Archived: Thursday, July 04, 2019 1:12:07 AM
From: Maureen Carson
Sent: Tuesday, June 25, 2019 2:19:16 PM
To: Luke, Bonnie; Baca, Brian
Cc: Marc Traut
Subject: [External] Transmittal of Flare report (Naumann Drill Site)
Importance: Normal
Attachments:
Naumann Drillsite Flare Test AIRx 5-9-2019 final 6-25-2019.pdf

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Dear Bonnie and Brian,

With this email, I am transmitting the attached report, dated May 9, 2019 and prepared by AIRx Testing Services, Inc. of Ventura, California Renaissance Petroleum contracted with AIRx, an independent third party, to perform testing of active flaring at the Naumann Drill Site. While not requested by Ventura County Planning, Ventura County APCD or any agency, RenPet took initiative to authorize the testing in order to provide supplemental scientific documentation for consideration by the Staff and the Board of Supervisors when they review the permit on July 23, 2019. Marc Traut will be providing a separate letter in support of the permit, but in the interim I want to get this report to you (and to the APCD) as soon as possible.

In very short summary, the report favorably documents that the emergency flare temperature exceeds the thermal destruction temperature required to destroy the six identified measurable VOC components that were sampled during emergency flaring.

You may also be aware that the Ventura County APCD took air quality measurements near the drill site. Their staff has indicated that they will be transmitting the findings of their sampling to you.

Please confirm receipt of this email and report, and feel free to call me if you have any questions.

Maureen Traut Carson
Land Use Consultant
maureen.t.carson@gmail.com
530.400.6315

AIRx Testing Services, Inc.

Date Tested: May 9, 2019

TEST REPORT:
VOLATILE ORGANIC COMPOUNDS & EXHAUST TEMPERATURE OF A NATURAL GAS FIRED EMERGENCY FLARE

Source Location:
Renaissance Petroleum, LLC
Naumann Drill site
3214 Etting Road
Oxnard, CA 93030

Submitted to:
Renaissance Petroleum, LLC
P.O. Box 20456
Bakersfield, CA 93390

Attention: Marc Traut

Prepared By:
AIRx Testing Services, Inc.
2472 Eastman Avenue Unit 34
Ventura, CA 93003

Job Number
18066

Laboratory Report Number
209-040

Test Team Leader
Ken Kennepohl

Tom Porter, Vice President of Testing Services

Ken Kennepohl, Source Test Engineer

TABLE OF CONTENTS

1.0 INTRODUCTION

Renaissance Petroleum, LLC (RenPet) conducts oil and natural gas production operations on the Oxnard Plain situated in an unincorporated area of Ventura County. RenPet's Naumann Drill site includes natural gas processing facilities and a sales connection to the distribution pipeline network of the Southern California Gas Company (SCG). The natural gas produced by RenPet is processed to the standards of SCG and then added to the SCG distribution pipeline system for it delivery to local customers. If for any reason the natural gas does not meet the standards of RenPet or SCG, the processed natural gas is directed to the emergency flare stack on the Naumann Drill site where it is ignited and burned.

RenPet contracted AIRx Testing Services, Inc, to measure the temperature of the emergency flare during a simulated emergency condition while simultaneously sampling the natural gas stream feeding the flare. The test was performed on May 9, 2019. The purpose of the test was to determine the temperature of the emergency flare while in operation relative to the thermal destruction temperature of any volatile organic compound (VOCs) that could be identified in the gas stream.

The measurement of the emergency flare stack temperature and the simultaneous sampling of the natural gas stream feeding the emergency flare stack were performed by AIRx Testing Services personnel. The two (2) technicians on location for AIRx during the measurements and sampling were Ken Kennepohl and Ferodie Torres.

There were two (2) individuals present from RenPet during the emergency flare test. They were Dan Velazquez and Zackery Keller.

Mr. Ed Swede, Air Quality Engineer for Ventura County Air Pollution Control District, was also on location as an observer during the test.

2.0 TEST RESULTS AND PROCEDURES

Utilizing a man lift, a Omega – Super Omegaclad XL - type k low drift thermocouple that handles temperature of up to 2400°F was mounted onto the emergency flare stack on the morning of May 9, 2019. The measurement accuracy of the thermal couple is reported to be 1.1°C or 0.4% degrees. The thermal couple was connected to a display on the ground where the instantaneous temperature could be recorded. Three Summa sample canisters with flow controllers were obtained by AIRx from Atmospheric Analysis & Consulting, Inc. (AAC). A Summa canister was attached to a 2" flowline that feeds the emergency flare. The sample location was approximately twenty five feet from the flare ignition source. The test commenced at approximately 8:00Am on May 9, 2019, when the RenPet personnel directed the processed gas natural to the emergency flare to simulate an emergency event. The test time was 55 minutes during which the temperature of the emergency flare was recorded while three pressurized Summa canisters were consecutively filled.

