Date Received: 10/14/10  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: ASTM D-1946  
Units: %v

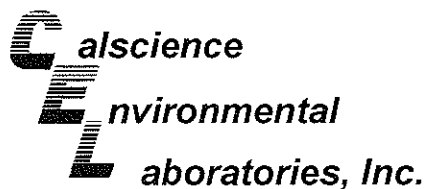
Project: ExxonMobil 74121

Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-03-002-1,160	N/A	Air	GC 36	N/A	10/14/10 08:48	101014L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Methane	ND	0.500	1	U	Oxygen + Argon	ND	0.500	1	U
Carbon Dioxide	ND	0.500	1	U					

RL - Reporting Limit    DF - Dilution Factor    Qual - Qualifiers



## Analytical Report

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Date Received: 10/14/10  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: EPA TO-3M

Project: ExxonMobil 74121

Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW1	10-10-1087-1-A	10/12/10 14:29	Air	GC 53	N/A	10/14/10 12:52	101014L01

Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	ND	11000	1.57	U	ug/m3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW2	10-10-1087-2-A	10/12/10 15:55	Air	GC 53	N/A	10/14/10 13:03	101014L01

Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	190000	11000	1.64		ug/m3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW5	10-10-1087-3-A	10/12/10 12:31	Air	GC 53	N/A	10/14/10 13:21	101014L01

Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	22000	11000	1.58		ug/m3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW5 (DUP)	10-10-1087-4-A	10/12/10 17:08	Air	GC 53	N/A	10/14/10 13:32	101014L01

Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	36000	12000	1.68		ug/m3

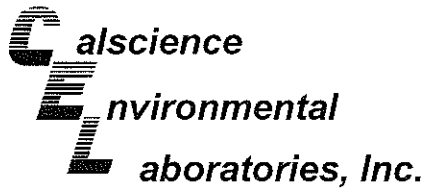
Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW6	10-10-1087-5-A	10/12/10 13:42	Air	GC 53	N/A	10/14/10 13:41	101014L01

Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	ND	12000	1.67	U	ug/m3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW9	10-10-1087-6-A	10/12/10 15:13	Air	GC 53	N/A	10/14/10 13:52	101014L01

Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	ND	11000	1.55	U	ug/m3

RL - Reporting Limit    DF - Dilution Factor    Qual - Qualifiers



## Analytical Report

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Date Received: 10/14/10  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: EPA TO-3M

Project: ExxonMobil 74121

Page 2 of 2

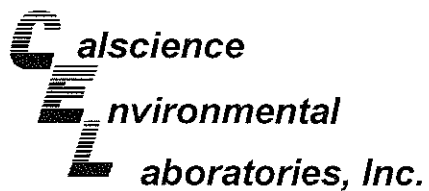
Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW10	10-10-1087-7-A	10/12/10 12:43	Air	GC 53	N/A	10/14/10 14:02	101014L01

Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	ND	11000	1.63	U	ug/m3

Method Blank	098-01-005-2,681	N/A	Air	GC 53	N/A	10/14/10 09:50	101014L01
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Parameter	Result	RL	DF	Qual	Units
TPH as Gasoline	ND	7000	1	U	ug/m3

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers



Analytical Report

ETIC Engineering, Inc.
2285 Morello Avenue
Pleasant Hill, CA 94523-1850

Date Received: 10/14/10
Work Order No: 10-10-1087
Preparation: N/A
Method: EPA TO-15
Units: ug/m3

Project: ExxonMobil 74121

Page 1 of 3

Table with 8 columns: Client Sample Number, Lab Sample Number, Date/Time Collected, Matrix, Instrument, Date Prepared, Date/Time Analyzed, QC Batch ID. Row 1: VW1, 10-10-1087-1-A, 10/12/10 14:29, Air, GC/MS YY, N/A, 10/15/10 03:02, 101014L01

Table with 10 columns: Parameter, Result, RL, DF, Qual, Parameter, Result, RL, DF, Qual. Lists Benzene, Diisopropyl Ether (DIPE), 1,2-Dibromoethane, 1,2-Dichloroethane, Ethyl-t-Butyl Ether (ETBE), Ethylbenzene, Surrogates: 1,4-Bromofluorobenzene, Toluene-d8, 1,2-Dichloroethane-d4.

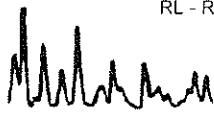
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Table with 10 columns: Parameter, Result, RL, DF, Qual, Parameter, Result, RL, DF, Qual. Lists Benzene, Diisopropyl Ether (DIPE), 1,2-Dibromoethane, 1,2-Dichloroethane, Ethyl-t-Butyl Ether (ETBE), Ethylbenzene, Surrogates: 1,4-Bromofluorobenzene, Toluene-d8, 1,2-Dichloroethane-d4.

