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**Lone Star Legal Aid
Equitable Development Initiative**

January 29, 2021

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Ms. Bridget C. Bohac,
Chief Clerk, MC 105
Texas Commission on Environmental Quality
PO Box 13087
Austin TX 78711-3087

Re: Public Comments Submitted on Behalf of Impact and Anna Ortiz Regarding Draft Renewal Permit/Compliance Plan 50343/ISWR No. 31547 and Notice of Passive Soil Gas Survey Funded by the City of Houston Health Department that Establishes Exposure Pathway

Lone Star Legal Aid (“Lone Star”) submits these comments on behalf of 5th Ward Impact Community Action (“Impact”) and Anna Ortiz (together, “Commenters”) regarding Union Pacific’s Draft Renewal/Compliance Plan 50343/ISWR No. 31547. The Union Pacific Railroad Company (“Union Pacific”) has applied to the Texas Commission on Environmental Quality (“TCEQ”) for a permit renewal with a major amendment to authorize the continuation of terms and conditions of the Permit and to submit the Response Action Plan (“RAP”) to address the facility-wide soil and groundwater contamination. Union Pacific owns the Houston Wood Preserving Works Facility (“the Site”) located at 4910 Liberty Road, Houston, Harris County, Texas 77026.

Commenters and Lone Star Legal Aid put the TCEQ on notice of the passive soil gas survey (“the survey”) recently completed by Beacon, Inc., contractor for the City of Houston, and the vapor exposure pathway to the surface that has been established by the testing. A total of three chemicals or *class of chemicals* that are on Beacon’s target compound list were detected in reportable limits: toluene, p-isopropyl toluene, and Total Petroleum Hydrocarbons (both TPH C4-C9 and TPH C10-C15). Additionally, twenty-two other chemicals known to be associated with creosote and compared to the National Institute of Science and Technology (“NIST”) database were documented as being present across the survey site as well.

Impact and Ms. Ortiz find this unacceptable and wish to draw the TCEQ's attention to Union Pacific's repeated representations in the past which have stated there is no vapor exposure pathway or risk. They also wish to make the following statements about the Survey:

1. A vapor exposure pathway, however small, has been established.
2. The results indicate that residents in the survey area are not currently exposed to a health risk. Nevertheless, the data must be further analyzed to ensure that this is true.
3. It is impossible to measure what vapor exposure might have been in the past. More than likely, it was higher.
4. Impact and Mrs. Ortiz request more action from both the TCEQ and UP, the specifics of which are mentioned at the end of these comments.

The City of Houston Health Department volunteered to fund the survey at the behest of Commenters and the wider community whose residents live above the creosote/DNAPL plume. The TCEQ took notice of the need to conduct this kind of testing as early as 2004 and even stated, "recent evidence suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate guidance and scale of demonstration necessary to be reasonably certain that indoor air in structures located above and adjacent to groundwater with volatile contaminants does present unacceptable risks."¹ Despite this early warning, neither Union Pacific Railroad nor the TCEQ followed up on this possible exposure pathway. Impact and Mrs. Ortiz first signaled the need for vapor testing in their public comments submitted in December of 2018. Both were glad to see that the TCEQ agreed with their assessment with the TCEQ having stated in its 4th Notice of Deficiency ("NOD No. 4") "Evaluation of Vapor Intrusion (VI) is needed".

Description of Beacon's Methodology:

The Beacon method utilizes thermal de-sorption gas chromatography mass/spectrometry instrumentation according to U.S. EPA method 8260C. The collectors are installed for two weeks and thus collect vapors over that two week period. Known as a passive soil gas survey, Beacon's method is capable of detecting several compounds on its Target Compound List (see Exhibit 1). For each of these there is a reporting limit that serves as a baseline above which results meet laboratory determined limits of precision and accuracy. Field sample measurements above the upper calibration standard are estimates; however those values are reported without any qualification as all reported measurements are relative to one another and are appropriate to meet the survey objectives *of locating source areas and vapor intrusion pathways as well as determining the lateral extent of the contamination.*

Beacon routinely does these sorts of surveys where the source material is creosote. Therefore, they are able to focus on those constituents that make up creosote. It should be note that Union Pacific's limited soil gas surveys focus on gasoline constituents and were taken over a short period of time. In reality, the concentration likely varies over time, depending on temperature and pressure. Therefore, Union Pacific's testing was not an appropriate way to measure for vapors.

¹ Documentation of Environmental Indicator Determination, Current Human Exposures Under Control, Interim Final 2/5/1999, signed by the Agency July 29, 2004.

Description of the Survey:

The City of Houston worked closely alongside Impact and residents nearest the offsite DNAPL/creosote plume to select the locations for the samplers all of which were placed *outside* structures. Therefore, the results do not represent possible *indoor* exposure. The survey area is the residential area offsite from Union Pacific's property that roughly overlays the creosote/DNAPL contamination plume and is bordered by Liberty Road to the South, Solo Street to the West, Lucille Street to the north and East Lockwood Drive to the east (See Figure 1 below). The survey was completed in November of 2020. A total of thirty eight samplers were placed in the community. Fourteen private properties were selected for the sampling, with two samplers being placed on each of the private properties, for a total of twenty eight samplers placed on private property. The remaining samplers were placed on city rights of way. Each of the samplers was assigned a unique sample number to protect the confidentiality of the property owners.

Samples SG 301 through SG 328 correspond to those samplers placed on private properties. For this range of samplers, odd number samplers were placed on the same property as the subsequent even numbered sample. For example, SG 301 and SG 302 were placed on the same property as one another and were the only samplers placed on that property. SG 303 and SG 304 were each placed on the same property and were similarly the only two samplers placed on that property, and so on, and so on. It should be noted that samplers 309 and 310 were removed shortly after installation as they had initially been placed on the wrong property. Also, on the day that the samplers were collected, it was discovered that SG 304 was missing and it is presumed that it had been tampered with/removed. Therefore, the Beacon report contains the results for twenty-five samplers placed on private properties and the remaining samplers placed on public rights of way.

Detail of Findings:

For each of the samplers Beacon's report presents the data can be understood in two parts: 1.) An analytical finding and 2.) A TIC Summary Report.

First, the analytical findings report information for the more than thirty five chemicals or types of chemicals that can be measured by the Beacon methodology (those on the target list). For those chemicals that are detected in an amount greater than the reporting limit the result is presented as a mass in nanograms (ng). On the attachment document, "Certificate of Analysis: Kashmere Gardens, Houston, Texas" (see Exhibit 2) Beacon has supplied the results of the samplers for which there were reportable amounts of a contaminant. As can be seen, twelve samplers showed reportable amounts of Toluene, ranging from 26 to 332 ng. Of those twelve samplers, seven were placed on private properties (SG 302, 312, 313, 315, 322, 323 and 324). One sampler showed TPH C4-C9 at 5790 ng (SG 312 on private property) and another sampler showed TPH C10-C15 at 5120 ng (SG 322 on private property). Finally, one sampler showed p-isopropyl toluene at a level of 60 ng (SG 307 on private property).

At the end of the report a color isopleth map shows the estimated extent of toluene via interpolation of data between all sample locations. The Map is also provided below. As can be seen, it is estimated that there are certain amounts of toluene that might be detected across several discrete locations of the survey area. While this may show extrapolated data, only further investigation can verify whether or not this is happening, in what amounts, and with more specificity as to exact location.

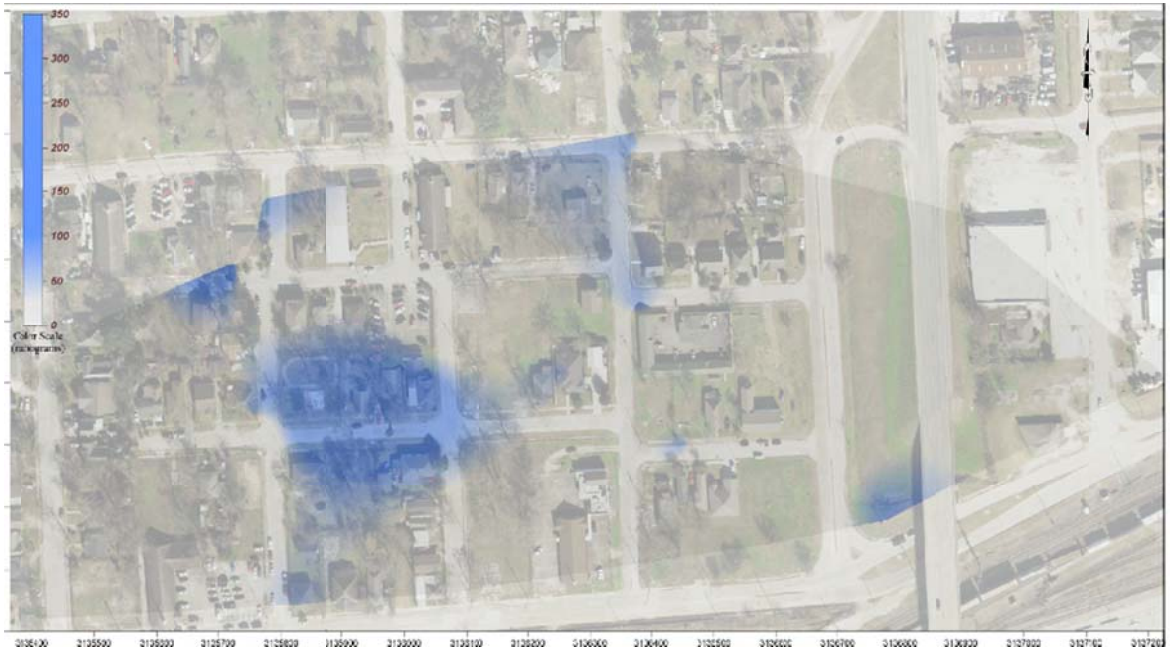


Figure 1 Isopleth Map Depicting Interpolated Extent of Toluene

The report also supplied a TIC Summary Report for each of the samplers taken. A typical TIC report like the one below shows a graphic, often with several “tics” or “peaks” that correspond to a particular chemical compound that is then listed just below the graphic. A total of 22 different chemical compounds were detected across the various TIC reports associated with the survey. Many if not all are chemicals that are known to be components of creosote.