Following the test, the three Summa canisters were transported by AIRx to AAC where ACC was directed to analyze the samples taken during the test for the identification and concentration of volatile organic compounds (VOCs) by EPA method TO-15.

AIR TESTING SERVICES, INC.

3.0 EMERGENCY FLARE TEMPERATURE

The chart below provides the recorded temperature of the emergency flare during the time at which the temperature of the emergency flare was recorded. Also shown in the information is the specific sample of the individual Summa canister in which the natural gas feeding the emergency flare stack sample was captured. The average temperature of the emergency flare was measured to be approximately 1600 degrees F.

TO-15 & TEMPERATURE DATA

Facility: Renaissance Petroleum Date: 5/9/2019

Job No: 18066

Source: Flare

Lab No: 219-040

	TIME	Canister #	Vacuum	Stack Temp Deg. F
Start	8:10	135	29	1604
	8:15	135	21	1650
	8:20	135	8	1630
Stop	8:25	135	5	1620
Start	8:30	25	30	1620
	8:35	25	26	1601
	8:40	25	15	1595
Stop	8:45	25	5	1615
Start	8:50	146	29	1625
	8:55	146	22	1584
	9:00	146	14	1595
Stop	9:05	146	5	1604

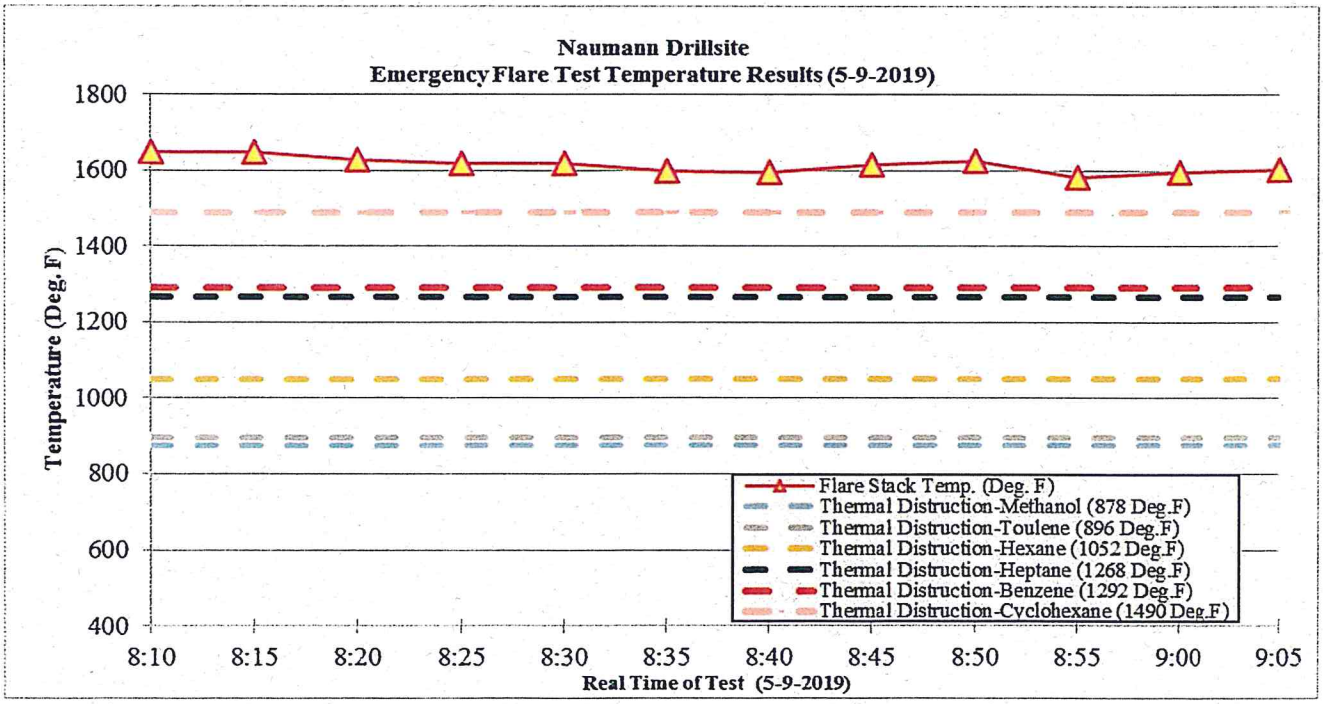
4.0 EMERGENCY FLARE TEST GAS FEEDSTOCK - EPA METHOD TO-15 RESULTS

EPA test TO-15 represents a standard for testing the concentration of VOCs. The full listing of the analytical results concerning the concentration of VOCs for the three Summa canister samples taken during Naumann Drill site emergency flare temperature test are attached herein as Appendix 1. There were a total of six VOC components that had a concentration above the sample reporting limit for the various EPA method TO-15 VOC components. The concentration of each of these six components from each of the three Summa canisters is provided below measured in parts per billion (ppb), along with the thermal destruction temperature for each of the six components.