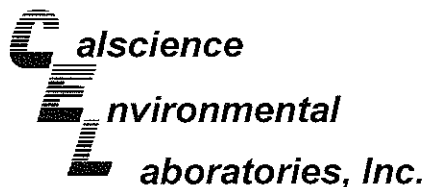
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Table with 10 columns: Parameter, Result, RL, DF, Qual, Parameter, Result, RL, DF, Qual. Lists Benzene, Diisopropyl Ether (DIPE), 1,2-Dibromoethane, 1,2-Dichloroethane, Ethyl-t-Butyl Ether (ETBE), Ethylbenzene, Surrogates: 1,4-Bromofluorobenzene, Toluene-d8, 1,2-Dichloroethane-d4.

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers







Analytical Report

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Date Received: 10/14/10  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: EPA TO-15  
Units: ug/m3

Project: ExxonMobil 74121

Page 2 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW5 (DUP)	10-10-1087-4-A	10/12/10 17:08	Air	GC/MS YY	N/A	10/15/10 05:26	101014L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	2.7	1.68	U	Methyl-t-Butyl Ether (MTBE)	ND	12	1.68	U
Diisopropyl Ether (DIPE)	ND	14	1.68	U	Xylenes (total)	ND	15	1.68	U
1,2-Dibromoethane	ND	6.5	1.68	U	Tert-Amyl-Methyl Ether (TAME)	ND	14	1.68	U
1,2-Dichloroethane	ND	3.4	1.68	U	Tert-Butyl Alcohol (TBA)	76	10	1.68	
Ethyl-t-Butyl Ether (ETBE)	ND	14	1.68	U	Toluene	7.9	3.2	1.68	
Ethylbenzene	4.1	3.6	1.68						
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>		<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>	
1,4-Bromofluorobenzene	103	57-129			1,2-Dichloroethane-d4	100	47-137		
Toluene-d8	64	78-156	2						

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW6	10-10-1087-5-A	10/12/10 13:42	Air	GC/MS YY	N/A	10/15/10 06:16	101014L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	7.3	2.7	1.67		Methyl-t-Butyl Ether (MTBE)	ND	12	1.67	U
Diisopropyl Ether (DIPE)	ND	14	1.67	U	Xylenes (total)	24	15	1.67	
1,2-Dibromoethane	ND	6.4	1.67	U	Tert-Amyl-Methyl Ether (TAME)	ND	14	1.67	U
1,2-Dichloroethane	ND	3.4	1.67	U	Tert-Butyl Alcohol (TBA)	12	10	1.67	
Ethyl-t-Butyl Ether (ETBE)	ND	14	1.67	U	Toluene	11	3.1	1.67	
Ethylbenzene	12	3.6	1.67						
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>		<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>	
1,4-Bromofluorobenzene	101	57-129			1,2-Dichloroethane-d4	100	47-137		
Toluene-d8	100	78-156							

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW9	10-10-1087-6-A	10/12/10 15:13	Air	GC/MS YY	N/A	10/15/10 07:06	101014L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	2.5	1.55	U	Methyl-t-Butyl Ether (MTBE)	ND	11	1.55	U
Diisopropyl Ether (DIPE)	ND	13	1.55	U	Xylenes (total)	ND	13	1.55	U
1,2-Dibromoethane	ND	6.0	1.55	U	Tert-Amyl-Methyl Ether (TAME)	ND	13	1.55	U
1,2-Dichloroethane	ND	3.1	1.55	U	Tert-Butyl Alcohol (TBA)	ND	9.4	1.55	U
Ethyl-t-Butyl Ether (ETBE)	ND	13	1.55	U	Toluene	3.7	2.9	1.55	
Ethylbenzene	ND	3.4	1.55	U					
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>		<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>	
1,4-Bromofluorobenzene	102	57-129			1,2-Dichloroethane-d4	100	47-137		
Toluene-d8	100	78-156							

RL - Reporting Limit    DF - Dilution Factor    Qual - Qualifiers

## Analytical Report

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Date Received: 10/14/10  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: EPA TO-15  
Units: ug/m3