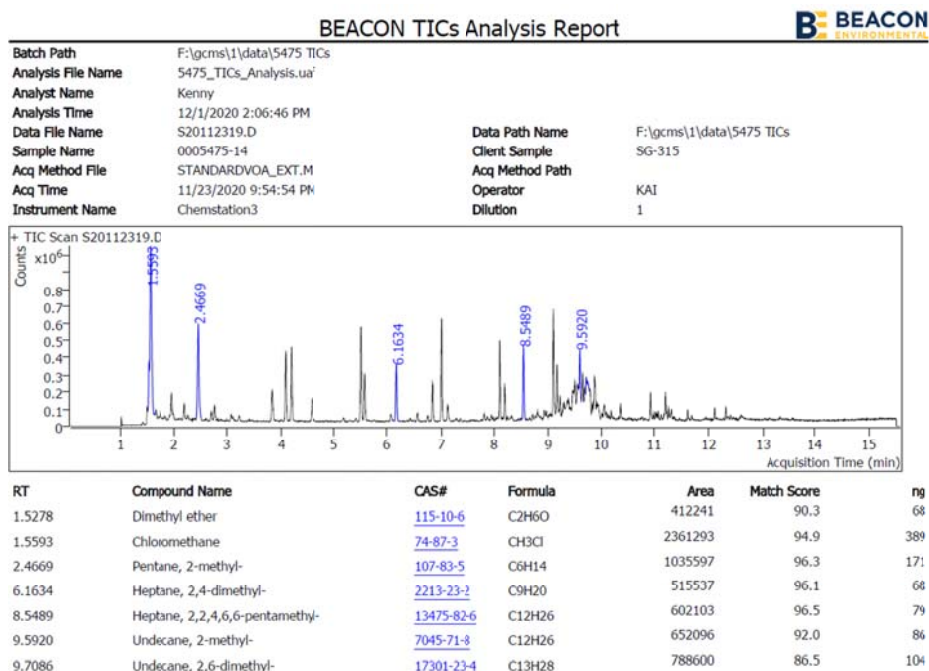


Figure 2 TIC Analysis Report for SG 315

The TIC report is helpful in understanding not only the presence of compounds but also the amount detected of that particular compound. The TIC report lists a match score for that compound as well as a mass, expressed in nanograms. Beacon is confident that any compound listed on a TIC report was present while the match score indicates the confidence in the amount that is reported. For example, in Figure 2 above, 2-methyl-Pentane was reported as having a mass of 171 ng and an associated match score of 96.3 which indicates that the reported mass reported is highly accurate. Please see Exhibit 3 for all of the TIC reports associated with SG 301 through SG 328, the samplers placed on private properties for the Survey. TIC reports for the remaining samplers, those placed on City Rights of Way, are available upon request.

For both the analytical results and the TIC analysis, the TCEQ and UP must bear the following in mind: The volatility of these constituents is such that had this testing been done back in 2004 as first suggested by the TCEQ then results would have likely been much higher. These chemicals originate at the DNAPL/creosote plume. They vaporize off the plume and migrate to the surface and have been doing so for as long as the plume has been migrating. November of 2020, when Beacon conducted its

study, is the tail end of the vaporization process. The amount detected at the surface would have been greater at any time during the past. What is more, these chemicals are not biodegrading and not expected to biodegrade. The rate of volatilization is unique to each chemical and is governed by Henry's Law. Henry's Law takes into account the importance of pressure and temperature in determining the rate of volatilization. Only further study and documentation will allow TCEQ and the community to have a better sense of these exposure pathways.

Request for Further Action from Both the TCEQ and UP

An August 31, 2020 letter from UPRR to TCEQ states that it is open to working with the community. Yet it also states that there has never "been an exposure identified." The results of Beacon's Survey reveal that despite Union Pacific's representations to the contrary, there is currently an exposure pathway to the surface for multiple chemicals. Many of the chemicals detected do not have EPA exposure levels associated with them.

Impact and Mrs. Ortiz demand that Union Pacific take immediate action to address the vapors detected across the residential neighborhood during the survey. Impact, Mrs. Ortiz, and their community want to see the results of the survey overlaid on future maps that Union Pacific produces in the context of this RAP. TCEQ should have Union Pacific repeat the testing since the exposure pathways continue to exist. Vaporization of the chemicals documented in the survey is influenced by factors such as temperature and atmospheric pressure. Stated another way, different conditions could lead to results different than the ones documented in this survey. Nevertheless, the survey confirms that the exposure pathway is active now and was active in the past. The fact that these exposure pathways exist more than 30 years after the creosoting operations ceased indicates that there must have been much higher rates of exposure to these chemicals in the past.

Impact and Mrs. Ortiz also welcome discussions with Union Pacific on specific actions that can be taken to ensure that residents are involved in the solution to address these findings. If you have any questions or concerns regarding these comments, please contact 5th Ward Impact Community Action and Mrs. Ortiz through their counsel at the information below.

/s/ Rodrigo G. Cantú

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Environmental Justice Team
Equitable Development Initiative
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LONE STAR LEGAL AID
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Houston, Texas 77001-0398

**ATTORNEYS FOR CARING FOR
5TH WARD IMPACT COMMUNITY ACTION AND ANNA
ORTIZ**

Beacon Project No. 4603
Target Compound List
Analysis by EPA Method 8260C

Standard Target Compounds

Vinyl Chloride
1,1-Dichloroethene
1,1,2-Trichlorotrifluoroethane (Freon 113)
trans-1,2-Dichloroethene
Methyl-t-butyl ether (MTBE)
1,1-Dichloroethane
cis-1,2-Dichloroethene
Chloroform
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon Tetrachloride
Benzene
Trichloroethene (TCE)
1,4-Dioxane
1,1,2-Trichloroethane
Toluene
1,2-Dibromoethane (EDB)
Tetrachloroethene (PCE)
1,1,1,2-Tetrachloroethane
Chlorobenzene
Ethylbenzene
p & m-Xylene
1,1,2,2-Tetrachloroethane

o-Xylene
1,2,3-Trichloropropane
Isopropylbenzene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1,2-Dichlorobenzene
1,2,4-Trichlorobenzene
Naphthalene
1,2,3-Trichlorobenzene
2-Methylnaphthalene

TPH C₄-C₉
TPH C₁₀-C₁₅

Additionally Targeted Compounds

Phenanthrene
Anthracene
Biphenyl
Acenaphthylene
Acenaphthene
Dibenzofuran
Fluorene

Note: All compounds on the standard list are included in Beacon's accreditation for NELAP, ISO/IEC 17025, and DoD ELAP, except 2-Methylnaphthalene and TPH. Results for compounds on the standards list will be based on a five-point calibration. Results for the additionally targeted compounds will be based on a one-point calibration.

The reporting quantitation level (RQL) for each compound is 10, 25 or 50 nanograms (ng) and the RQL for TPH is 5,000 ng; however, the demonstrated limit of quantitation (LOQ) is 10 ng for each compound on the standard list.

“BEACON — A PROVEN LEADER IN SOIL-GAS SURVEYS”

2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA phone: 1-410-838-8780 www.beacon-usa.com

EXHIBIT 2

Beacon Environmental

2203A Commerce Road, Suite 1

Forest Hill, MD 21050 USA

1.410.838.8780



CERTIFICATE OF ANALYSIS

Beacon Proposal No.: 200205H01

Beacon Project No.: 0005475

Project Description:

Project Site: Kashmere Gardens

Houston, TX

Prepared for:

Jeremy Rangel

City of Houston Health Department

8000 N. Stadium Drive, 2nd Floor

Houston, TX 77054

Ryan W. Schneider
Senior Project Manager

January 12, 2021

All data meet requirements as specified in the Beacon Environmental Services, Inc. Quality Assurance Project Plan and the results relate only to the samples reported. The work performed was in accordance with ISO/IEC 17025:2017 requirements, except TPH is not included in BEACON's scope of accreditation, and Acenaphthene, Acenaphthylene, Biphenyl, Dibenzofuran, Fluorene, m&p-Cresols, o-Cresol (2-Methylphenol), were targeted with a one-point calibration. This report shall not be reproduced, except in full, without written approval of the laboratory. Release of the data contained in this data package has been authorized by the Laboratory Director or his signee, as verified by the following signatures:

Steven C. Thornley
Laboratory Director

Peter B. Kelly
Interim Quality Manager

City of Houston Health Department 8000 N. Stadium Drive, 2nd Floor Houston, TX 77054	Project Site: Kashmere Gardens Project Location: Houston, TX Project Manager: Jeremy Rangel	Beacon Proposal: 200205H01 Beacon Project No.: 0005475 Reported: 01/12/2021
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Summary of Compound Detections- Mass

Lab Sample ID: 0005475-04	SG-302 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	53		25	S20112309.D

Lab Sample ID: 0005475-08	SG-307 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
p-Isopropyl toluene	99-87-6	60		25	S20112313.D

Lab Sample ID: 0005475-11	SG-312 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	51		25	S20112316.D
TPH C4-C9		5,790		5,000	S20112316.D

Lab Sample ID: 0005475-12	SG-313 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	34		25	S20112317.D

Lab Sample ID: 0005475-14	SG-315 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	54		25	S20112319.D

City of Houston Health Department 8000 N. Stadium Drive, 2nd Floor Houston, TX 77054	Project Site: Kashmere Gardens Project Location: Houston, TX Project Manager: Jeremy Rangel	Beacon Proposal: 200205H01 Beacon Project No.: 0005475 Reported: 01/12/2021
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Summary of Compound Detections- Mass

Lab Sample ID: 0005475-21	SG-322	Method: EPA 8260C
Soil Gas		

Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	275		25	S20112409.D
TPH C10-C15		5,120		5,000	S20112409.D

Lab Sample ID: 0005475-22	SG-323	Method: EPA 8260C
Soil Gas		

Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	54		25	S20112410.D

Lab Sample ID: 0005475-23	SG-324	Method: EPA 8260C
Soil Gas		

Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	26		25	S20112411.D

Lab Sample ID: 0005475-29	SG-330	Method: EPA 8260C
Soil Gas		

Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	53		25	S20112417.D

Lab Sample ID: 0005475-34	SG-337	Method: EPA 8260C
Soil Gas		

Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	270		25	S20112422.D

City of Houston Health Department 8000 N. Stadium Drive, 2nd Floor Houston, TX 77054	Project Site: Kashmere Gardens Project Location: Houston, TX Project Manager: Jeremy Rangel	Beacon Proposal: 200205H01 Beacon Project No.: 0005475 Reported: 01/12/2021
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Summary of Compound Detections- Mass

Lab Sample ID: 0005475-35	SG-338 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	332		25	S20112423.D

Lab Sample ID: 0005475-37	SG-340 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	35		25	S20112425.D

Lab Sample ID: 0005475-38	SG-341 Soil Gas	Method: EPA 8260C
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Analyte	CAS#	Result (ng)	Q	LOQ (ng)	File ID
Toluene	108-88-3	80		25	S20112426.D