VOC	Summa Canister No.135 (ppb)	Summa Canister No.25 (ppb)	Summa Canister No.146 (ppb)	Thermal Destruction Temperature
Methanol	173,000	194,000	208,000	878 °F
Hexane	13,200	11,100	12,900	1052 °F
Benzene	4,810	3,870	3,700	1292 °F
Cyclohexane	5,550	4,100	4,210	1490 °F
Heptane	4,480	2,870	2,480	1268 °F
Toluene	4,680	2,930	2,070	896 °F

5.0 DISCUSSION

The chart below shows the measured record of the temperature of the emergency flare during the test period relative to the thermal destruction temperature of the six components for which the concentration of the component was greater than the sample reporting limit.



6.0 CONCLUSION

The Naumann Drill site emergency flare temperature was simultaneously measured while a sample of the natural gas feeding the flare was captured. The natural gas samples were subsequently analyzed by EPA method TO-15 to determine the concentration of VOCs present in the natural gas feeding the emergency flare. A total of six components were determined to have a concentration higher than the sample reporting limit of method TO-15. The temperature of the Naumann Drill site emergency flare is significantly higher than the destruction temperature for the six components that were identified by EPA method TO-15.

References for Thermal Destruction:

Cyclohexane - ACS Publications
Benzene – EPA oxidizers/incinerators chapter 2
Toluene – EPA oxidizers/incinerators chapter 2
Heptane – Research Gate
Methanol – Wikipedia
Hexane – Wiley online Library

If you have any questions regarding the testing procedures or the calculations, please contact the undersigned at (805) 644-1099.

Respectfully submitted,
AIRx Testing Services, Inc.

Ken Kennepohl
Source Test Engineer

Reviewed by:

Tom Porter
Vice President of Testing Services

AIRX Testing Services, Inc.

APPENDIX A LABORATORY REPORT

The following list itemizes the information submitted by AAC concerning the samples acquired during the test of the emergency flare at the Naumann Drill site on May 9, 2019:

1. Cover letter from Sucha Parmar, Ph.D. dated 5-14-2019 (Page 1)
2. Laboratory Analysis Report for Samples Summa 135, Summa 025 and Summa 146 (Pages 2-5)
3. Calibration Information (Pages 6-7)
4. Quality Control/Quality Assurance Report TO15 Control Spike Recovery (Page 8)
5. Method Blank Analysis Report – VOC's (Pages 9-10)
6. Quality Control/Quality Assurance Report TO15 Duplicate Analysis (Pages 11-12)
7. Chain of Custody (page-13)

Atmospheric Analysis & Consulting, Inc.

CLIENT : AIRx Testing Inc.
PROJECT NAME : Renaissance Petroleum
PROJECT NUMBER : 219-040
AAC PROJECT NO. : 190707
REPORT DATE : 05/14/2019

On May 9, 2019, Atmospheric Analysis & Consulting, Inc. received three (3) Six-Liter Summa Canisters for Volatile Organic Compounds analysis by EPA method TO-15. Upon receipt each sample was assigned a unique Laboratory ID number as follows:

Client ID	Lab ID	Return Pressure (mmHga)
Summa 000135 R-1	190707-118351	662.5
Summa 000025 R-2	190707-118352	648.8
Summa 000146 R-3	190707-118353	644.0

This analysis is accredited under the laboratory's ISO/IEC 17025:2005 accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation AT-1908. . For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of these samples. The Technical Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

Sucha Parmar, Ph.D.
Technical Director

This report consists of 13 pages.

2225 Sperry Ave., Ventura, CA 93003 • www.aaclab.com 1534 Eastman Ave., Ste. A, Ventura, CA 93003 • (805) 650-1642

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : AIRx Testing Inc.
PROJECT NO : 180707
MATRIX : AIR
UNITS : PPB (v/v)

DATE RECEIVED : 05/09/2019
DATE REPORTED : 05/14/2019

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	Summa 000135 R-1			Sample Reporting Limit (SRL) (MRLxDF's)	Summa 000025 R-2			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	190707-118351				190707-118352				
Date Sampled	05/09/2019				05/09/2019				
Date Analyzed	05/14/2019				05/14/2019				
Can Dilution Factor	1.54				1.57				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Chlorodifluoromethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Propene	<SRL	U	2000	3074	<SRL	U	2000	3149	1.0
Dichlorodifluoromethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Chloromethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Dichlorotetrafluoroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Vinyl Chloride	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Methanol	173000		2000	15368	194000		2000	15746	5.0
1,3-Butadiene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Bromomethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Chloroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Dichlorofluoromethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Ethanol	<SRL	U	2000	6147	<SRL	U	2000	6298	2.0
Vinyl Bromide	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Acetone	<SRL	U	2000	6147	<SRL	U	2000	6298	2.0
Trichlorofluoromethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
2-Propanol (IPA)	<SRL	U	2000	6147	<SRL	U	2000	6298	2.0
Acrylonitrile	<SRL	U	2000	3074	<SRL	U	2000	3149	1.0
1,1-Dichloroethene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Methylene Chloride (DCM)	<SRL	U	2000	3074	<SRL	U	2000	3149	1.0
Allyl Chloride	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Carbon Disulfide	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Trichlorotrifluoroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
trans-1,2-Dichloroethene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,1-Dichloroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Methyl Tert Butyl Ether (MTBE)	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Vinyl Acetate	<SRL	U	2000	3074	<SRL	U	2000	3149	1.0
2-Butanone (MEK)	<SRL	U	2000	3074	<SRL	U	2000	3149	1.0
cis-1,2-Dichloroethene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Hexane	13200		2000	1537	11100		2000	1575	0.5
Chloroform	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Ethyl Acetate	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Tetrahydrofuran	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,2-Dichloroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,1,1-Trichloroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : AIRx Testing Inc.
PROJECT NO : 180707
MATRIX : AIR
UNITS : PPB (v/v)