Project: ExxonMobil 74121

Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
VW10	10-10-1087-7-A	10/12/10 12:43	Air	GC/MS YY	N/A	10/15/10 07:55	101014L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	2.6	1.63	U	Methyl-t-Butyl Ether (MTBE)	ND	12	1.63	U
Diisopropyl Ether (DIPE)	ND	14	1.63	U	Xylenes (total)	ND	14	1.63	U
1,2-Dibromoethane	ND	6.3	1.63	U	Tert-Amyl-Methyl Ether (TAME)	ND	14	1.63	U
1,2-Dichloroethane	ND	3.3	1.63	U	Tert-Butyl Alcohol (TBA)	ND	9.9	1.63	U
Ethyl-t-Butyl Ether (ETBE)	ND	14	1.63	U	Toluene	4.0	3.1	1.63	
Ethylbenzene	ND	3.5	1.63	U					
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>		<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>	
1,4-Bromofluorobenzene	100	57-129			1,2-Dichloroethane-d4	99	47-137		
Toluene-d8	100	78-156							

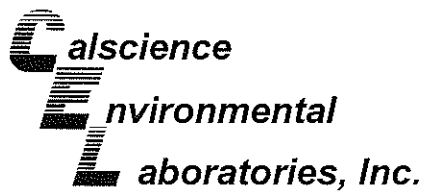
Method Blank	095-01-021-8,787	N/A	Air	GC/MS YY	N/A	10/14/10 13:27	101014L01
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Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	1.6	1	U	Methyl-t-Butyl Ether (MTBE)	ND	7.2	1	U
Diisopropyl Ether (DIPE)	ND	8.4	1	U	Xylenes (total)	ND	8.7	1	U
1,2-Dibromoethane	ND	3.8	1	U	Tert-Amyl-Methyl Ether (TAME)	ND	8.4	1	U
1,2-Dichloroethane	ND	2.0	1	U	Tert-Butyl Alcohol (TBA)	ND	6.1	1	U
Ethyl-t-Butyl Ether (ETBE)	ND	8.4	1	U	Toluene	ND	1.9	1	U
Ethylbenzene	ND	2.2	1	U					
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>		<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>	
1,4-Bromofluorobenzene	101	57-129			1,2-Dichloroethane-d4	99	47-137		
Toluene-d8	98	78-156							

Method Blank	095-01-021-8,788	N/A	Air	GC/MS YY	N/A	10/15/10 12:58	101015L01
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Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	1.6	1	U	Methyl-t-Butyl Ether (MTBE)	ND	7.2	1	U
Diisopropyl Ether (DIPE)	ND	8.4	1	U	Xylenes (total)	ND	8.7	1	U
1,2-Dibromoethane	ND	3.8	1	U	Tert-Amyl-Methyl Ether (TAME)	ND	8.4	1	U
1,2-Dichloroethane	ND	2.0	1	U	Tert-Butyl Alcohol (TBA)	ND	6.1	1	U
Ethyl-t-Butyl Ether (ETBE)	ND	8.4	1	U	Toluene	ND	1.9	1	U
Ethylbenzene	ND	2.2	1	U					
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>		<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>	
1,4-Bromofluorobenzene	101	57-129			1,2-Dichloroethane-d4	101	47-137		
Toluene-d8	99	78-156							

RL - Reporting Limit    DF - Dilution Factor    Qual - Qualifiers



Quality Control - Duplicate



ETIC Engineering, Inc.  
 2285 Morello Avenue  
 Pleasant Hill, CA 94523-1850

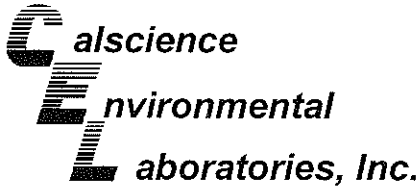
Date Received: 10/14/10  
 Work Order No: 10-10-1087  
 Preparation: N/A  
 Method: EPA TO-3M

Project: ExxonMobil 74121

Quality Control Sample ID	Matrix	Instrument	Date Prepared:	Date Analyzed:	Duplicate Batch Number
VW2	Air	GC 53	N/A	10/14/10	101014D01

Parameter	Sample Conc.	DUP Conc	RPD	RPD CL	Qualifiers
TPH as Gasoline	190000	180000	4	0-20	

RPD - Relative Percent Difference , CL - Control Limit



Quality Control - LCS/LCS Duplicate

ETIC Engineering, Inc.  
 2285 Morello Avenue  
 Pleasant Hill, CA 94523-1850

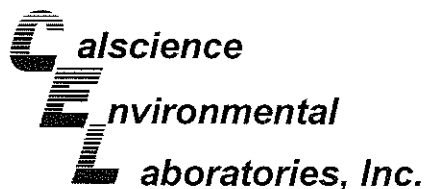
Date Received: N/A  
 Work Order No: 10-10-1087  
 Preparation: N/A  
 Method: ASTM D-1946