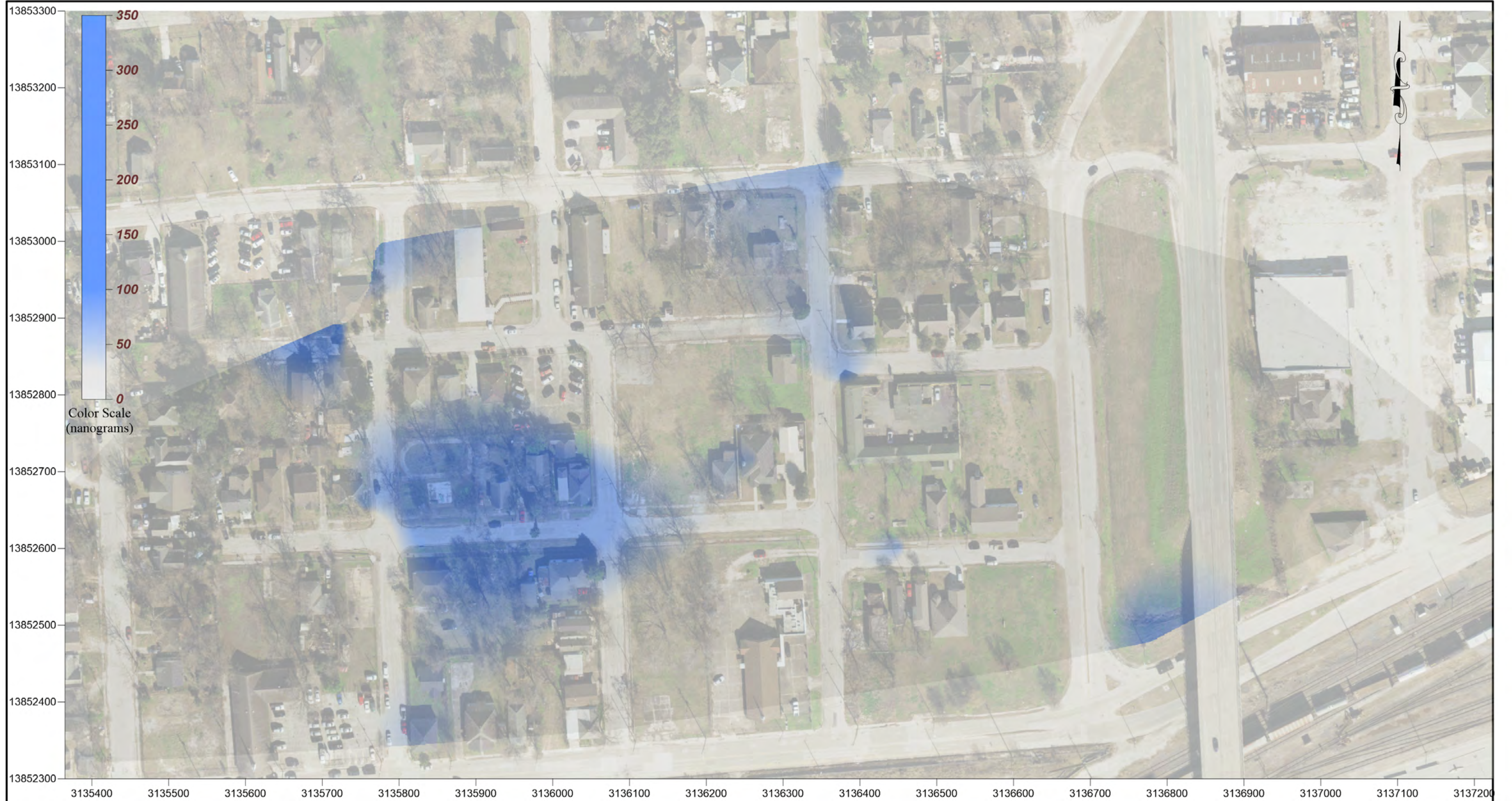
City of Houston Health Department 8000 N. Stadium Drive, 2nd Floor Houston, TX 77054	Project Site: Kashmere Gardens Project Location: Houston, TX Project Manager: Jeremy Rangel	Beacon Proposal: 200205H01 Beacon Project No.: 0005475 Reported: 01/12/2021
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Map Data Summary Table

The following table lists number of detections on field samples from the current survey, the reporting limit, and the maximum value for each mapped compound. The table also includes the transformation and interpolation method for the compound distribution maps provided.

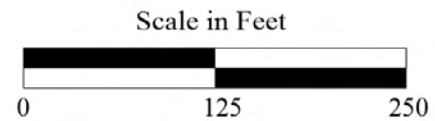
Figure No.	Compound	Number of Detections	LOQ (ng)	Max Value (ng)	Transformation Method	Interpolation Method
1	Toluene	12	25	332	Log	Kriging

EXHIBIT 2



BEACON
ENVIRONMENTAL
2203A Commerce Road, Suite 1, Forest Hill, MD 21050 USA
www.Beacon-USA.com 1-410-838-8780
Beacon Project No. 5475, December 2020

Note:
Color isopleth map shows interpolation
of data between all sample locations.



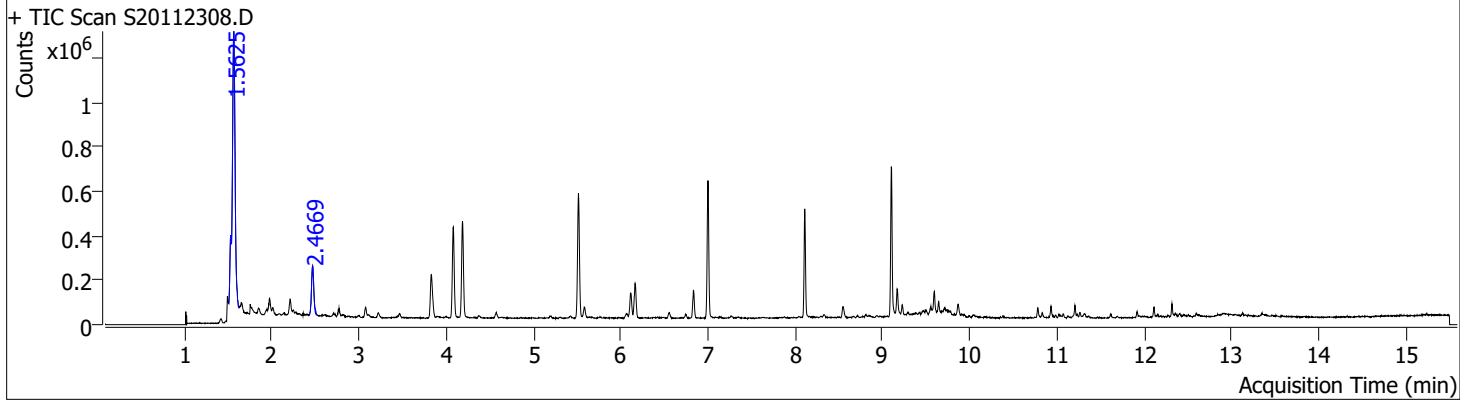
System: State Plane
Zone: Texas South Central 4204
Datum: NAD 1983
Coordinate Units: Feet

Figure 1
Passive Soil-Gas Survey
Toluene
Kashmere Gardens
Houston, TX

EXHIBIT 3
BEACON TICs Analysis Report

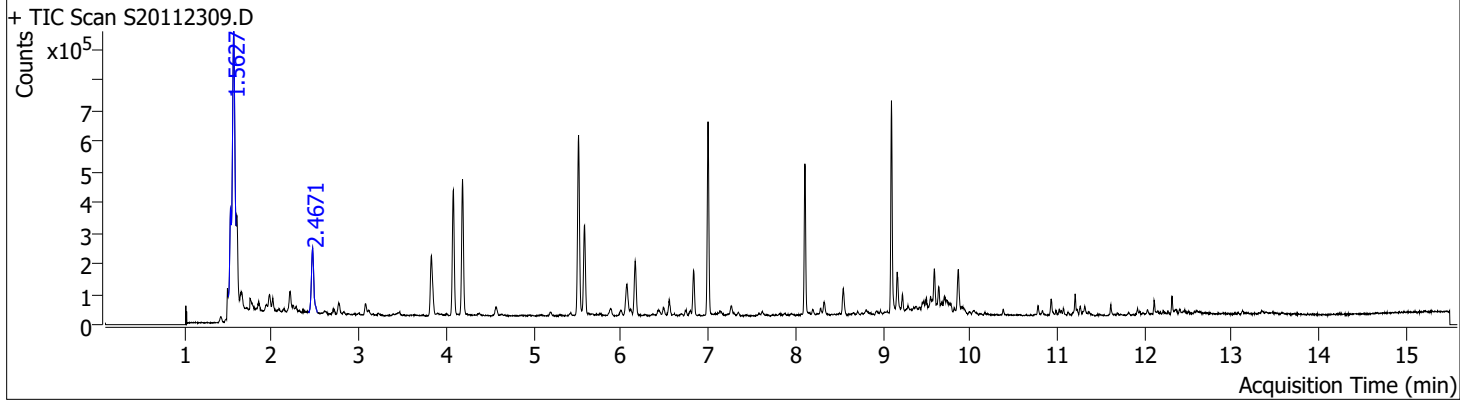


Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112308.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-03	Client Sample	SG-301
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 5:36:03 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



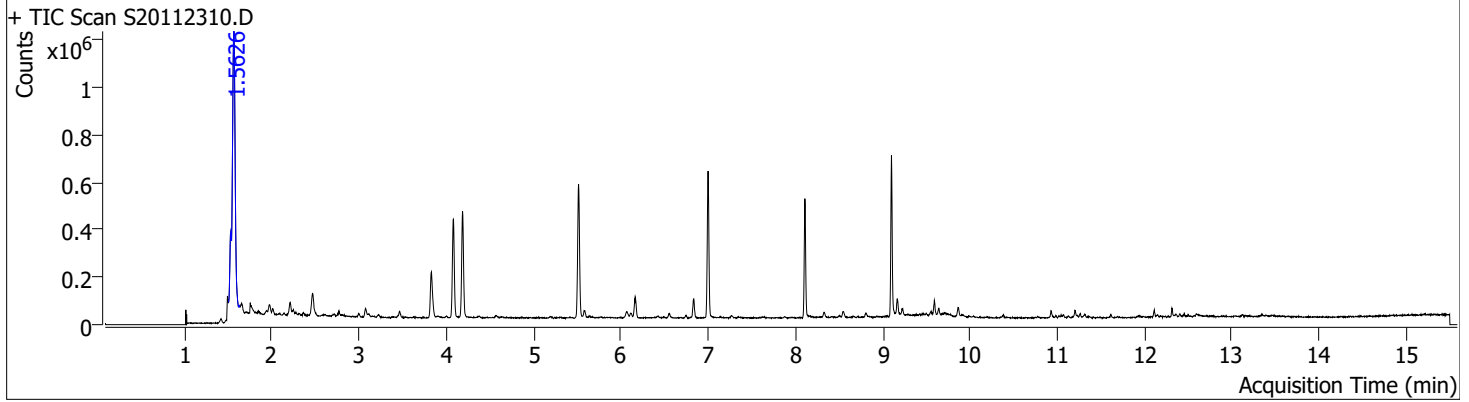
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5278	Dimethyl ether	115-10-6	C ₂ H ₆ O	450867	92.1	73
1.5625	Chloromethane	74-87-3	CH ₃ Cl	2824899	95.5	457
2.4669	Pentane, 2-methyl-	107-83-5	C ₆ H ₁₄	415675	92.9	67

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112309.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-04	Client Sample	SG-302
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 5:59:23 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