DATE RECEIVED : 05/09/2019
DATE REPORTED : 05/14/2019

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	Summa 000135 R-1			Sample Reporting Limit (SRL) (MRLxDF's)	Summa 000025 R-2			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	190707-118351				190707-118352				
Date Sampled	05/09/2019				05/09/2019				
Date Analyzed	05/14/2019				05/14/2019				
Can Dilution Factor	1.54				1.57				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Benzene	4810		2000	1537	3870		2000	1575	0.5
Carbon Tetrachloride	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Cyclohexane	5550		2000	1537	4100		2000	1575	0.5
1,2-Dichloropropane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Bromodichloromethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,4-Dioxane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Trichloroethene (TCE)	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
2,2,4-Trimethylpentane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Heptane	4480		2000	1537	2870		2000	1575	0.5
cis-1,3-Dichloropropene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
4-Methyl-2-pentanone (MiBK)	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
trans-1,3-Dichloropropene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,1,2-Trichloroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Toluene	4680		2000	1537	2930		2000	1575	0.5
2-Hexanone (MBK)	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Dibromochloromethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,2-Dibromoethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Tetrachloroethene (PCE)	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Chlorobenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Ethylbenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
m & p-Xylenes	<SRL	U	2000	3074	<SRL	U	2000	3149	1.0
Bromoform	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Styrene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,1,2,2-Tetrachloroethane	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
o-Xylene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
4-Ethyltoluene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,3,5-Trimethylbenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,2,4-Trimethylbenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Benzyl Chloride (a-Chlorotoluene)	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,3-Dichlorobenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,4-Dichlorobenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,2-Dichlorobenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
1,2,4-Trichlorobenzene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
Hexachlorobutadiene	<SRL	U	2000	1537	<SRL	U	2000	1575	0.5
BFB-Surrogate Std. % Recovery	96%				95%				70-130%

U - Compound was analyzed for, but was not detected at or above the SRL.

Sucha Parmar, PhD
Technical Director

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : AIRx Testing Inc.
PROJECT NO : 180707
MATRIX : AIR
UNITS : PPB (v/v)

DATE RECEIVED : 05/09/2019
DATE REPORTED : 05/14/2019

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	Summa 000146 R-3			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	190707-118353				
Date Sampled	05/09/2019				
Date Analyzed	05/14/2019				
Can Dilution Factor	1.58				
	Result	Qualifier	Analysis DF		
Chlorodifluoromethane	<SRL	U	2000	1585	0.5
Propene	<SRL	U	2000	3170	1.0
Dichlorodifluoromethane	<SRL	U	2000	1585	0.5
Chloromethane	<SRL	U	2000	1585	0.5
Dichlorotetrafluoroethane	<SRL	U	2000	1585	0.5
Vinyl Chloride	<SRL	U	2000	1585	0.5
Methanol	208000		2000	15848	5.0
1,3-Butadiene	<SRL	U	2000	1585	0.5
Bromomethane	<SRL	U	2000	1585	0.5
Chloroethane	<SRL	U	2000	1585	0.5
Dichlorofluoromethane	<SRL	U	2000	1585	0.5
Ethanol	<SRL	U	2000	6339	2.0
Vinyl Bromide	<SRL	U	2000	1585	0.5
Acetone	<SRL	U	2000	6339	2.0
Trichlorofluoromethane	<SRL	U	2000	1585	0.5
2-Propanol (IPA)	<SRL	U	2000	6339	2.0
Acrylonitrile	<SRL	U	2000	3170	1.0
1,1-Dichloroethene	<SRL	U	2000	1585	0.5
Methylene Chloride (DCM)	<SRL	U	2000	3170	1.0
Allyl Chloride	<SRL	U	2000	1585	0.5
Carbon Disulfide	<SRL	U	2000	1585	0.5
Trichlorotrifluoroethane	<SRL	U	2000	1585	0.5
trans-1,2-Dichloroethene	<SRL	U	2000	1585	0.5
1,1-Dichloroethane	<SRL	U	2000	1585	0.5
Methyl Tert Butyl Ether (MTBE)	<SRL	U	2000	1585	0.5
Vinyl Acetate	<SRL	U	2000	3170	1.0
2-Butanone (MEK)	<SRL	U	2000	3170	1.0
cis-1,2-Dichloroethene	<SRL	U	2000	1585	0.5
Hexane	12900		2000	1585	0.5
Chloroform	<SRL	U	2000	1585	0.5
Ethyl Acetate	<SRL	U	2000	1585	0.5
Tetrahydrofuran	<SRL	U	2000	1585	0.5
1,2-Dichloroethane	<SRL	U	2000	1585	0.5
1,1,1-Trichloroethane	<SRL	U	2000	1585	0.5