Project: ExxonMobil 74121

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-03-002-1,160	Air	GC 36	N/A	10/14/10	101014L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Carbon Dioxide	97	96	80-120	1	0-30	
Oxygen + Argon	91	91	80-120	0	0-30	
Nitrogen	91	91	80-120	0	0-30	

RPD - Relative Percent Difference , CL - Control Limit



## Quality Control - LCS/LCS Duplicate

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Date Received: N/A  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: EPA TO-15

Project: ExxonMobil 74121

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number		
095-01-021-8,787	Air	GC/MS YY	N/A	10/14/10	101014L01		
Parameter	LCS %REC	LCSD %REC	%REC CL	ME CL	RPD	RPD CL	Qualifiers
Benzene	104	105	60-156	44-172	1	0-40	
Carbon Tetrachloride	97	98	64-154	49-169	1	0-32	
1,2-Dibromoethane	108	110	54-144	39-159	2	0-36	
1,2-Dichlorobenzene	87	90	34-160	13-181	3	0-47	
1,2-Dichloroethane	98	99	69-153	55-167	1	0-30	
1,2-Dichloropropane	107	108	67-157	52-172	1	0-35	
1,4-Dichlorobenzene	93	96	36-156	16-176	3	0-47	
c-1,3-Dichloropropene	113	114	61-157	45-173	1	0-35	
Ethylbenzene	106	108	52-154	35-171	2	0-38	
Xylenes (total)	104	106	52-148	36-164	2	0-38	
Tetrachloroethene	102	104	56-152	40-168	2	0-40	
Toluene	107	108	56-146	41-161	1	0-43	
Trichloroethene	99	100	63-159	47-175	1	0-34	
1,1,2-Trichloroethane	103	104	65-149	51-163	1	0-37	
Vinyl Chloride	102	102	45-177	23-199	1	0-36	

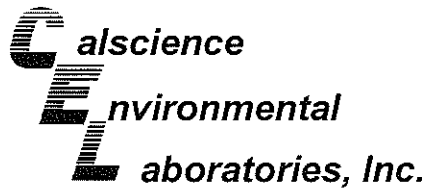
Total number of LCS compounds : 15

Total number of ME compounds : 0

Total number of ME compounds allowed : 1

LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit



## Quality Control - LCS/LCS Duplicate

ETIC Engineering, Inc.  
2285 Morello Avenue  
Pleasant Hill, CA 94523-1850

Date Received: N/A  
Work Order No: 10-10-1087  
Preparation: N/A  
Method: EPA TO-15

Project: ExxonMobil 74121

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number		
095-01-021-8,788	Air	GC/MS YY	N/A	10/15/10	101015L01		
Parameter	LCS %REC	LCSD %REC	%REC CL	ME CL	RPD	RPD CL	Qualifiers
Benzene	106	107	60-156	44-172	2	0-40	
Carbon Tetrachloride	100	102	64-154	49-169	2	0-32	
1,2-Dibromoethane	110	124	54-144	39-159	12	0-36	
1,2-Dichlorobenzene	89	103	34-160	13-181	14	0-47	
1,2-Dichloroethane	100	101	69-153	55-167	1	0-30	
1,2-Dichloropropane	109	110	67-157	52-172	2	0-35	
1,4-Dichlorobenzene	95	109	36-156	16-176	13	0-47	
c-1,3-Dichloropropene	115	117	61-157	45-173	2	0-35	
Ethylbenzene	109	123	52-154	35-171	12	0-38	
Xylenes (total)	107	121	52-148	36-164	12	0-38	
Tetrachloroethene	103	116	56-152	40-168	12	0-40	
Toluene	109	122	56-146	41-161	12	0-43	
Trichloroethene	101	102	63-159	47-175	2	0-34	
1,1,2-Trichloroethane	105	107	65-149	51-163	2	0-37	
Vinyl Chloride	104	104	45-177	23-199	0	0-36	