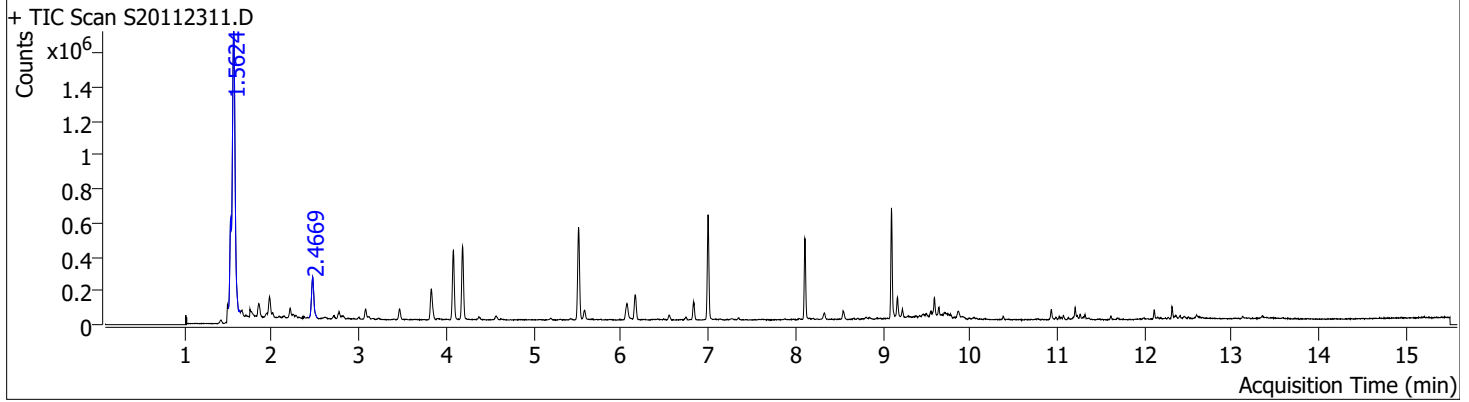
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5249	Dimethyl ether	115-10-6	C ₂ H ₆ O	479423	93.8	78
1.5627	Chloromethane	74-87-3	CH ₃ Cl	1976198	94.7	321
2.4671	Pentane, 2-methyl-	107-83-5	C ₆ H ₁₄	413732	92.3	67

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112310.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-05	Client Sample	SG-303
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Instrument Name	Chemstation3	Dilution	1



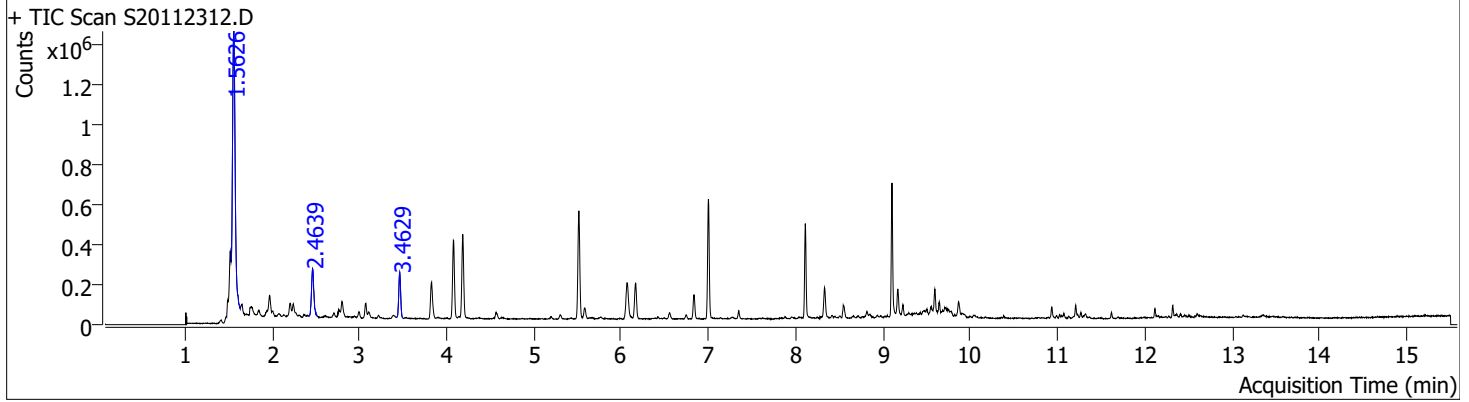
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5279	Dimethyl ether	115-10-6	C ₂ H ₆ O	532233	91.6	85
1.5626	Chloromethane	74-87-3	CH ₃ Cl	2660883	95.6	427

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-305
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112311.D	Dilution	1
Sample Name	0005475-06		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/23/2020 6:46:20 PM		
Instrument Name	Chemstation3		



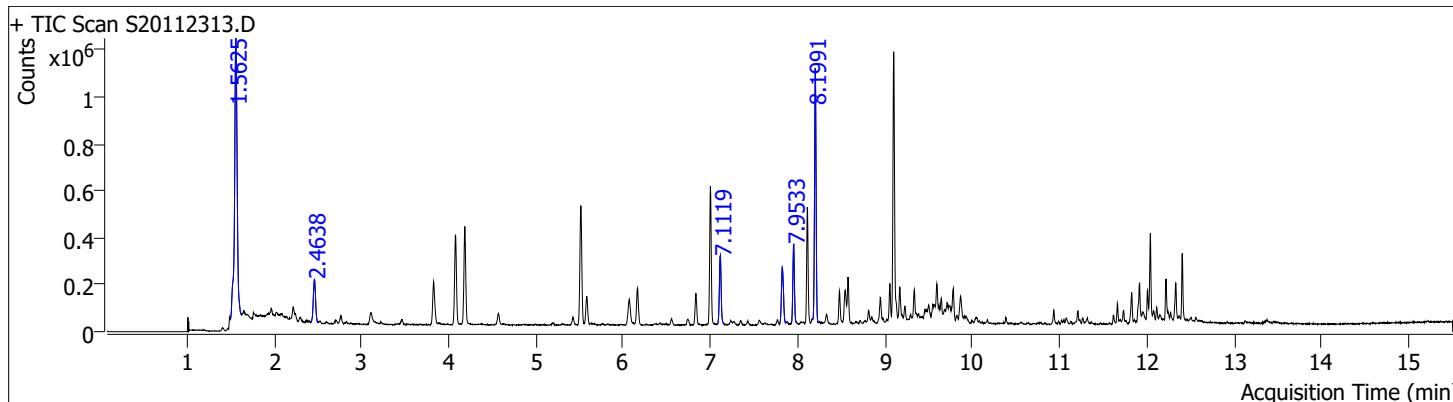
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5278	Dimethyl ether	115-10-6	C ₂ H ₆ O	720141	92.5	117
1.5624	Chloromethane	74-87-3	CH ₃ Cl	3844506	96.6	623
2.4669	Pentane, 2-methyl-	107-83-5	C ₆ H ₁₄	460037	93.4	75

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112312.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-07	Client Sample	SG-306
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 7:09:49 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



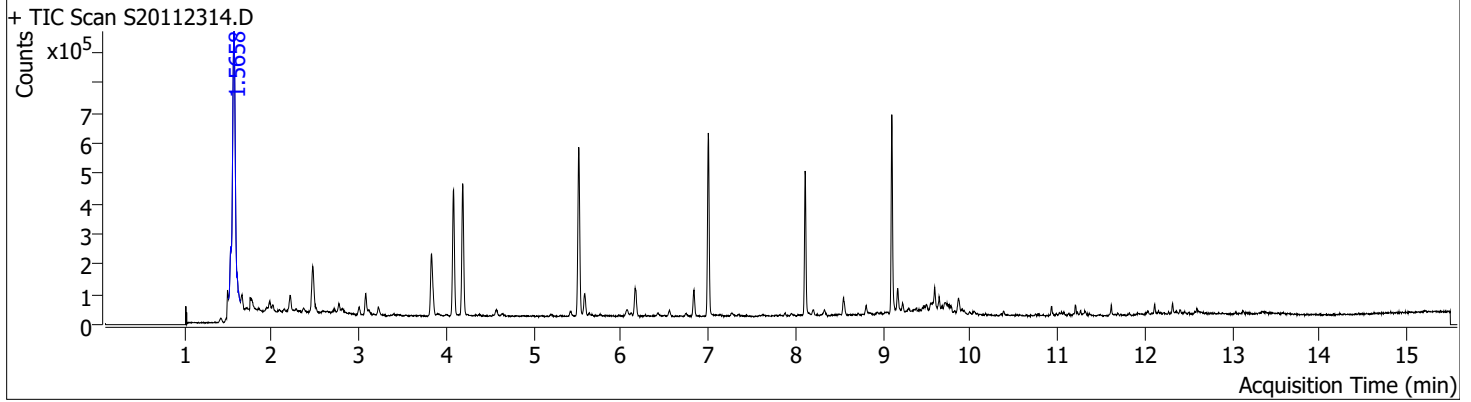
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5626	Chloromethane	74-87-3	CH3Cl	3365216	96.3	568
2.4639	Pentane, 2-methyl-	107-83-5	C6H14	463574	94.4	78
3.4629	Trichloromethane	67-66-3	CHCl3	353794	97.8	106

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-307
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112313.D	Dilution	1
Sample Name	0005475-08		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/23/2020 7:33:19 PM		
Instrument Name	Chemstation3		



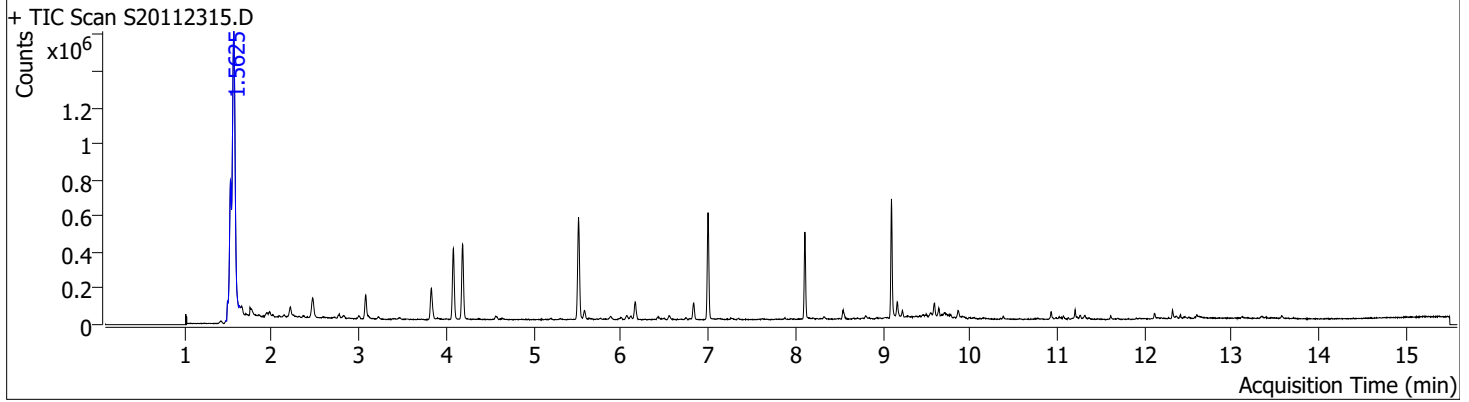
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5625	Chloromethane	74-87-3	CH3Cl	2668845	92.7	469
2.4638	Pentane, 2-methyl-	107-83-5	C6H14	328498	94.3	58
7.1119	1,5-Hexadiene, 2,5-dimethyl-3-methylene-	59131-13-4	C9H14	429559	95.2	57
7.8210	Tricyclo[2.2.1.0(2,6)]heptane, 1,7,7-trimethyl-	508-32-7	C10H16	412806	96.6	55
7.9533	3-Carene	13466-78-9	C10H16	425412	94.7	57
8.1991	Camphene	79-92-5	C10H16	1350904	97.4	180