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT : AIRx Testing Inc.
PROJECT NO : 180707
MATRIX : AIR
UNITS : PPB (v/v)

DATE RECEIVED : 05/09/2019
DATE REPORTED : 05/14/2019

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	Summa 000146 R-3			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	190707-118353				
Date Sampled	05/09/2019				
Date Analyzed	05/14/2019				
Can Dilution Factor	1.58				
	Result	Qualifier	Analysis DF		
Benzene	3700		2000	1585	0.5
Carbon Tetrachloride	<SRL	U	2000	1585	0.5
Cyclohexane	4210		2000	1585	0.5
1,2-Dichloropropane	<SRL	U	2000	1585	0.5
Bromodichloromethane	<SRL	U	2000	1585	0.5
1,4-Dioxane	<SRL	U	2000	1585	0.5
Trichloroethene (TCE)	<SRL	U	2000	1585	0.5
2,2,4-Trimethylpentane	<SRL	U	2000	1585	0.5
Heptane	2480		2000	1585	0.5
cis-1,3-Dichloropropene	<SRL	U	2000	1585	0.5
4-Methyl-2-pentanone (MiBK)	<SRL	U	2000	1585	0.5
trans-1,3-Dichloropropene	<SRL	U	2000	1585	0.5
1,1,2-Trichloroethane	<SRL	U	2000	1585	0.5
Toluene	2070		2000	1585	0.5
2-Hexanone (MBK)	<SRL	U	2000	1585	0.5
Dibromochloromethane	<SRL	U	2000	1585	0.5
1,2-Dibromoethane	<SRL	U	2000	1585	0.5
Tetrachloroethene (PCE)	<SRL	U	2000	1585	0.5
Chlorobenzene	<SRL	U	2000	1585	0.5
Ethylbenzene	<SRL	U	2000	1585	0.5
m & p-Xylenes	<SRL	U	2000	3170	1.0
Bromoform	<SRL	U	2000	1585	0.5
Styrene	<SRL	U	2000	1585	0.5
1,1,2,2-Tetrachloroethane	<SRL	U	2000	1585	0.5
o-Xylene	<SRL	U	2000	1585	0.5
4-Ethyltoluene	<SRL	U	2000	1585	0.5
1,3,5-Trimethylbenzene	<SRL	U	2000	1585	0.5
1,2,4-Trimethylbenzene	<SRL	U	2000	1585	0.5
Benzyl Chloride (a-Chlorotoluene)	<SRL	U	2000	1585	0.5
1,3-Dichlorobenzene	<SRL	U	2000	1585	0.5
1,4-Dichlorobenzene	<SRL	U	2000	1585	0.5
1,2-Dichlorobenzene	<SRL	U	2000	1585	0.5
1,2,4-Trichlorobenzene	<SRL	U	2000	1585	0.5
Hexachlorobutadiene	<SRL	U	2000	1585	0.5
BFB-Surrogate Std. % Recovery	95%				70-130%

U - Compound was analyzed for, but was not detected at or above the SRL.

Sucha Parmar, PhD
Technical Director

ANALYSIS DATE : 05/14/2019
ANALYST : JJG
INSTRUMENT ID : GC/MS-02
CALIBRATION STD ID : PS041919-04

VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15

Continuing Calibration Verification of the 05/06/2019 Calibration

Compounds	Conc	Daily Conc	%REC*
4-BFB (surrogate standard)	10.00	9.98	100
Chlorodifluoromethane	10.80	10.32	96
Propene	11.00	10.24	93
Dichlorodifluoromethane	10.20	10.00	98
Chloromethane	10.60	10.36	98
Dichlorotetrafluoroethane	11.00	10.80	98
Vinyl Chloride	10.40	9.86	95
Methanol	22.50	20.41	91
1,3-Butadiene	10.90	10.39	95
Bromomethane	10.30	10.17	99
Chloroethane	10.10	11.87	118
Dichlorofluoromethane	10.80	10.89	101
Ethanol	11.00	10.33	94
Vinyl Bromide	10.70	11.04	103
Acetone	10.90	10.38	95
Trichlorofluoromethane	10.10	9.83	97
2-Propanol (IPA)	11.00	10.20	93
Acrylonitrile	11.50	11.34	99
1,1-Dichloroethene	10.70	10.70	100
Methylene Chloride (DCM)	10.60	10.64	100
Allyl Chloride	10.70	10.15	95
Carbon Disulfide	10.50	10.26	98
Trichlorotrifluoroethane	10.60	10.71	101
trans-1,2-Dichloroethene	10.30	10.39	101
1,1-Dichloroethane	10.50	10.38	99
Methyl Tert Butyl Ether (MTBE)	10.80	10.60	98
Vinyl Acetate	10.90	10.48	96
2-Butanone (MEK)	10.90	10.40	95
cis-1,2-Dichloroethene	10.90	11.15	102
Hexane	10.70	10.00	93
Chloroform	10.90	10.69	98
Ethyl Acetate	10.90	10.23	94
Tetrahydrofuran	10.20	9.70	95
1,2-Dichloroethane	10.80	10.57	98
1,1,1-Trichloroethane	10.80	10.48	97