Total number of LCS compounds : 15

Total number of ME compounds : 0

Total number of ME compounds allowed : 1

LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit

## Glossary of Terms and Qualifiers

Work Order Number: 10-10-1087

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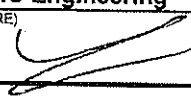
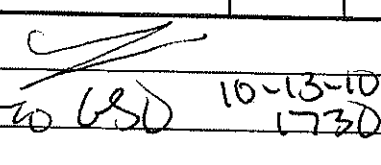
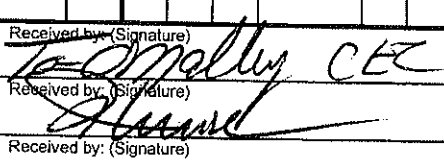
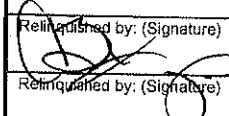
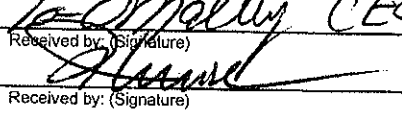
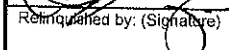

<u>Qualifier</u>	<u>Definition</u>
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	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.
4	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.
5	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.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
I	Compound did not meet method-described identification guidelines. Identification was based on additional GC/MS characteristics.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
ME	LCS recovery percentage is within LCS ME control limit range.
ND	Parameter not detected at the indicated reporting limit.
Q	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.
U	Undetected at detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture.

<b>Site Name</b>	<b>74121</b>
<i>Provide MRN for retail or AFE for major projects</i>	
<b>Retail Project (MRN)</b>	
<b>Major Project (AFE)</b>	
<b>Project Name</b>	<b>Former Exxon RS 74121</b>

**CHAIN OF CUSTODY RECORD**

DATE: 10/12/2010  
PAGE: 1 OF 1

ExxonMobil Engr: Jennifer Sedlachek

LABORATORY CLIENT: <b>ExxonMobil c/o ETIC Engineering</b> ADDRESS: <b>2285 Morello Avenue</b> CITY: <b>Pleasant Hill, CA 94523</b> TEL: <b>925-602-4710 x21</b> FAX: <b>925-602-4720</b> TURNAROUND TIME <input type="checkbox"/> SAME DAY <input type="checkbox"/> 24 HR <input type="checkbox"/> 48 HR <input type="checkbox"/> 72 HR <input checked="" type="checkbox"/> 5 DAYS <input type="checkbox"/> 10 DAYS SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY) <input type="checkbox"/> RWQCB REPORTING <input type="checkbox"/> ARCHIVE SAMPLES UNTIL _____ SPECIAL INSTRUCTIONS:  * 7 Oxygenates include MTBE, TBA, TAME, ETBE, DIPE, EDB, AND 1,2-DCA. Email report to eticlabreports@eticeng.com				GLOBAL ID # COELT LOG CODE: <b>T0600120383</b> PROJECT CONTACT: <b>Erik Appel, ETIC Engineering</b> SAMPLER(S): (SIGNATURE) 				P.O. <b>4512012296</b> LAB USE ONLY <b>10-1087</b> COOLER RECEIPT Temp = _____ °C														
REQUESTED ANALYSIS																						
LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING		MAT- RIX	NO. OF CONT.	TPHg by EPA TO-3M	BTEX by EPA TO-15	7 Oxygenates by EPA TO-15*	Oxygen & argon, Methane, Carbon dioxide by ASTM D-1946											CONTAINER TYPE	
			DATE	TIME																		
1	VW1		10/12/10	1429	Vapor	1	X	X	X	X												1-liter summa canister
2	VW2		10/12/10	1555	Vapor	1	X	X	X	X												1-liter summa canister
3	VW5		10/12/10	1231	Vapor	1	X	X	X	X												1-liter summa canister
4	VW5 (DUP)		10/12/10	1708	Vapor	1	X	X	X	X												1-liter summa canister
5	VW6		10/12/10	1342	Vapor	1	X	X	X	X												1-liter summa canister
6	VW9		10/12/10	1513	Vapor	1	X	X	X	X												1-liter summa canister
7	VW10		10/12/10	1243	Vapor	1	X	X	X	X												1-liter summa canister
Reinquished by: (Signature)							Received by: (Signature)							Date & Time:								
														10/13/10 1415								
Reinquished by: (Signature)							Received by: (Signature)							Date & Time:								
														10/14/10 1000								
Reinquished by: (Signature)							Received by: (Signature)							Date & Time:								
																						

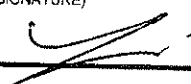


<b>Site Name</b>	<b>74121</b>
<i>Provide MRN for retail or AFE for major projects</i>	
<b>Retail Project (MRN)</b>	
<b>Major Project (AFE)</b>	
<b>Project Name</b>	<b>Former Exxon RS 74121</b>