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112314.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-09	Client Sample	SG-308
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 7:56:42 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



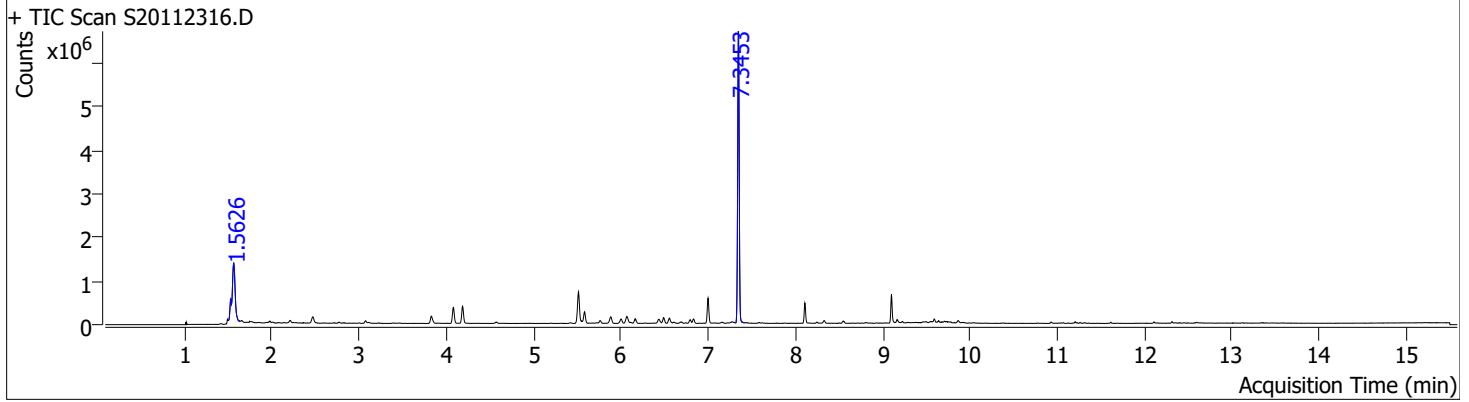
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5658	Chloromethane	74-87-3	CH3Cl	2526704	93.5	409

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112315.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-10	Client Sample	SG-311
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 8:20:15 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



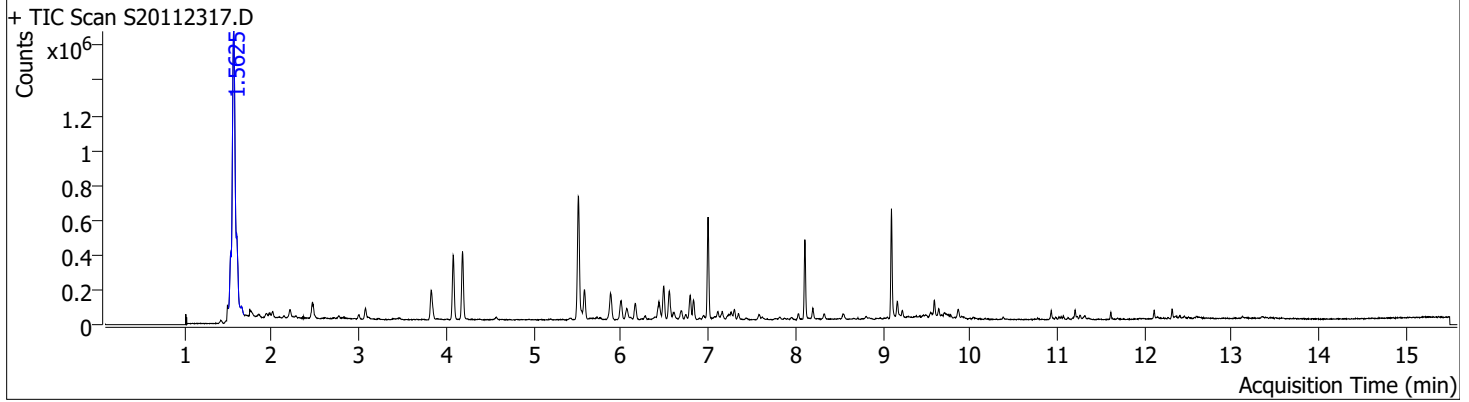
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5247	Formic acid	64-18-6	CH2O2	1286321	88.4	222
1.5625	Chloromethane	74-87-3	CH3Cl	3642653	96.5	628

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-312
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112316.D	Dilution	1
Sample Name	0005475-11		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/23/2020 8:44:36 PM		
Instrument Name	Chemstation3		



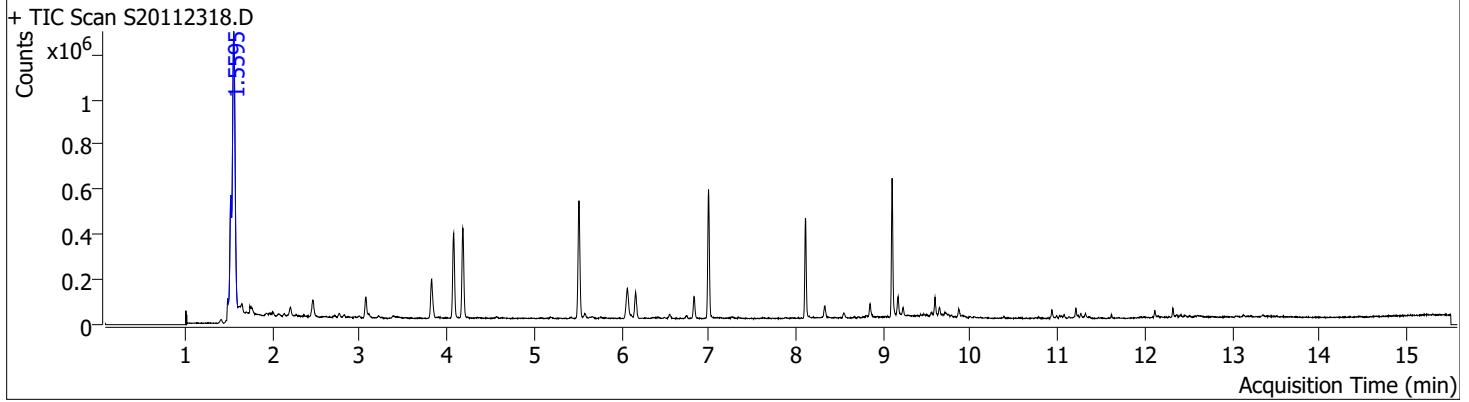
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5280	Dimethyl ether	115-10-6	C ₂ H ₆ O	722003	93.3	131
1.5626	Chloromethane	74-87-3	CH ₃ Cl	3090807	95.9	560
7.3453	Nonane	111-84-2	C ₉ H ₂₀	8226507	97.9	1,099

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112317.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-12	Client Sample	SG-313
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 9:08:02 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



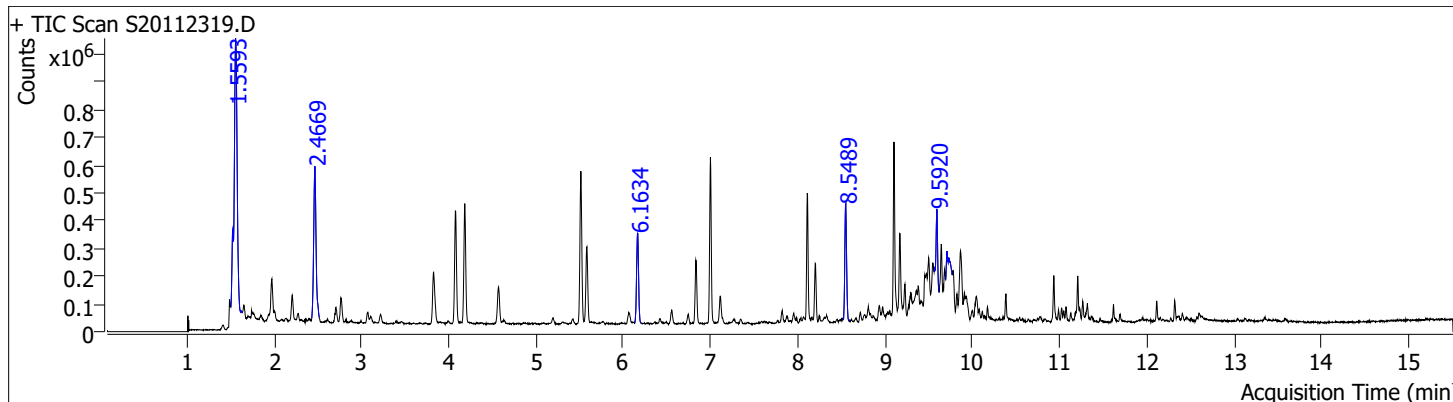
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5625	Chloromethane	74-87-3	CH3Cl	4855652	96.0	880

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112318.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-13	Client Sample	SG-314
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 9:31:26 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



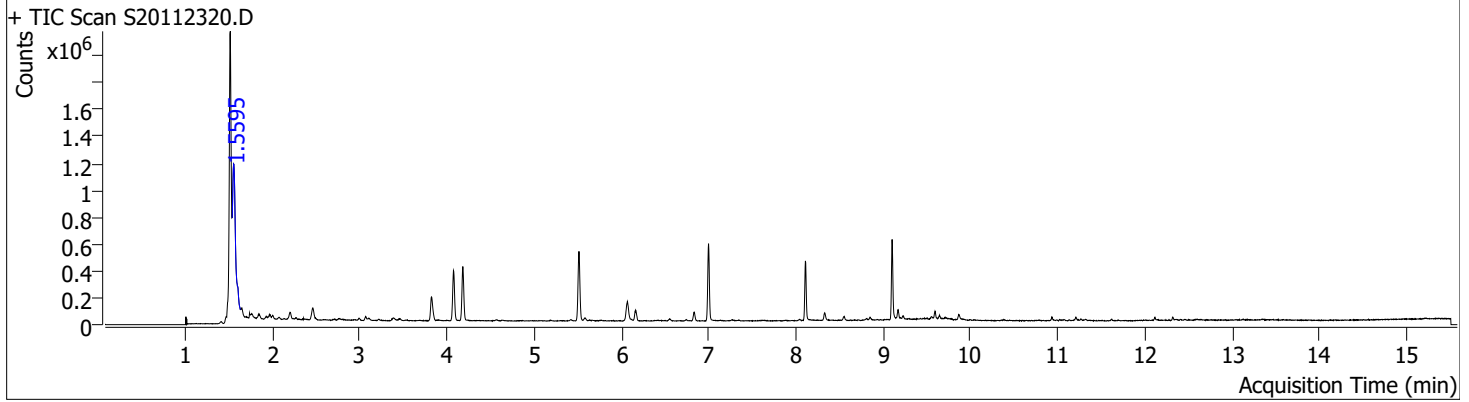
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5280	Formic acid	64-18-6	CH2O2	778255	92.6	137
1.5595	Chloromethane	74-87-3	CH3Cl	2676867	96.5	470