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ANALYSIS DATE : 05/14/2019
ANALYST : JJG
INSTRUMENT ID : GC/MS-02
CALIBRATION STD ID : PS041919-04

VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15
Continuing Calibration Verification of the 05/06/2019 Calibration

Compounds	Conc	Daily Conc	%REC*
Benzene	10.90	10.47	96
Carbon Tetrachloride	10.60	10.22	96
Cyclohexane	10.90	10.44	96
1,2-Dichloropropane	10.80	10.55	98
Bromodichloromethane	10.90	10.37	95
1,4-Dioxane	10.90	10.42	96
Trichloroethene (TCE)	10.90	10.67	98
2,2,4-Trimethylpentane	10.70	10.32	96
Heptane	10.80	10.51	97
cis-1,3-Dichloropropene	10.60	10.74	101
4-Methyl-2-pentanone (MiBK)	10.60	10.47	99
trans-1,3-Dichloropropene	10.20	10.01	98
1,1,2-Trichloroethane	10.90	10.65	98
Toluene	11.00	10.76	98
2-Hexanone (MBK)	10.80	10.40	96
Dibromochloromethane	10.30	10.16	99
1,2-Dibromoethane	10.90	10.59	97
Tetrachloroethene (PCE)	10.90	10.71	98
Chlorobenzene	11.00	11.31	103
Ethylbenzene	10.90	10.98	101
m & p-Xylenes	21.00	21.45	102
Bromoform	10.50	10.87	104
Styrene	10.80	11.17	103
1,1,2,2-Tetrachloroethane	10.70	10.75	100
o-Xylene	10.70	10.82	101
4-Ethyltoluene	10.30	10.73	104
1,3,5-Trimethylbenzene	10.40	10.94	105
1,2,4-Trimethylbenzene	10.40	10.93	105
Benzyl Chloride (a-Chlorotoluene)	9.70	10.31	106
1,3-Dichlorobenzene	10.10	10.55	104
1,4-Dichlorobenzene	10.20	10.65	104
1,2-Dichlorobenzene	10.20	10.54	103
1,2,4-Trichlorobenzene	9.70	10.23	105
Hexachlorobutadiene	10.00	10.87	109

* - %REC should be 70-130%

Sueha Parmar, PhD
Technical Director

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Quality Control/Quality Assurance Report

CLIENT ID	: Laboratory Control Spike	**DATE ANALYZED**	: 05/14/2019
AAC ID	: LCS/LCSD	**DATE REPORTED**	: 05/14/2019
MEDIA	: Air	**UNITS**	: ppbv

TO-15 Laboratory Control Spike Recovery

Compound	Sample Conc.	Spike Added	Spike Res	Dup Spike Res	Spike % Rec *	Spike Dup % Rec *	RPD** %
1,1-Dichloroethene	0.0	10.70	10.70	10.68	100	100	0.2
Methylene Chloride (DCM)	0.0	10.60	10.64	10.50	100	99	1.3
Benzene	0.0	10.90	10.47	10.71	96	98	2.3
Trichloroethene (TCE)	0.0	10.90	10.67	10.93	98	100	2.4
Toluene	0.0	11.00	10.76	10.87	98	99	1.0
Tetrachloroethene (PCE)	0.0	10.90	10.71	10.91	98	100	1.9
Chlorobenzene	0.0	11.00	11.31	11.41	103	104	0.9
Ethylbenzene	0.0	10.90	10.98	11.08	101	102	0.9
m & p-Xylenes	0.0	21.00	21.45	21.78	102	104	1.5
o-Xylene	0.0	10.70	10.82	10.73	101	100	0.8

* Must be 70-130%

** Must be < 25%

Sucha Parmar, PhD
Technical Director

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Method Blank Analysis Report