**CHAIN OF CUSTODY RECORD**

DATE: 10/12/10  
PAGE: 1 OF 1

ExxonMobil Engr: Jennifer Sedlachek

LABORATORY CLIENT: <b>ExxonMobil c/o ETIC Engineering</b>		GLOBAL ID # / COELT LOG CODE: <b>T0600120383</b>	P.O. <b>4512012296</b>
ADDRESS: <b>2285 Morello Avenue</b>		PROJECT CONTACT: <b>Erik Appel, ETIC Engineering</b>	LAB USE ONLY: <b>10-1087</b>
CITY: <b>Pleasant Hill, CA 94523</b>		SAMPLER(S): (SIGNATURE) 	COOLER RECEIPT Temp = _____ °C
TEL: <b>925-602-4710 x21</b>	FAX: <b>925-602-4720</b>		

TURNAROUND TIME  
 SAME DAY    24 HR    48 HR    72 HR    5 DAYS    10 DAYS


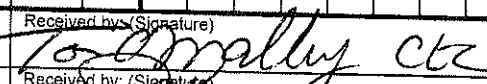
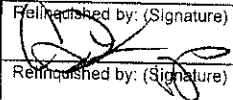
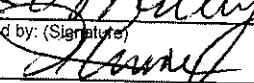
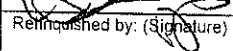
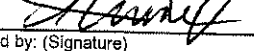
SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)  
 RWQCB REPORTING    ARCHIVE SAMPLES UNTIL \_\_\_\_\_

SPECIAL INSTRUCTIONS:  
 \* 7 Oxygenates include MTBE, TBA, TAME, ETBE, DIPE, EDB, AND 1,2-DCA.  
 Email report to eticlabreports@eticeng.com

**REQUESTED ANALYSIS**

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING		MAT- RIX	NO. OF CONT.	CONTAINER TYPE
			DATE	TIME			
	8 VW1		10/12/10		Vapor	1	6-liter summa canister
	9 VW2						
	10 VW3						
	11 VW5						
	12 VW6						
	13 VW9						
	14 VW10						
	15 VW12						

DO NOT ANALYZE

Relinquished by: (Signature) 	Received by: (Signature) 	Date, & Time: <b>10/13/10 1415</b>
Relinquished by: (Signature) 	Received by: (Signature) 	Date, & Time: <b>10/14/10 1000</b>
Relinquished by: (Signature) 	Received by: (Signature) 	Date, & Time: <b>10-13-10 1730</b>



< WebShip > > > >  
800-322-5555 www.gso.com



< 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:**  
ETIC

**Delivery Instructions:**

**Signature Type:**  
SIGNATURE REQUIRED

**Tracking #:** 515143234

**NPS**

**ORC** **D**

GARDEN GROVE

**D92843A**

85455881

Print Date : 10/13/10 15:01 PM

**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:**  
ETIC

**Delivery Instructions:**

**Signature Type:**  
SIGNATURE REQUIRED

**Tracking #:** 515143235

**NPS**

**ORC** **D**

GARDEN GROVE

**D92843A**

85455882

Print Date : 10/13/10 15:01 PM

Package 1 of 4

Package 2 of 4

**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:**  
ETIC

**Delivery Instructions:**

**Signature Type:**  
SIGNATURE REQUIRED

**Tracking #:** 515143236

**NPS**

**ORC** **D**

GARDEN GROVE

**D92843A**

85455883

Print Date : 10/13/10 15:01 PM

**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:**  
ETIC

**Delivery Instructions:**

**Signature Type:**  
SIGNATURE REQUIRED

**Tracking #:** 515143237

**NPS**

**ORC** **D**

GARDEN GROVE

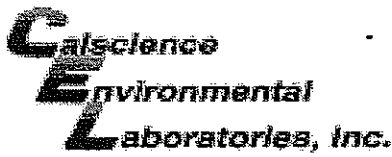
**D92843A**

85455884

Print Date : 10/13/10 15:01 PM

Package 3 of 4

Package 4 of 4



WORK ORDER #: 10-10-1087

**SAMPLE RECEIPT FORM**

Box 1 of 4

CLIENT: ETIC

DATE: 10/14/10

**TEMPERATURE:** Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature \_\_\_\_\_ °C + 0.5 °C (CF) = \_\_\_\_\_ °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.

Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature:  Air     Filter    Initial: NK

**CUSTODY SEALS INTACT:**

Box     \_\_\_\_\_     No (Not Intact)     Not Present     N/A    Initial: NK

Sample     \_\_\_\_\_     No (Not Intact)     Not Present    Initial: NK

**SAMPLE CONDITION:**

	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
<input type="checkbox"/> No analysis requested. <input type="checkbox"/> Not relinquished. <input type="checkbox"/> No date/time relinquished.			
Sampler's name indicated on COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers and sufficient volume for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analyses received within holding time.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
pH / Residual Chlorine / Dissolved Sulfide received within 24 hours.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation noted on COC or sample container.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tedlar bag(s) free of condensation.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**CONTAINER TYPE:**

Solid:  4ozCGJ     8ozCGJ     16ozCGJ     Sleeve (\_\_\_\_)     EnCores®     TerraCores®     \_\_\_\_\_

Water:  VOA     VOA<sub>h</sub>     VOA<sub>na2</sub>     125AGB     125AGB<sub>h</sub>     125AGB<sub>p</sub>     1AGB     1AGB<sub>na2</sub>     1AGB<sub>s</sub>

500AGB     500AGJ     500AGJ<sub>s</sub>     250AGB     250CGB     250CGB<sub>s</sub>     1PB     500PB     500PB<sub>na</sub>

250PB     250PB<sub>n</sub>     125PB     125PB<sub>z</sub>na     100PJ     100PJ<sub>na2</sub>     \_\_\_\_\_     \_\_\_\_\_     \_\_\_\_\_

Air:  Tedlar®     Summa®    Other:  \_\_\_\_\_ Trip Blank Lot#: \_\_\_\_\_ Labeled/Checked by: NK

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope Reviewed by: PK

Preservative: h: HCL n: HNO<sub>3</sub> na<sub>2</sub>: Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> na: NaOH p: H<sub>3</sub>PO<sub>4</sub> s: H<sub>2</sub>SO<sub>4</sub> z<sub>na</sub>: ZnAc<sub>2</sub>+NaOH f: Field-filtered Scanned by: NK

WORK ORDER #: 10-10-1087

**SAMPLE RECEIPT FORM**

Box 2 of 4

CLIENT: ETIC

DATE: 10/14/10

**TEMPERATURE:** Thermometer ID: SC1 (Criteria: 0.0°C – 6.0°C, not frozen)

Temperature \_\_\_\_\_ °C + 0.5°C (CF) = \_\_\_\_\_ °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.

Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature:  Air  Filter

Initial: NZ

**CUSTODY SEALS INTACT:**

Box  \_\_\_\_\_  No (Not Intact)  Not Present  N/A

Initial: NZ

Sample  \_\_\_\_\_  No (Not Intact)  Not Present

Initial: NZ

**SAMPLE CONDITION:**

	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------------------	-------------------------------------	--------------------------	--------------------------

Sample container label(s) consistent with COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	-------------------------------------	--------------------------	--------------------------

Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	-------------------------------------	--------------------------	--------------------------

Proper containers and sufficient volume for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
---	-------------------------------------	--------------------------	--------------------------

Analyses received within holding time.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	-------------------------------------	--------------------------	--------------------------

pH / Residual Chlorine / Dissolved Sulfide received within 24 hours.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
--	--------------------------	--------------------------	-------------------------------------

Proper preservation noted on COC or sample container.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
---	--------------------------	--------------------------	-------------------------------------

Unpreserved vials received for Volatiles analysis

Volatile analysis container(s) free of headspace.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
---	--------------------------	--------------------------	-------------------------------------

Tedlar bag(s) free of condensation.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
---	--------------------------	--------------------------	-------------------------------------

**CONTAINER TYPE:**

Solid:  4ozCGJ  8ozCGJ  16ozCGJ  Sleeve (\_\_\_\_)  EnCores®  TerraCores®  \_\_\_\_\_

Water:  VOA  VOAh  VOAna<sub>2</sub>  125AGB  125AGBh  125AGBp  1AGB  1AGBna<sub>2</sub>  1AGBs

500AGB  500AGJ  500AGJs  250AGB  250CGB  250CGBs  1PB  500PB  500PBna

250PB  250PBn  125PB  125PBz<sub>nna</sub>  100PJ  100PJna<sub>2</sub>  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_

Air:  Tedlar®  Summa® Other:  \_\_\_\_\_ Trip Blank Lot#: \_\_\_\_\_ Labeled/Checked by: NZ

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope Reviewed by: NZ

Preservative: h: HCL n: HNO<sub>3</sub> na<sub>2</sub>: Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> na: NaOH p: H<sub>3</sub>PO<sub>4</sub> s: H<sub>2</sub>SO<sub>4</sub> z<sub>nna</sub>: ZnAc<sub>2</sub>+NaOH f: Field-filtered Scanned by: NZ

WORK ORDER #: 10-10-1087

**SAMPLE RECEIPT FORM**

Box 3 of 4

CLIENT: ETIC

DATE: 10/14/10

**TEMPERATURE:** Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature \_\_\_\_\_ °C + 0.5 °C (CF) = \_\_\_\_\_ °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.

Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature:  Air  Filter

Initial: NC

**CUSTODY SEALS INTACT:**

Box  \_\_\_\_\_  No (Not Intact)  Not Present  N/A

Initial: NC

Sample  \_\_\_\_\_  No (Not Intact)  Not Present

Initial: NC

**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 / Residual Chlorine / Dissolved Sulfide 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.....

**CONTAINER TYPE:**

**Solid:**  4ozCGJ  8ozCGJ  16ozCGJ  Sleeve (\_\_\_\_)  EnCores®  TerraCores®  \_\_\_\_\_

**Water:**  VOA  VOA<sub>h</sub>  VOA<sub>na2</sub>  125AGB  125AGB<sub>h</sub>  125AGB<sub>p</sub>  1AGB  1AGB<sub>na2</sub>  1AGB<sub>s</sub>

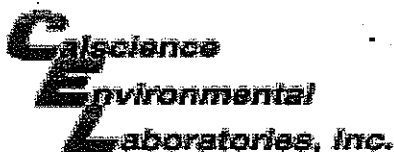
500AGB  500AGJ  500AGJ<sub>s</sub>  250AGB  250CGB  250CGB<sub>s</sub>  1PB  500PB  500PB<sub>na</sub>

250PB  250PB<sub>n</sub>  125PB  125PB<sub>z<sub>na</sub></sub>  100PJ  100PJ<sub>na2</sub>  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_

**Air:**  Tedlar®  Summa® **Other:**  \_\_\_\_\_ **Trip Blank Lot#:** \_\_\_\_\_ **Labeled/Checked by:** NC

**Container:** C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope **Reviewed by:** NC

**Preservative:** h: HCL n: HNO<sub>3</sub> na<sub>2</sub>: Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> na: NaOH p: H<sub>3</sub>PO<sub>4</sub> s: H<sub>2</sub>SO<sub>4</sub> z<sub>na</sub>: ZnAc<sub>2</sub>+NaOH f: Field-filtered **Scanned by:** NC



WORK ORDER #: 10-10-1087

**SAMPLE RECEIPT FORM**

Box 4 of 4

CLIENT: ETIC

DATE: 10/14/10

**TEMPERATURE:** Thermometer ID: SC1 (Criteria: 0.0°C – 6.0°C, not frozen)

Temperature \_\_\_\_\_ °C + 0.5°C (CF) = \_\_\_\_\_ °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.

Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature:  Air  Filter

Initial: NC

**CUSTODY SEALS INTACT:**

Box  \_\_\_\_\_  No (Not Intact)  Not Present  N/A

Initial: NC

Sample  \_\_\_\_\_  No (Not Intact)  Not Present

Initial: NC

**SAMPLE CONDITION:**

	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
<input type="checkbox"/> No analysis requested. <input type="checkbox"/> Not relinquished. <input type="checkbox"/> No date/time relinquished.			
Sampler's name indicated on COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers and sufficient volume for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analyses received within holding time.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
pH / Residual Chlorine / Dissolved Sulfide received within 24 hours.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation noted on COC or sample container.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Tedlar bag(s) free of condensation.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**CONTAINER TYPE:**

Solid:  4ozCGJ  8ozCGJ  16ozCGJ  Sleeve (\_\_\_\_)  EnCores®  TerraCores®  \_\_\_\_\_

Water:  VOA  VOAh  VOAna<sub>2</sub>  125AGB  125AGBh  125AGBp  1AGB  1AGBna<sub>2</sub>  1AGBs

500AGB  500AGJ  500AGJs  250AGB  250CGB  250CGBs  1PB  500PB  500PBna

250PB  250PBn  125PB  125PBz<sub>na</sub>  100PJ  100PJna<sub>2</sub>  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_

Air:  Tedlar®  Summa® Other:  \_\_\_\_\_ Trip Blank Lot#: \_\_\_\_\_ Labeled/Checked by: NC

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope Reviewed by: NC

Preservative: h: HCL n: HNO<sub>3</sub> na<sub>2</sub>: Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> na: NaOH p: H<sub>3</sub>PO<sub>4</sub> s: H<sub>2</sub>SO<sub>4</sub> z<sub>na</sub>: ZnAc<sub>2</sub>+NaOH f: Field-filtered Scanned by: NC