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112319.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-14	Client Sample	SG-315
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 9:54:54 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



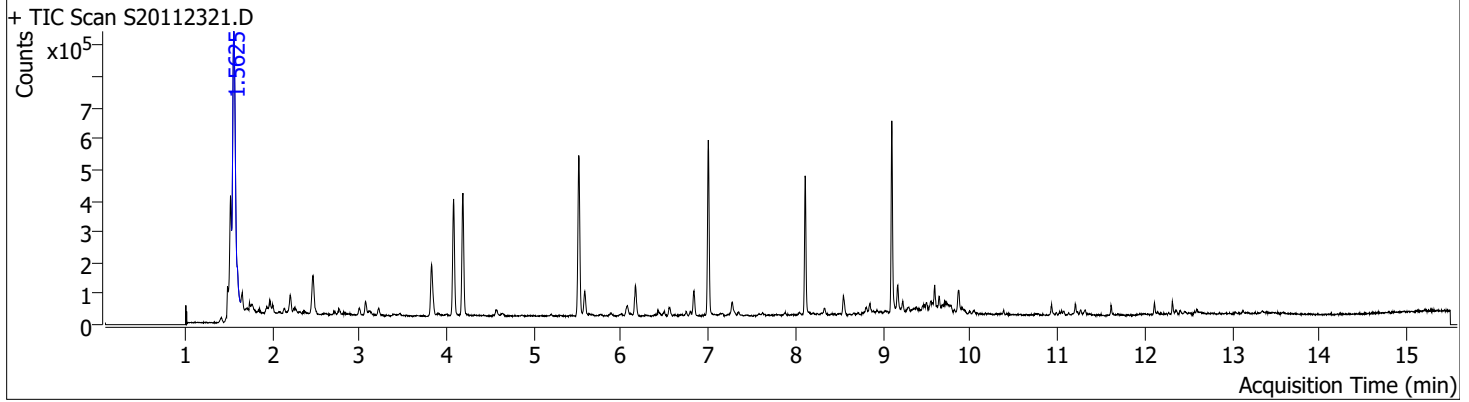
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5278	Dimethyl ether	115-10-6	C2H6O	412241	90.3	68
1.5593	Chloromethane	74-87-3	CH3Cl	2361293	94.9	389
2.4669	Pentane, 2-methyl-	107-83-5	C6H14	1035597	96.3	171
6.1634	Heptane, 2,4-dimethyl-	2213-23-2	C9H20	515537	96.1	68
8.5489	Heptane, 2,2,4,6,6-pentamethyl-	13475-82-6	C12H26	602103	96.5	79
9.5920	Undecane, 2-methyl-	7045-71-8	C12H26	652096	92.0	86
9.7086	Undecane, 2,6-dimethyl-	17301-23-4	C13H28	788600	86.5	104

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112320.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-15	Client Sample	SG-316
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 10:18:20 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5595	Chloromethane	74-87-3	CH3Cl	2876871	93.0	512

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112321.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-16	Client Sample	SG-317
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 10:41:49 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5625	Chloromethane	74-87-3	CH3Cl	2232503	95.2	400

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-318
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112322.D	Dilution	1
Sample Name	0005475-17		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/23/2020 11:05:14 PM		
Instrument Name	Chemstation3		

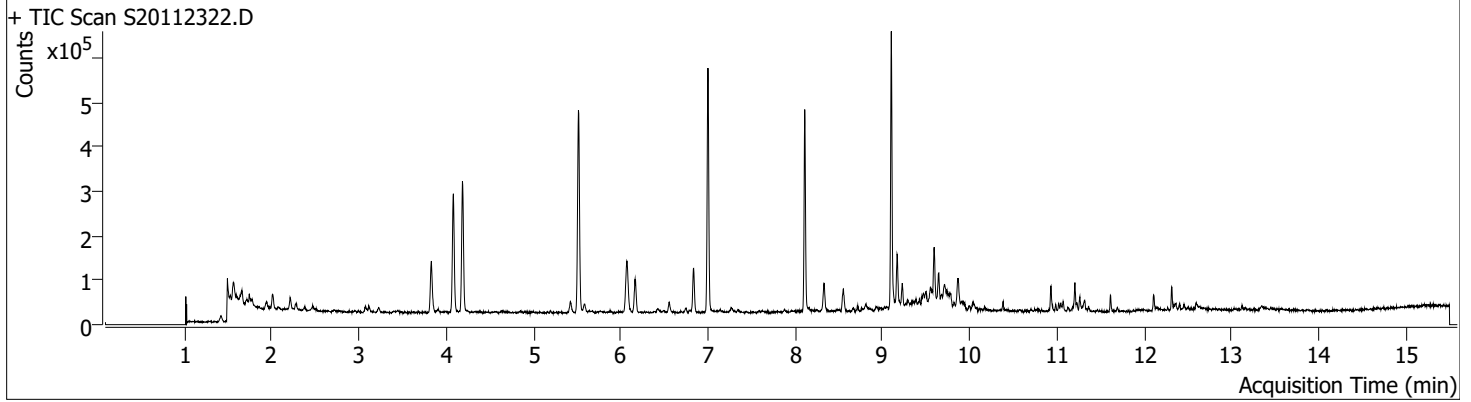
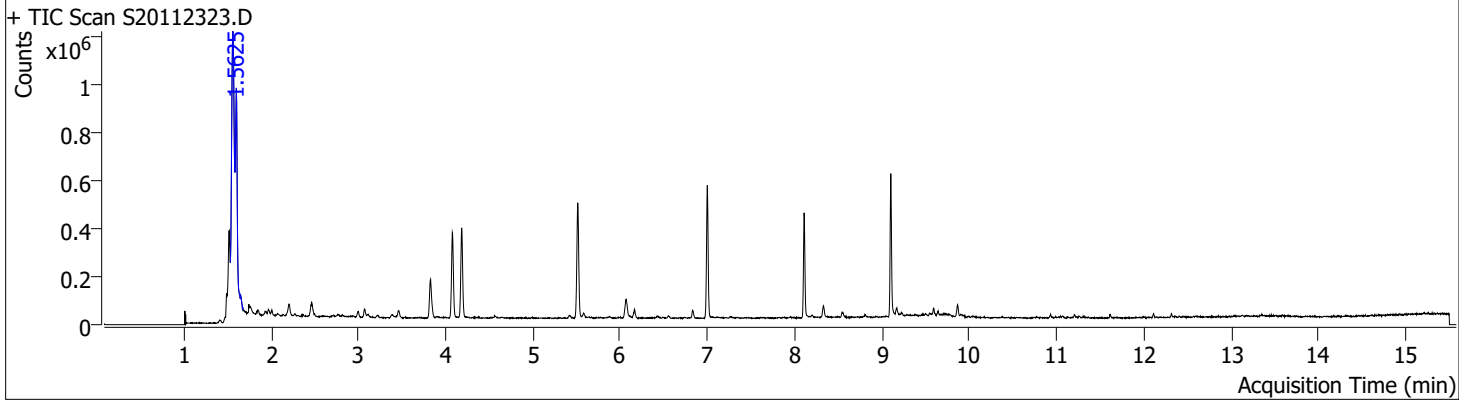


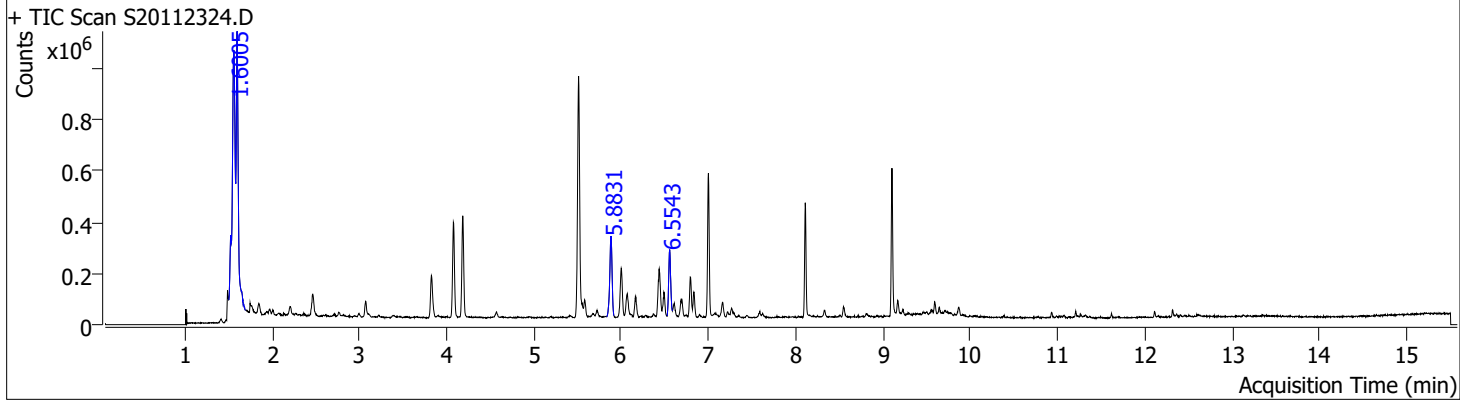
EXHIBIT 3

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-319
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112323.D	Dilution	1
Sample Name	0005475-18		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/23/2020 11:28:36 PM		
Instrument Name	Chemstation3		



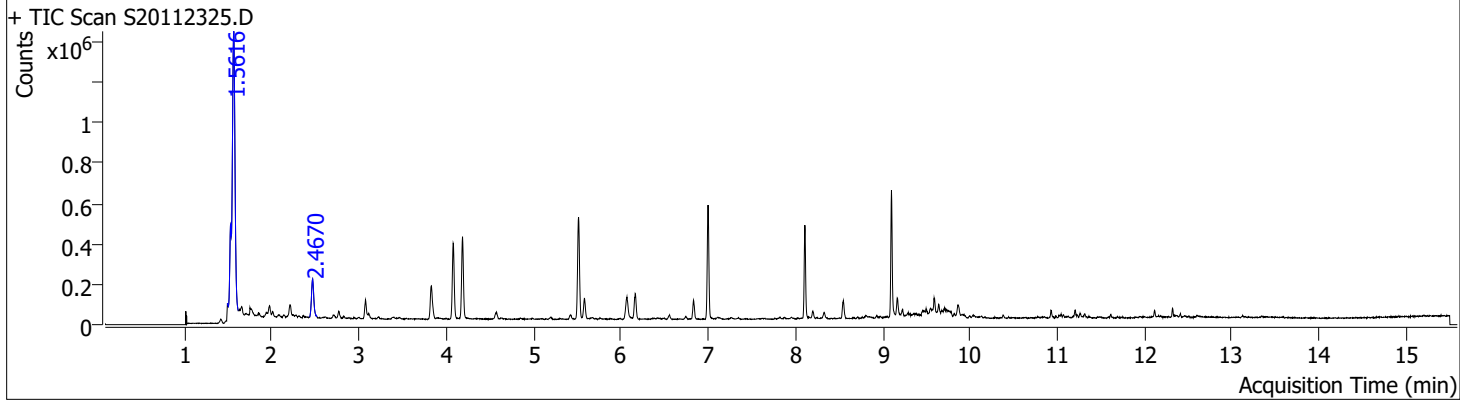
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5625	Chloromethane	74-87-3	CH ₃ Cl	2540917	95.8	484
1.6035	Butane	106-97-8	C ₄ H ₁₀	1583656	94.9	302