MATRIX	: AIR	ANALYSIS DATE	: 05/14/2019
UNITS	: ppbv	REPORT DATE	: 05/14/2019

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	Method Blank	RL
AAC ID	MB 051419	
Chlorodifluoromethane	<RL	0.5
Propene	<RL	1.0
Dichlorodifluoromethane	<RL	0.5
Chloromethane	<RL	0.5
Dichlorotetrafluoroethane	<RL	0.5
Vinyl Chloride	<RL	0.5
Methanol	<RL	5.0
1,3-Butadiene	<RL	0.5
Bromomethane	<RL	0.5
Chloroethane	<RL	0.5
Dichlorofluoromethane	<RL	0.5
Ethanol	<RL	2.0
Vinyl Bromide	<RL	0.5
Acetone	<RL	2.0
Trichlorofluoromethane	<RL	0.5
2-Propanol (IPA)	<RL	2.0
Acrylonitrile	<RL	1.0
1,1-Dichloroethene	<RL	0.5
Methylene Chloride (DCM)	<RL	1.0
Allyl Chloride	<RL	0.5
Carbon Disulfide	<RL	0.5
Trichlorotrifluoroethane	<RL	0.5
trans-1,2-Dichloroethene	<RL	0.5
1,1-Dichloroethane	<RL	0.5
Methyl Tert Butyl Ether (MTBE)	<RL	0.5
Vinyl Acetate	<RL	1.0
2-Butanone (MEK)	<RL	1.0
cis-1,2-Dichloroethene	<RL	0.5
Hexane	<RL	0.5
Chloroform	<RL	0.5
Ethyl Acetate	<RL	0.5
Tetrahydrofuran	<RL	0.5
1,2-Dichloroethane	<RL	0.5
1,1,1-Trichloroethane	<RL	0.5
Benzene	<RL	0.5
Carbon Tetrachloride	<RL	0.5
Cyclohexane	<RL	0.5
1,2-Dichloropropane	<RL	0.5
Bromodichloromethane	<RL	0.5
1,4-Dioxane	<RL	0.5
Trichloroethene (TCE)	<RL	0.5
2,2,4-Trimethylpentane	<RL	0.5
Heptane	<RL	0.5

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Method Blank Analysis Report

MATRIX	: AIR	ANALYSIS DATE	: 05/14/2019
UNITS	: ppbv	REPORT DATE	: 05/14/2019

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID / *AAC ID*	Method Blank MB 051419	RL
cis-1,3-Dichloropropene	<RL	0.5
4-Methyl-2-pentanone (MiBK)	<RL	0.5
trans-1,3-Dichloropropene	<RL	0.5
1,1,2-Trichloroethane	<RL	0.5
Toluene	<RL	0.5
2-Hexanone (MBK)	<RL	0.5
Dibromochloromethane	<RL	0.5
1,2-Dibromoethane	<RL	0.5
Tetrachloroethene (PCE)	<RL	0.5
Chlorobenzene	<RL	0.5
Ethylbenzene	<RL	0.5
m & p-Xylenes	<RL	1.0
Bromoform	<RL	0.5
Styrene	<RL	0.5
1,1,2,2-Tetrachloroethane	<RL	0.5
o-Xylene	<RL	0.5
4-Ethyltoluene	<RL	0.5
1,3,5-Trimethylbenzene	<RL	0.5
1,2,4-Trimethylbenzene	<RL	0.5
Benzyl Chloride (a-Chlorotoluene)	<RL	0.5
1,3-Dichlorobenzene	<RL	0.5
1,4-Dichlorobenzene	<RL	0.5
1,2-Dichlorobenzene	<RL	0.5
1,2,4-Trichlorobenzene	<RL	0.5
Hexachlorobutadiene	<RL	0.5
System Monitoring Compounds		
BFB-Surrogate Std. % Recovery	95%	--

RL - Reporting Limit

Sucha Parmar, PhD
Technical Director

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Quality Control/Quality Assurance Report