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112324.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-19	Client Sample	SG-320
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/23/2020 11:52:01 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5280	Dimethyl ether	115-10-6	C ₂ H ₆ O	418350	90.8	75
1.5627	Chloromethane	74-87-3	CH ₃ Cl	2216680	95.5	399
1.6005	Butane	106-97-8	C ₄ H ₁₀	1961979	94.2	353
5.8831	Cyclohexane, 1,4-dimethyl-, trans-	2207-04-7	C ₈ H ₁₆	584147	96.2	80
6.5543	Cyclohexane, 1,1,3-trimethyl-	3073-66-3	C ₉ H ₁₈	431453	94.2	59

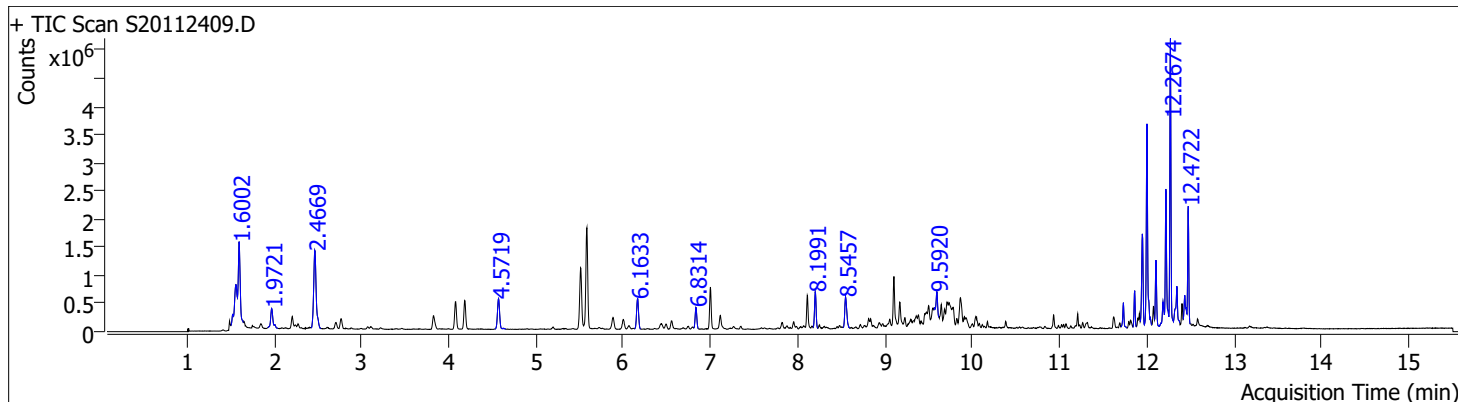
Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112325.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-20	Client Sample	SG-321
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/24/2020 12:15:18 AM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5279	Formic acid	64-18-6	CH2O2	593048	91.4	106
1.5616	Chloromethane	74-87-3	CH3Cl	2925061	96.3	524
2.4670	Pentane, 2-methyl-	107-83-5	C6H14	358417	91.5	64

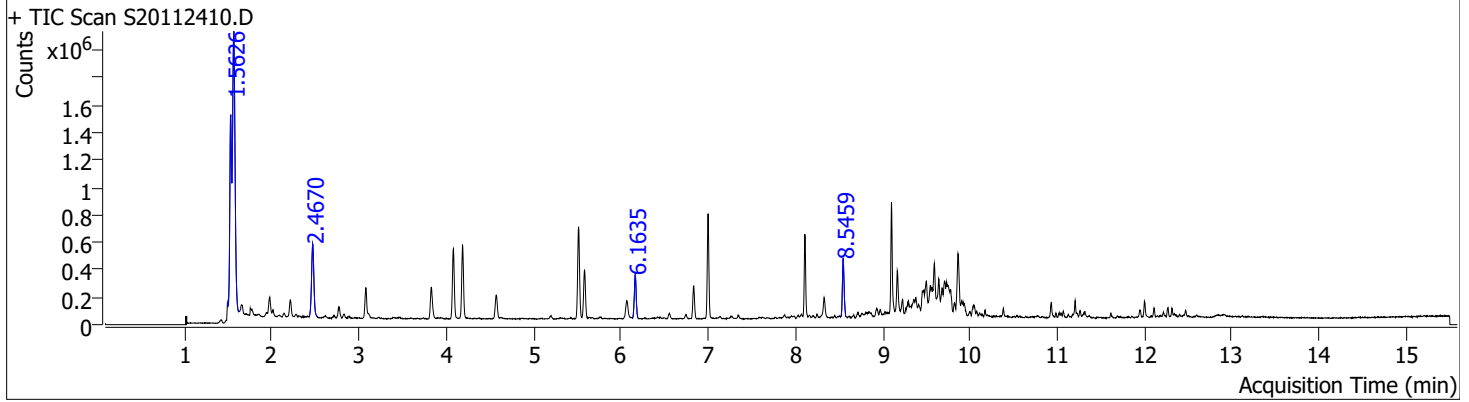
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 Analysis File Name 5475_TICs_Analysis.uaf
 Analyst Name Kenny
 Analysis Time 12/1/2020 2:06:46 PM
 Data File Name S20112409.D
 Sample Name 0005475-21
 Acq Method File STANDARDVOA_EXT.M
 Acq Time 11/24/2020 2:29:04 PM
 Instrument Name Chemstation3

Data Path Name F:\gcms\1\data\5475 TICs
 Client Sample SG-322
 Acq Method Path
 Operator KAI
 Dilution 1



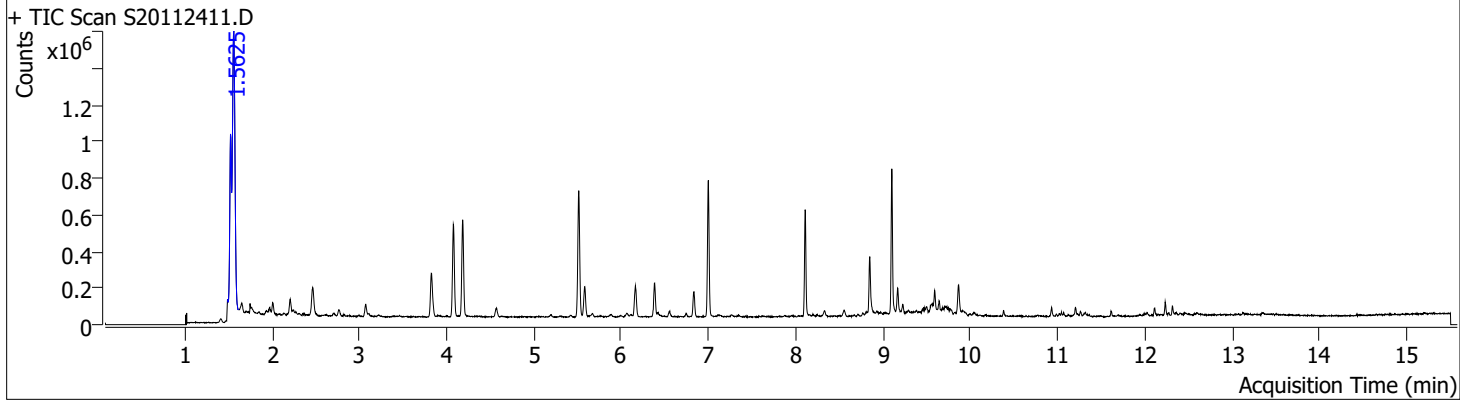
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5278	Dimethyl ether	115-10-6	C2H6O	411729	90.5	56
1.5624	Chloromethane	74-87-3	CH3Cl	1662447	92.2	225
1.6002	Butane	106-97-8	C4H10	2619630	94.0	355
1.9721	Pentane	109-66-0	C5H12	679177	95.2	92
2.4669	Pentane, 2-methyl-	107-83-5	C6H14	2813141	96.9	381
4.5719	Cyclohexane, methyl-	108-87-2	C7H14	959176	96.1	130
6.1633	Heptane, 2,4-dimethyl-	2213-23-2	C9H20	854331	96.1	91
6.8314	Octane, 4-methyl-	2216-34-4	C9H20	524057	94.0	56
8.1991	Camphene	79-92-5	C10H16	837442	96.9	90
8.5457	Heptane, 2,2,4,6,6-pentamethyl-	13475-82-6	C12H26	920223	95.5	98
9.5920	Undecane, 5-methyl-	1632-70-8	C12H26	787009	89.5	84
11.7285	3-Isopropyl-6,8a-dimethyl-1,2,4,5,8,8a-hexahydroazulene	16661-00-0	C15H24	477735	90.3	51
11.8577	1,4-Methano-1H-indene, octahydro-4-methyl-8-methylene-7-(1-methylethyl)-, [1S-(1.alpha.,3a.beta.,4.alpha.,7.alpha.,7a.beta.)]-	3650-28-0	C15H24	614825	96.7	66
11.9460	.gamma.-HIMACHALENE	1000140-08-0	C15H24	2026513	86.0	217
11.9996	Longifolene	475-20-7	C15H24	4288536	97.7	459
12.1004	cis-Thujopsene	470-40-6	C15H24	1276811	94.8	137
12.1823	.beta.-copaene	1000374-18-9	C15H24	675718	92.0	72
12.2138	(1R,4S,5S)-1,8-Dimethyl-4-(prop-1-en-2-yl)spiro[4.5]dec-7-ene	43219-80-3	C15H24	2760469	92.2	295
12.2674	Di-epi-.alpha.-cedrene	50894-66-1	C15H24	4634582	95.1	496
12.3399	Spiro[5.5]undec-2-ene, 3,7,7-trimethyl-11-methylene-, (-)-	18431-82-8	C15H24	1060910	95.3	114
12.4313	1,2,4-Methenoazulene, decahydro-1,5,5,8a-tetramethyl-, [1S-(1.alpha.,2.alpha.,3a.beta.,4.alpha.,8a.beta.,9R*)]-	1137-12-8	C15H24	760676	87.8	81
12.4722	Benzene, 1-methyl-4-(1,2,2-trimethylcyclopentyl)-, (R)-	16982-00-6	C15H22	1860024	97.2	199

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-323
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112410.D	Dilution	1
Sample Name	0005475-22		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/24/2020 2:52:27 PM		
Instrument Name	Chemstation3		



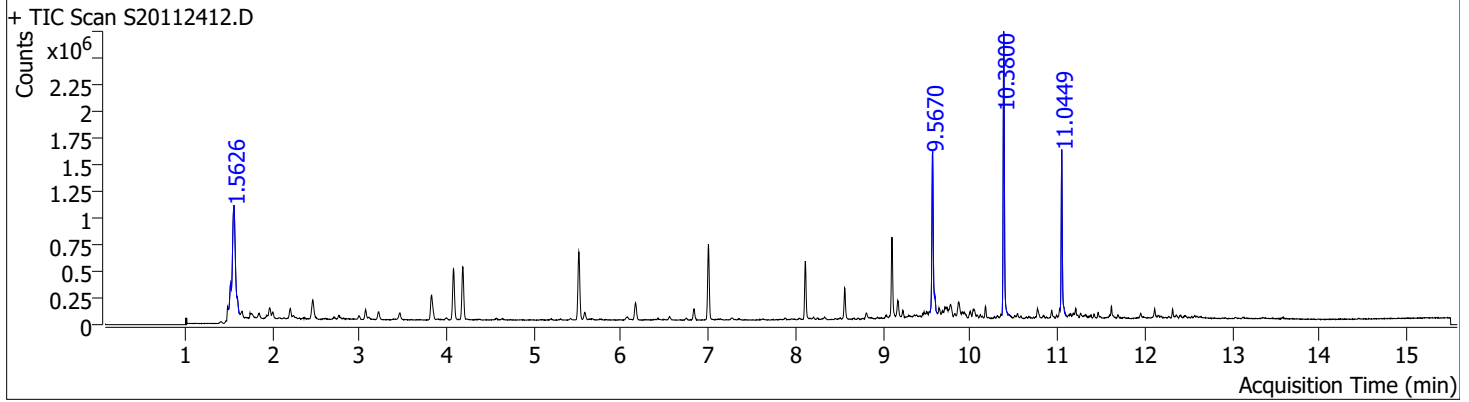
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5279	Dimethyl ether	115-10-6	C2H6O	2129484	95.5	280
1.5626	Chloromethane	74-87-3	CH3Cl	4333474	97.0	571
2.4670	Pentane, 2-methyl-	107-83-5	C6H14	992212	95.5	131
6.1635	Heptane, 2,4-dimethyl-	2213-23-2	C9H20	487424	95.3	50
8.5459	Heptane, 2,2,4,6,6-pentamethyl-	13475-82-6	C12H26	578136	96.0	60

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112411.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-23	Client Sample	SG-324
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/24/2020 3:15:58 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



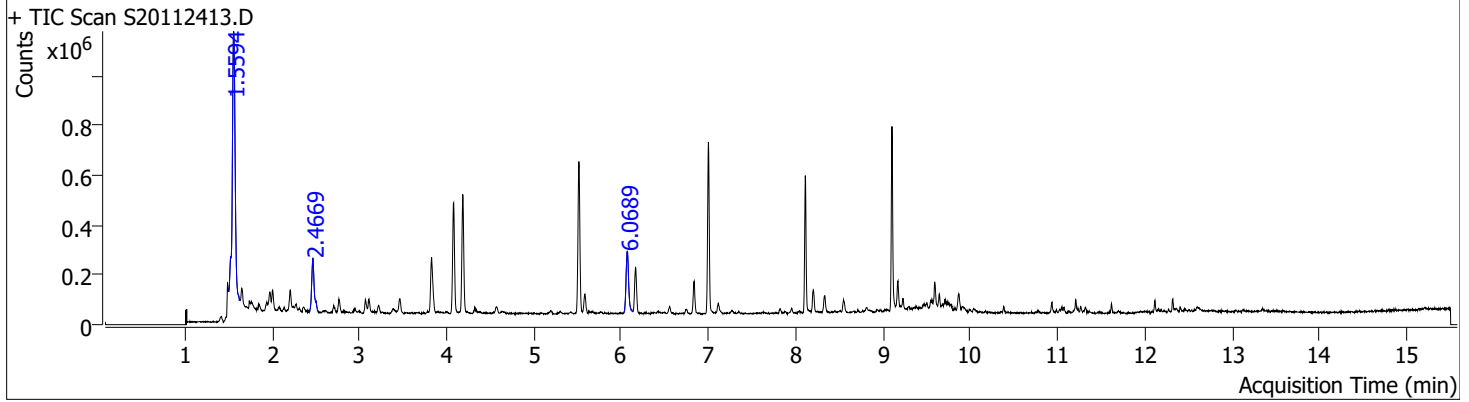
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5247	Dimethyl ether	115-10-6	C ₂ H ₆ O	1345170	95.3	181
1.5625	Chloromethane	74-87-3	CH ₃ Cl	3270439	96.1	440

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-325
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112412.D	Dilution	1
Sample Name	0005475-24		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/24/2020 3:39:23 PM		
Instrument Name	Chemstation3		



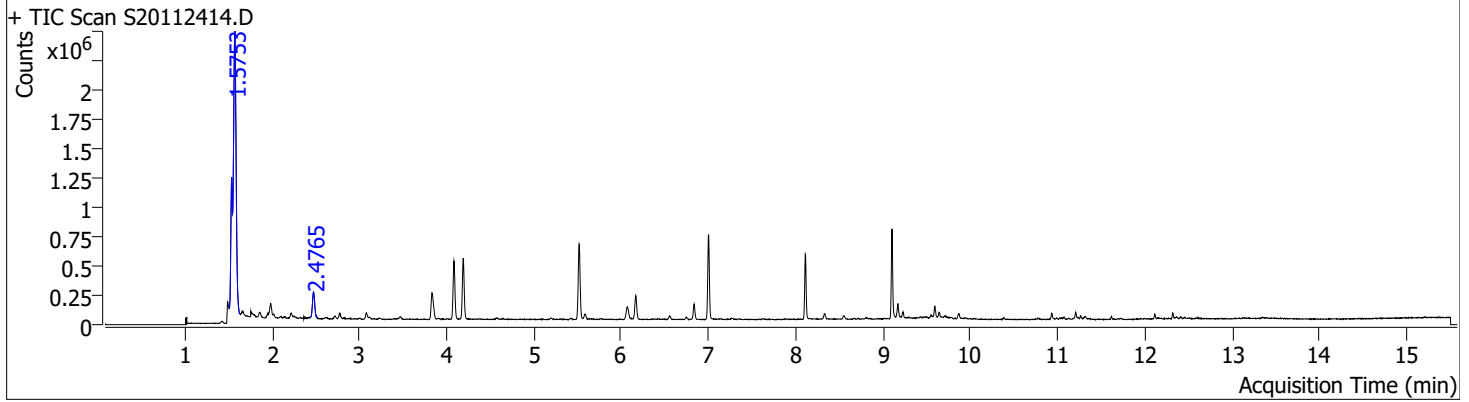
RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5248	Dimethyl ether	115-10-6	C2H6O	533806	85.0	75
1.5626	Chloromethane	74-87-3	CH3Cl	2480592	94.6	347
9.5670	Undecane	1120-21-4	C11H24	1983856	95.3	278
10.3800	Dodecane	112-40-3	C12H26	2759322	95.7	386
11.0449	Tridecane	629-50-5	C13H28	1470890	96.2	206

Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112413.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-25	Client Sample	SG-326
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/24/2020 4:02:52 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5594	Chloromethane	74-87-3	CH3Cl	2715823	94.5	409
2.4669	Pentane, 2-methyl-	107-83-5	C6H14	443236	93.2	67
6.0689	Cyclotrisiloxane, hexamethyl-	541-05-9	C6H18O3Si3	529477	95.8	59

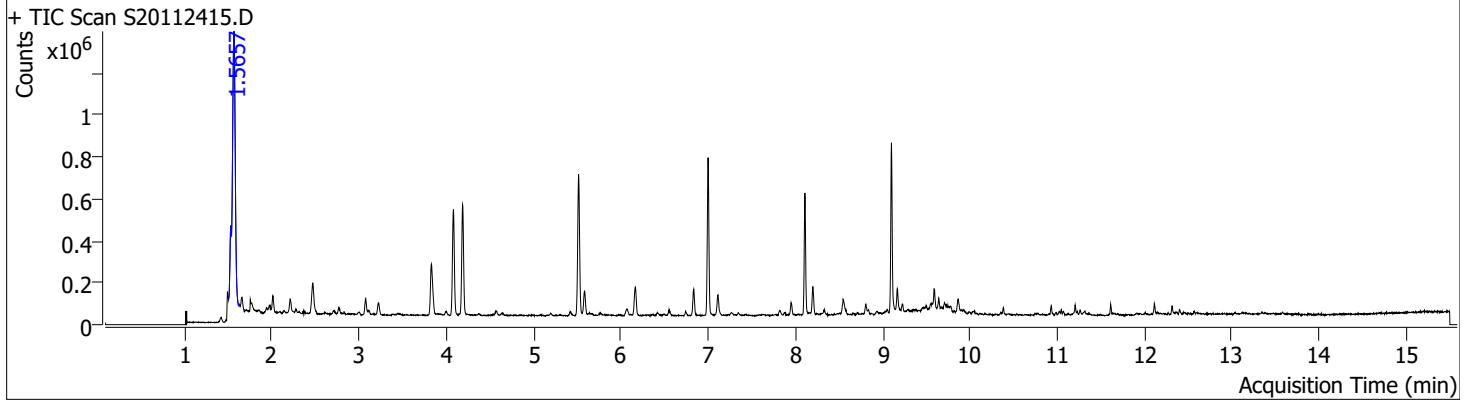
Batch Path	F:\gcms\1\data\5475 TICs		
Analysis File Name	5475_TICs_Analysis.uaf		
Analyst Name	Kenny		
Analysis Time	12/1/2020 2:06:46 PM		
Data File Name	S20112414.D	Data Path Name	F:\gcms\1\data\5475 TICs
Sample Name	0005475-26	Client Sample	SG-327
Acq Method File	STANDARDVOA_EXT.M	Acq Method Path	
Acq Time	11/24/2020 4:26:23 PM	Operator	KAI
Instrument Name	Chemstation3	Dilution	1



RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5374	Dimethyl ether	115-10-6	C ₂ H ₆ O	1532933	95.5	210
1.5753	Chloromethane	74-87-3	CH ₃ Cl	5203595	97.1	713
2.4765	Pentane, 2-methyl-	107-83-5	C ₆ H ₁₄	413538	93.1	57

EXHIBIT 3

Batch Path	F:\gcms\1\data\5475 TICs	Data Path Name	F:\gcms\1\data\5475 TICs
Analysis File Name	5475_TICs_Analysis.uaf	Client Sample	SG-328
Analyst Name	Kenny	Acq Method Path	
Analysis Time	12/1/2020 2:06:46 PM	Operator	KAI
Data File Name	S20112415.D	Dilution	1
Sample Name	0005475-27		
Acq Method File	STANDARDVOA_EXT.M		
Acq Time	11/24/2020 4:49:50 PM		
Instrument Name	Chemstation3		



RT	Compound Name	CAS#	Formula	Area	Match Score	ng
1.5279	Dimethyl ether	115-10-6	C ₂ H ₆ O	624982	92.0	82
1.5657	Chloromethane	74-87-3	CH ₃ Cl	3043326	95.6	401