AAC ID	: 190707-118351	**DATE ANALYZED**	: 05/14/2019
MATRIX	: Air	**DATE REPORTED**	: 05/14/2019
		UNITS	: ppbv

TO-15 Duplicate Analysis

Compound	Sample Conc	Duplicate Conc	% RPD
Chlorodifluoromethane	<SRL	<SRL	0.0
Propene	<SRL	<SRL	0.0
Dichlorodifluoromethane	<SRL	<SRL	0.0
Chloromethane	<SRL	<SRL	0.0
Dichlorotetrafluoroethane	<SRL	<SRL	0.0
Vinyl Chloride	<SRL	<SRL	0.0
Methanol	173000	182000	5.1
1,3-Butadiene	<SRL	<SRL	0.0
Bromomethane	<SRL	<SRL	0.0
Chloroethane	<SRL	<SRL	0.0
Dichlorofluoromethane	<SRL	<SRL	0.0
Ethanol	<SRL	<SRL	0.0
Vinyl Bromide	<SRL	<SRL	0.0
Acetone	<SRL	<SRL	0.0
Trichlorofluoromethane	<SRL	<SRL	0.0
2-Propanol (IPA)	<SRL	<SRL	0.0
Acrylonitrile	<SRL	<SRL	0.0
1,1-Dichloroethene	<SRL	<SRL	0.0
Methylene Chloride (DCM)	<SRL	<SRL	0.0
Allyl Chloride	<SRL	<SRL	0.0
Carbon Disulfide	<SRL	<SRL	0.0
Trichlorotrifluoroethane	<SRL	<SRL	0.0
trans-1,2-Dichloroethene	<SRL	<SRL	0.0
1,1-Dichloroethane	<SRL	<SRL	0.0
Methyl Tert Butyl Ether (MTBE)	<SRL	<SRL	0.0
Vinyl Acetate	<SRL	<SRL	0.0
2-Butanone (MEK)	<SRL	<SRL	0.0
cis-1,2-Dichloroethene	<SRL	<SRL	0.0
Hexane	13200	13900	5.2
Chloroform	<SRL	<SRL	0.0
Ethyl Acetate	<SRL	<SRL	0.0
Tetrahydrofuran	<SRL	<SRL	0.0
1,2-Dichloroethane	<SRL	<SRL	0.0
1,1,1-Trichloroethane	<SRL	<SRL	0.0
Benzene	4810	5130	6.4
Carbon Tetrachloride	<SRL	<SRL	0.0

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Quality Control/Quality Assurance Report

AAC ID	**: 190707-118351**	**DATE ANALYZED**	**: 05/14/2019**
MATRIX	**: Air**	**DATE REPORTED**	**: 05/14/2019**
		UNITS	**: ppbv**

TO-15 Duplicate Analysis

Compound	Sample Conc	Duplicate Conc	% RPD
Cyclohexane	5550	5830	4.9
1,2-Dichloropropane	<SRL	<SRL	0.0
Bromodichloromethane	<SRL	<SRL	0.0
1,4-Dioxane	<SRL	<SRL	0.0
Trichloroethene (TCE)	<SRL	<SRL	0.0
2,2,4-Trimethylpentane	<SRL	<SRL	0.0
Heptane	4480	4970	10.4
cis-1,3-Dichloropropene	<SRL	<SRL	0.0
4-Methyl-2-pentanone (MiBK)	<SRL	<SRL	0.0
trans-1,3-Dichloropropene	<SRL	<SRL	0.0
1,1,2-Trichloroethane	<SRL	<SRL	0.0
Toluene	4680	5170	9.9
2-Hexanone (MBK)	<SRL	<SRL	0.0
Dibromochloromethane	<SRL	<SRL	0.0
1,2-Dibromoethane	<SRL	<SRL	0.0
Tetrachloroethene (PCE)	<SRL	<SRL	0.0
Chlorobenzene	<SRL	<SRL	0.0
Ethylbenzene	<SRL	<SRL	0.0
m & p-Xylenes	<SRL	<SRL	0.0
Bromoform	<SRL	<SRL	0.0
Styrene	<SRL	<SRL	0.0
1,1,2,2-Tetrachloroethane	<SRL	<SRL	0.0
o-Xylene	<SRL	<SRL	0.0
4-Ethyltoluene	<SRL	<SRL	0.0
1,3,5-Trimethylbenzene	<SRL	<SRL	0.0
1,2,4-Trimethylbenzene	<SRL	<SRL	0.0
Benzyl Chloride (a-Chlorotoluene)	<SRL	<SRL	0.0
1,3-Dichlorobenzene	<SRL	<SRL	0.0
1,4-Dichlorobenzene	<SRL	<SRL	0.0
1,2-Dichlorobenzene	<SRL	<SRL	0.0
1,2,4-Trichlorobenzene	<SRL	<SRL	0.0
Hexachlorobutadiene	<SRL	<SRL	0.0
System Monitoring Compounds			
BFB-Surrogate Std. % Recovery	96%	96%	0.1

SRL - Sample Reporting Limit

Sucha Parmar, PhD
Technical Director

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AIRx Testing

CHAIN OF CUSTODY

190707

INVOICE TO: SAME
RENAISSANCE PETROLEUM

ATTN:

REPORT TO: PO#

AIRx Testing
2472 Eastman Avenue, Unit 34
Ventura, CA 93003
(805) 644-1099 Fax (805) 644-2672

Contact:

LAB # 219-040 PROJECT Name: RENAISSANCE Petroleum

Samplers: (Signature)

Rush: 24hr. Normal: 10 Day

Sample Method:

Return or Dispose

Sample No.	Sample Date	Sample Time	Comp	Grab	Sample Description	Volume (g) (ml)	Fuel (ng) (oil)	ANALYSIS EPA TO-15	REMARKS
1	5-9-19		X		Summa 000135 K-1	6L		X	118351
2	"		X		Summa 000075 K-2	6L		X	118352
3	"		X		Summa 000146 K-3	6L		X	118353

Relinquished by:

Date: 5.9.19 Time 09:48

Received by:

Date: Time

Relinquished by:

Date: Time:

Received by: Rudy

Date: 5/9/19 Time 0948

3x cans + 3x flows

dropoff